

Supporting Information

**Distinct Sustainable Carbon Nanodots Enable Free Radical  
Photopolymerization, Photo-ATRP and Photo-CuAAC Chemistry**

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## 1. Experimental and methods

### 1.1 Materials

Lac dyes were obtained from Research Institute of Resource Insects, Chinese Academy of Forestry. Sodium alginate was purchased from Hai Zhilin Co. Ltd. (Qingdao, China). Citric acid was received from Aladdin (Shanghai, China). Ethylenediamine was purchased from Sigma-Aldrich (Shanghai, China). Solvents were obtained from Aladdin or Tokyo Chemical Industry (Shanghai, China). Deionized water was produced using a Smart-RO ultrapure water system (Hitech Instruments Co., Ltd., Shanghai, China). **CD-4** and **CD-5** were prepared according to the reported method.<sup>[1, 2]</sup> Tri(propylene glycol) diacrylate (TPGDA), methyl methacrylate (MMA) and styrene (St) were purchased from Sigma Aldrich and passed through a plug of basic alumina before use to remove the inhibitor and stored in the fridge. Dimethyl sulfoxide (DMSO, anhydrous, 99.8%) was purchased from Sigma Aldrich, and stored over activated molecular sieves (4Å). Copper(II)bromide (CuBr<sub>2</sub>), tris(2-pyridylmethyl) amine (TPMA, 98%), ethyl  $\alpha$ -bromophenylacetate (EBPA, 97%), methanol (99.9%), benzyl azide (98%), phenylacetylene (98%), *N,N,N',N'',N'''*-pentamethyldiethylenetriamine (PMDETA, 99%), and bis(4-tert-butylphenyl)iodonium hexafluorophosphate (ISPF6-, 98%) were purchased from Sigma Aldrich used as received. Iodonium salts (S2617 and S2430) were received from FEW Chemicals GmbH as commercially available materials. They relate to the following abbreviations: **1a**: ISPF6, **1b**: S2430, and **1c**: S2617.

### 1.2 Characterization

#### 1.2.1 Fluorescence Lifetime Measurements

Fluorescence spectra were recorded with a FluoTime 300 from PicoQuant GmbH operating in Time Correlated Single Photon Counting (TCSPC) mode. It was equipped with a Xe-lamp to take steady state spectra and a laser diode emitting at 376 nm exhibiting FWHM of about 80 ps. A double monochromator was placed in L-geometry at both the emission side and the excitation side if recording of excitation spectra is required. The spectrometer was fully automatized facilitating automatic adjustment of optimal excitation intensity and spectral resolution depending on emission intensity. All measurements were pursued at the magic angle. Time resolution of the instrument is >50 ps. More details are available from the supplier.

All liquid samples were measured in 1 cm quartz cuvettes keeping the OD below 0.2 to keep reabsorption events on a small level. Solid state samples available as powder were taken in front face mode.

Data were analyzed with the software from Picoquant being part of the entire instrument giving also access to global analysis of fluorescence decays taken in 20 nm intervals from the begin of emission in the blue part to the tail of fluorescence in the red part of the emission spectrum. These decays were globally linked over the wavelengths where they were recorded and fit by iterative convolution. Here, the time dependent decay ((Dec(t))) can be described by iterative convolution between exponential functions  $\tau_i$ , ( $i$  = number necessary exponential functions) instrumental response function taken with a scattering solution at each emission wavelength based on Eq. 1. It also includes the respective background for the decay ( $Bkgr_{dec}$ ) and instrumental response function ( $Bkgr_{IRF}$ ). Additional time shifts caused by the setup are considered for the sample ( $t'$ ) and instrumental function ( $Shift_{IRF}$ ). Respective

preexponential factors for the sample ( $A_i$ ) and the scatter ( $A_{\text{Scatt}}$ ) adjust the overall intensity of  $\text{Dec}(t)$ . Calculation of the preexponential factors for each component proceeded according to Eq. 2.

$$\text{Dec}(t) = \left[ \int_0^t dt' [\text{IRF}(t - \text{Shift}_{\text{IRF}}) - \text{Bkgr}_{\text{IRF}}] \left[ \sum_{i=1}^{n_{\text{Exp}}} A_i e^{-\frac{t-t'}{\tau_i}} + A_{\text{Scatt}} \delta(t - t') \right] \right] + \text{Bkgr}_{\text{dec}} \quad (1)$$

$$A_{\text{Rel},m} = \frac{A_m}{\sum_{\substack{i=1 \\ A_i > 0}}^n A_i} \quad (2)$$

### 1.2.2 Transmission Electron Microscopy (TEM)

TEM was conducted using a JEM 2100 transmission electron microscope (JEOL Ltd., Tokyo, Japan), at an accelerating voltage of 200 kV.

### 1.2.3 X-ray Photoelectron Spectroscopy (XPS)

XPS experiments were performed using ESCALAB 250x X-ray photoelectron spectrometer (American Thermo Co., Ltd., Waltham, Massachusetts) with a monochromatic Al K $\alpha$  X-ray source.

### 1.2.4 Gel Permeation Chromatography (GPC)

GPC was used to determine number average molecular weight ( $M_n$ ) and dispersity ( $\mathcal{D}$ ) values. GPC measurements were conducted with a GPC Viscotek 270 max using TGuard Col 10 x 4.6 mm and two T6000M General Mixed 3000 x 7.8 mm columns, a column temperature of 35°C, an RI detector, and tetrahydrofuran (THF) as an eluent at a flow rate of 1 mL/min. The column system was calibrated with 7 linear poly(methyl methacrylate) standards received from Shodex (1850 g $\times$ mol $^{-1}$ ; 6380 g $\times$ mol $^{-1}$ ; 20100 g $\times$ mol $^{-1}$ ; 73200 g $\times$ mol $^{-1}$ ; 218000 g $\times$ mol $^{-1}$ ; 608000 g $\times$ mol $^{-1}$ ; and 1050000 g $\times$ mol $^{-1}$ ). GPC data were analyzed using Omni SEC 4.6.2:GPC.

### 1.2.5 NMR Spectroscopy

Fourier 300 from Bruker was used for all  $^1\text{H}$ -NMR-measurements. 5-20 mg sample were dissolved in 0.7 mL solvent. This was pursued for all polymers before taking GPC data to ensure the absence of low molecular weight products.

### 1.2.6 UV-Visible Spectroscopy

UV/Vis/NIR spectrometer. Measurements of activation rate coefficients were performed on Agilent 8453 UV-Vis Spectrometer.

### 1.2.7 Photo-DSC

Measurements were performed as previously described using an UV or Vis LED emitting with an intensity of 100 mW/cm $^2$  at 405 nm, 10 mW/cm $^2$  at 525 nm and 200 mW/cm $^2$  at 660 nm for polymerization. Details about these measurements were earlier reported.<sup>[3]</sup> A regular photo-DSC setup was used to determine the photoinitiation efficiency of the different systems comprising **CDs** in the monomers. Each sample went through a syringe before used in the experiment. A LED-array emitting at the respective wavelengths was used for all exposure experiments. The light generated was collected with a lens and projected into a y-fiber, which was connected with the head of the DSC (Q2000 from TA- Instruments).

The output of each fiber arm was adjusted at the y-fiber with a strong emitting source (OmniCure HR4000 from TA-Instruments, coupled additionally to the DSC). This realized an almost equal intensity of each fiber arm being available for simultaneous exposure of both the sample and reference in the calorimeter providing an intensity of photons/cm<sup>2</sup> s. The LED-source was synchronized with the DSC by a shutter system placed between the fiber and the lens. It was controlled by an Arduino uno board, which was programmed with the program Arduino 1.05 available from Arduino. The software of the DSC controls the event-output of this instrument functioning as digital switch. Change of resistance resulted in an ON (no resistance)/OFF (infinite resistance) modulation. This information went to the Arduino uno board controlling the shutter in ON/OFF position by a servomotor.

The DSC delivered the heat flow in J/s, which yields the polymerization rate  $R_p$  from where the maximum as one representative parameter disclosing reactivity can be obtained. Integration of  $R_p$  with respect to the time results in the conversion degree  $x$ .

#### 1.2.8 Flow cytometry

AnnexinV FITC/PI tool kit and flow cytometry were used to determine the cellular cytotoxicity of **CDs**. Specifically, MCF-10A cells were inoculated into 6-well plates with  $5 \times 10^5$  cells per well. After the cells grew to more than 80%, sample ( $400 \mu\text{g mL}^{-1}$ ) was added and incubated for 4 hours. The cells were digested and collected with trypsin, centrifuged at  $2000 \text{ rpm min}^{-1}$  for 5 min and washed with PBS buffer twice ( $2000 \text{ rpm min}^{-1}$  for 5 min). After that, the cells were then resuspended in Binding Buffer. Fluorescence was then observed with flow cytometer after AnnexinV FITC ( $5 \mu\text{L}$ ) and Propidium Iodide ( $5 \mu\text{L}$ ) being added and reacted at room temperature in dark environment for 10 min. The company Maiying Biotech pursued the experiments.

#### 1.2.9 Cyclic voltammetry

Electrochemical experiments were performed with an CHI660E potentiostat (Chenhua Company, Shanghai, China) in a conventional three-electrode cell. The electrode assembly consists of a platinum wire as the counter electrode, a standard calomel electrode (SCE) as the reference electrode, and a glass carbon (GC) electrode as the working electrode. The measurement buffer contains 1 M KCl and 5 mM  $[\text{Fe}(\text{CN})_6]^{4-/3-}$  as redox indicator. Cyclic voltammetry (CV) was recorded in the range from  $-1$  to  $1$  V with a scan rate of  $0.01 \text{ V s}^{-1}$ .

### 1.3 Synthetic Methods

#### 1.3.1 Preparation of **CD**

-1

A mixture of Lac dyes (100 mg) and DMF (10 mL) were placed in a reaction kettle and heated at  $180 \text{ }^\circ\text{C}$  for 8 h. The reaction vessel was allowed to cool naturally to room temperature and the solution was freeze-dried to provide **CD-1**.

### 1.3.2 Preparation of **CD-2**

A mixture of Lac dyes (100 mg), DMF (10 mL) and ethylenediamine (62  $\mu$ L) were placed in a reaction kettle and heated at 180 °C for 8 h. The reaction vessel was allowed to cool naturally to room temperature and the solution was freeze-dried to provide **CD-2**.

### 1.3.3 Preparation of **CD-3**

A mixture of Lac dyes (100 mg), DMF (10 mL) and ethylenediamine (124  $\mu$ L) were placed in a reaction kettle and heated at 180 °C for 8 h. The reaction vessel was allowed to cool naturally to room temperature and the solution was freeze-dried to provide **CD-3**.

### 1.3.4 Preparation of **CD-4**

A mixture of sodium alginate (750 mg), H<sub>2</sub>O (50 mL) and ethylenediamine (500  $\mu$ L) was placed in a reaction kettle and heated at 180 °C for 8 h. The reaction vessel was allowed to cool naturally to room temperature and the solution was freeze-dried to provide **CD-4**. More details were previously disclosed.<sup>[1, 2]</sup>

### 1.3.5 Preparation of **CD-5**

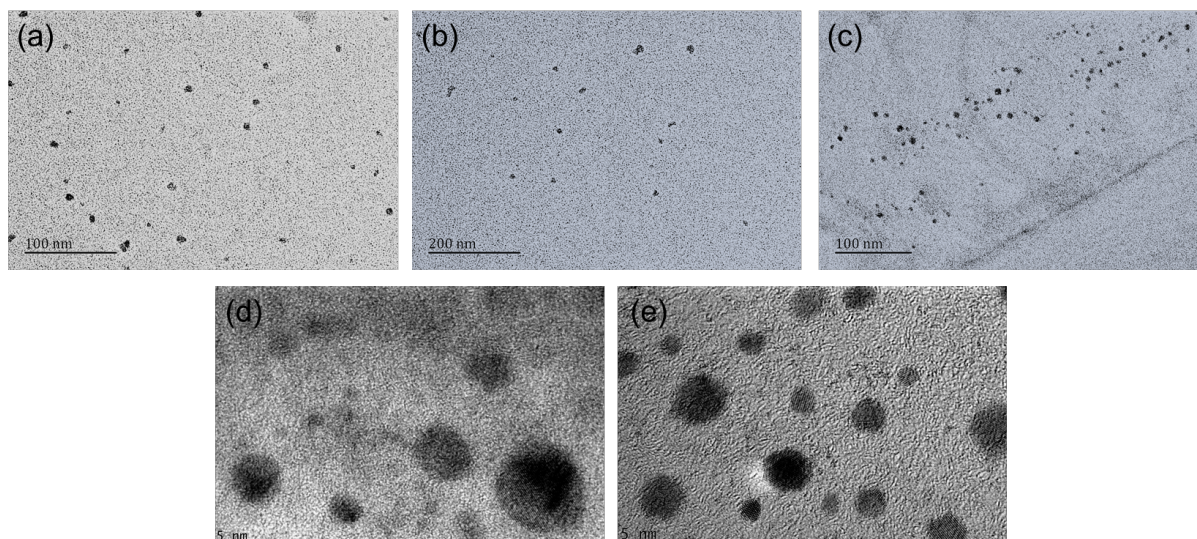
A mixture of citric acid (1050 mg), H<sub>2</sub>O (10 mL) and ethylenediamine (335  $\mu$ L) were placed in a reaction kettle and heated at 150 °C for 5 h. The reaction vessel was allowed to cool naturally to room temperature and the solution was freeze-dried to provide **CD-5**. More details were previously disclosed.<sup>[2]</sup> XPS of **CD-5** was reported in previous paper. <sup>[2]</sup>

## 2. Complementary Results

### 2.1 Characterization of the CDs

#### 2.1.1 TEM Measurements to evaluate particle size in the dispersions

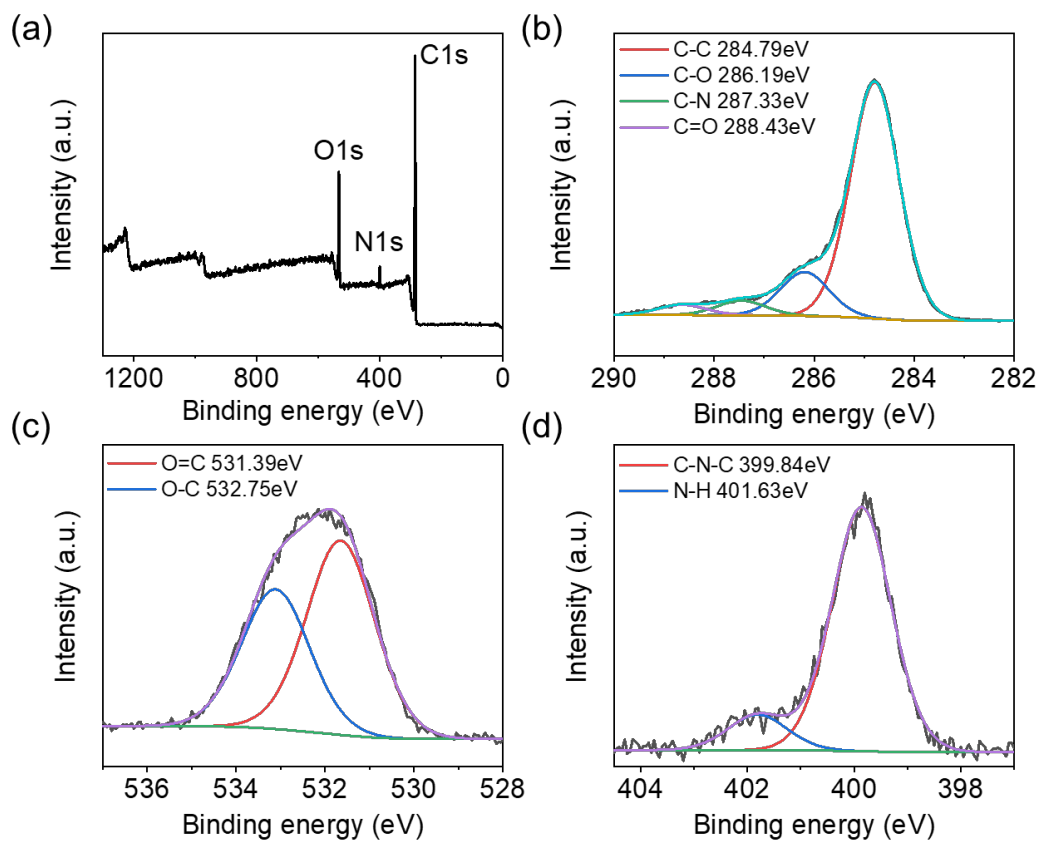
TEM measurements were pursued to justify the heterogeneity. Based on the fact the **CDs** exhibit a size of 10 nm or less, one may get the impression to work with a homogeneous solution, which was not the case. All slides nicely show the appearance of the **CDs** in the dispersions.



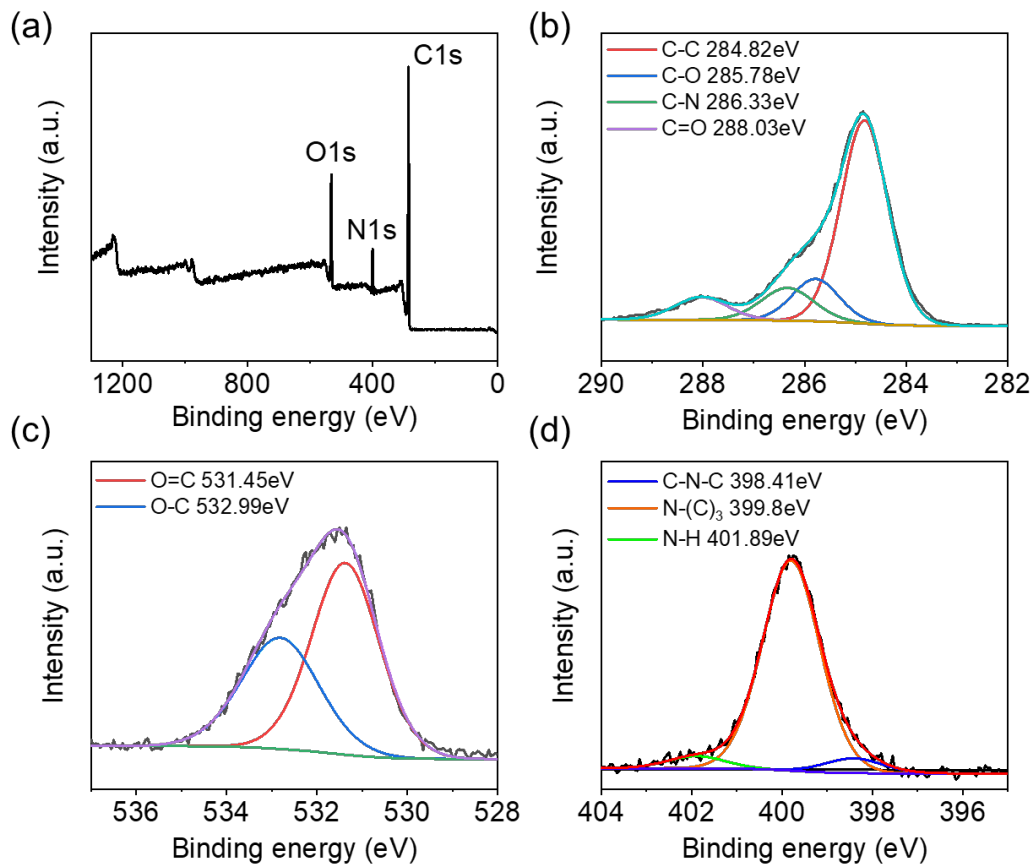
**Figure S1.** TEM images of a) **CD-1**, b) **CD-2**, c) **CD-3** d) **CD-4**, and **CD-5**.

#### 2.1.2 XPS Measurements to evaluate the composition of the **CDs**

XPS measurements were carried to quantify the amount on hetero atoms in the nanoparticles. It also images the contribution distinct moieties (C=O, C-O, N, NH, ...). They are different for each **CD** showing that they comprise different structural moieties.

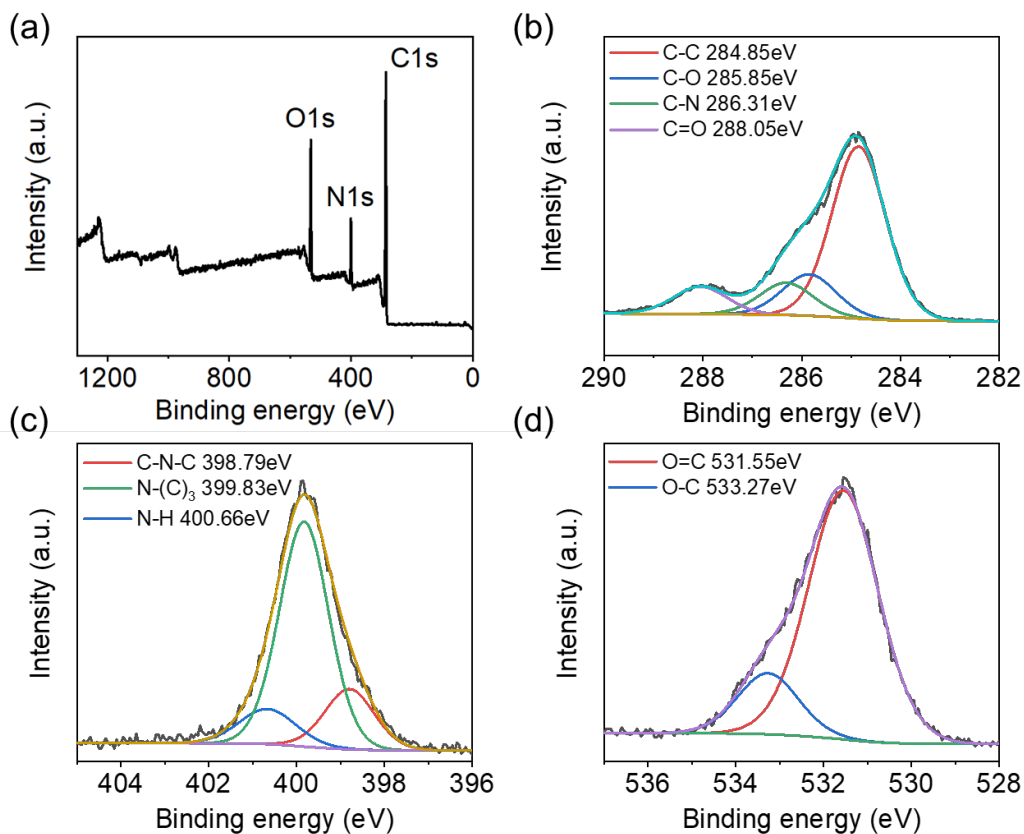


**Figure S2.** a) XPS survey of **CD-1**, b) C1s scan of **CD-1**, c) O1s scan of **CD-1** and d) N1s scan of **CD-1**. (C: ~80%, N: ~4%, O: ~16%).

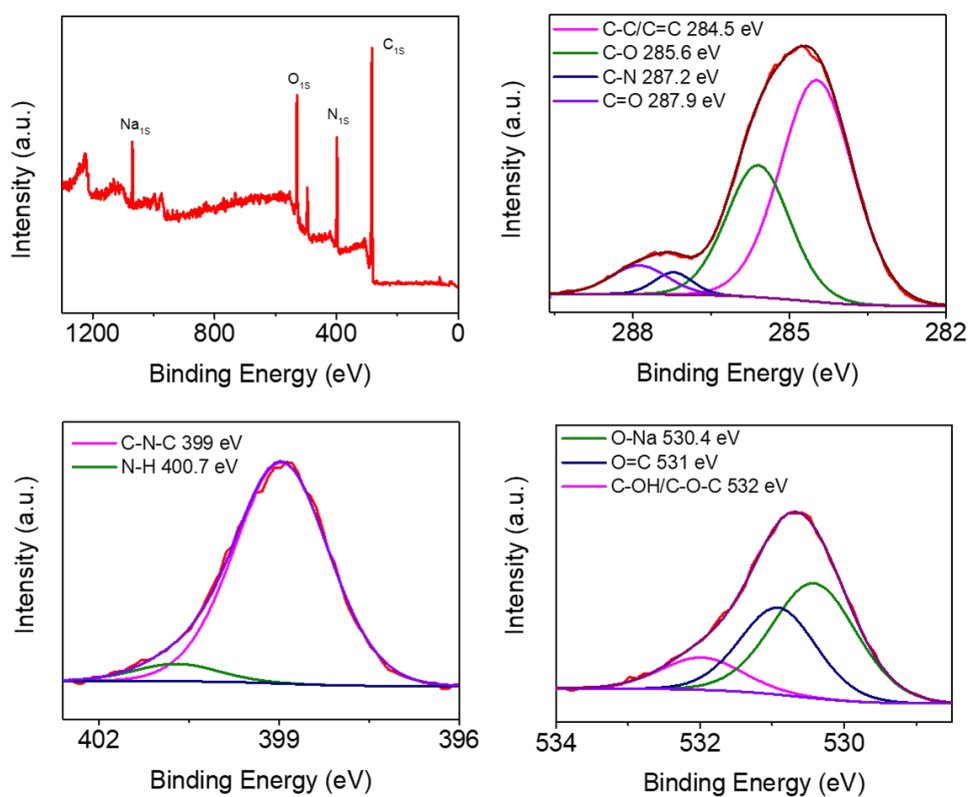


**Figure S3.** a) XPS survey of **CD-2**, b) C1s scan of **CD-2**, c) O1s scan of **CD-2** and d) N1s scan of **CD-2**. (C: ~77%, N: ~8%, O: ~15%)





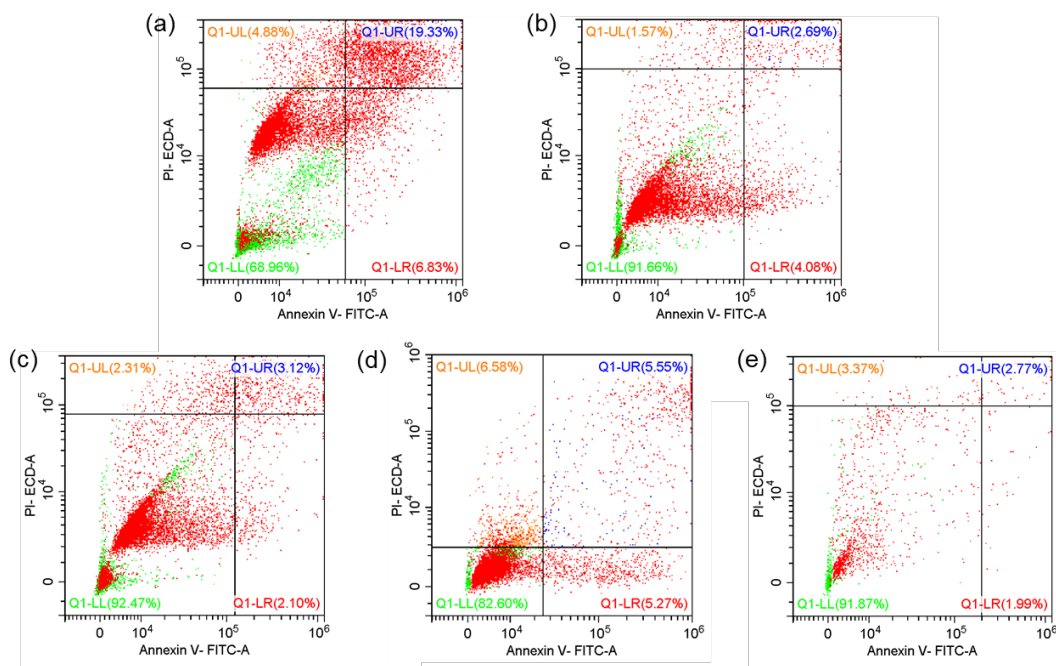
**Figure S4.** a) XPS survey of **CD-3**, b) C1s scan of **CD-3**, c) O1s scan of **CD-3** and d) N1s scan of **CD-3**. (C:~73%, N:~12%, O:~15%).



**Figure S5.** a) XPS survey of **CD-4**, b) C1s scan of **CD-4**, c) O1s scan of **CD-4** and d) N1s scan of **CD-4**. (C:~69%, N:~16%, O:~12%, Na: ~3%).

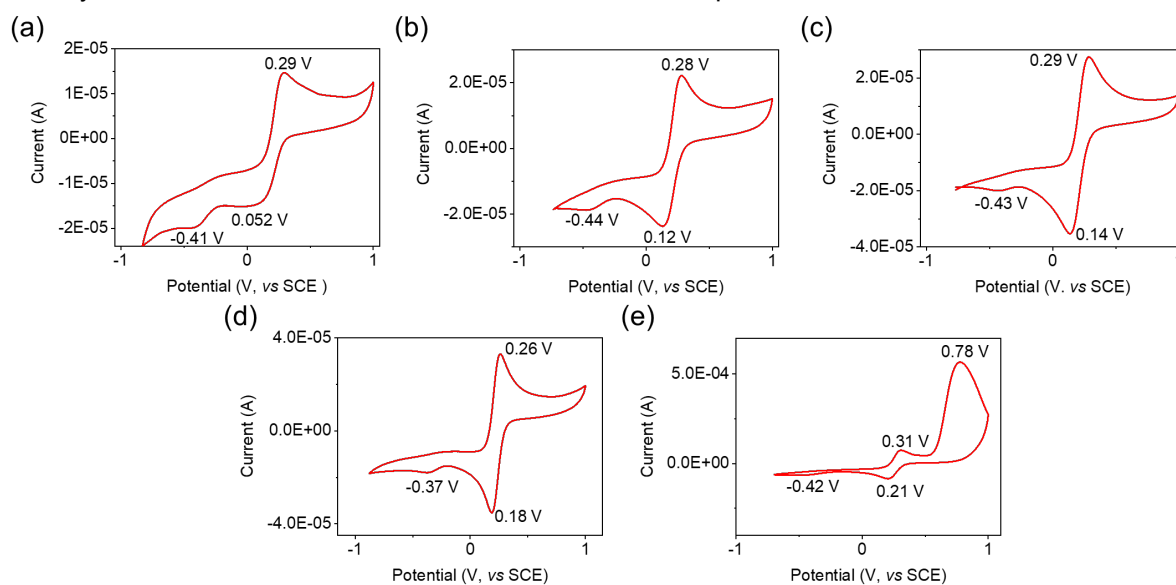
### 2.1.3 Flow cytometric measurements to evaluate toxicity

These experiments imaged the cell viability after adding the **CDs**. Data showed no issue regarding cytotoxicity.



**Figure S6.** The apoptosis level of MCF-10A cells after treatment of a) **CD-1**, b) **CD-2**, c) **CD-3**, d) **CD-4** and e) **CD-5** (concentration = 400  $\mu\text{g/mL}$ ) determined by flow cytometry.

### 2.1.4 Cyclic voltametric measurements to evaluate the redox potentials



**Figure S7.** CV spectra of a) **CD-1**, b) **CD-2**, c) **CD-3**, d) **CD-4** and e) **CD-5**.

Data for **CD-5** were published elsewhere.<sup>[2]</sup>

## 2.2 Photopolymerization

### 2.2.1 Controlled photopolymerization sensitized by **CDs**

*General procedure for photo-induced ATRP of MMA:* A vial equipped with a magnetic stir bar and fitted with a Teflon screw cap septum was charged with **CDs** (3 mg) and 1 mL of DMSO. To this mixture MMA (1 mL), 5.20  $\mu\text{L}$  of a 180 mM CuBr<sub>2</sub> stock solution in DMSO and 15.6  $\mu\text{L}$  of a 270 mM TPMA stock solution in DMSO and ethyl  $\alpha$ -bromophenylacetate (5.5  $\mu\text{L}$ ) was added and the solution was homogenized by stirring. The solution was transferred to a Schlenk Flask with a magnetic stirrer and degassed by four Freeze-Pump-Thaw cycles. The reaction mixture was irradiated at 405 nm in a distance of 5 cm. Solution was stirred during exposure. At the end of the irradiation, the resulting polymer was precipitated in methanol and then dried under reduced pressure. Conversion was determined gravimetrically.

*Block copolymerization experiment (PMMA-*b*-PSt):* A vial equipped with a magnetic stir bar and fitted with a Teflon screw cap septum was charged with PMMA macroinitiator (0.676 g, 0.045 mmol), 7.5  $\mu\text{L}$  of a 180 mM CuBr<sub>2</sub> stock solution in DMSO (1.35  $\mu\text{mol}$ ) and 45  $\mu\text{L}$  of a 270 mM TPMA stock solution in DMF (6.09  $\mu\text{mol}$ ). Styrene (1.38 g, 13.5 mmol) and DMSO (1.38 g) were added to this mixture, and the resulting solution was homogenized by vigorous stirring. The solution was transferred to a Schlenk Flask comprising a magnetic stirrer and degassed by four Freeze- Pump-Thaw cycles. The reaction mixture was placed in a photoreactor and irradiated at 790 nm. The resulted polymers were precipitated in methanol at the end of the irradiation, and then dried under reduced pressure. Conversion was determined gravimetrically.

*Light on-off experiments:* A vial equipped with a magnetic stir bar and fitted with a Teflon screw cap septum was charged with **CDs** (3 mg) and 1 mL of DMSO. To this mixture MMA (1 mL), 5.20  $\mu\text{L}$  of a 180 mM CuBr<sub>2</sub> stock solution in DMSO and 15.6  $\mu\text{L}$  of a 270 mM TPMA stock solution in DMSO and ethyl  $\alpha$ -bromophenylacetate (5.5  $\mu\text{L}$ ) was added and the solution was homogenized by stirring. The solution was transferred to a Schlenk Flask with a magnetic stirrer and degassed by four Freeze-Pump-Thaw cycles. The reaction tube was exposed to repeated cycles at 405 nm for 30 minutes and kept in dark for 30 minutes. In these subsequent intervals, 1 mL volumes of reaction mixture were syringed out from the polymerization media and precipitated in methanol. Next, the polymers were analyzed gravimetrically to determine the conversions. The molecular weight was analyzed by GPC. Exposure occurred under conditions as mentioned *vide supra*.<sup>[1]</sup>

*Kinetic studies of the polymerization:* A vial equipped with a magnetic stir bar and fitted with a Teflon screw cap septum was charged with **CDs-2** (3 mg) and 1 mL of DMSO. To this mixture MMA (1 mL), 5.20  $\mu\text{L}$  of a 180 mM CuBr<sub>2</sub> stock solution in DMSO and 15.6  $\mu\text{L}$  of a 270 mM TPMA stock solution in DMSO and ethyl  $\alpha$ -bromophenylacetate (5.5  $\mu\text{L}$ ) was added and the solution was homogenized by stirring. The solution was transferred to a Schlenk Flask with a magnetic stirrer and degassed by four Freeze-Pump-Thaw cycles. The reaction tube was exposed at 405 nm and every 30 minutes 1 mL volumes of reaction mixture was syringed out from the polymerization media and precipitated in methanol. Next, the polymers were analyzed gravimetrically to determine the conversions. The

molecular weight was analyzed by GPC. Exposure occurred under conditions as mentioned *vide supra*.<sup>[1]</sup>

**Table S1.** Photoinduced Cu-Catalyzed ATRP of MMA using **CD-1** in Different Exposure Time under Blue Light LED irradiation at 405 nm<sup>[a]</sup>

Run	Time (h)	Conv. (%)	$M_{n,th}$ (g/mol)	$M_{n,GPC}$ (g/mol)	$\mathcal{D}$
1	18	26.5	8052	8500	1.16
2	24	35.3	10855	12800	1.10
3	36	53	16160	16000	1.08
4	48	71	21570	19200	1.06

[a] [MMA]/[EBPA]/[CuBr<sub>2</sub>]/[TPMA]=300/1/0.03/0.135 using **CD-1** (3 mg) in 50 vol % DMSO and irradiated under blue light LED ( $\lambda=405$  nm, 100 mW/cm<sup>2</sup>). Number-average molecular weight ( $M_n$ ) and dispersity ( $\mathcal{D}$ ) were obtained by gel permeation chromatography (GPC) in THF based on poly(methyl methacrylate) standards.

### 2.2.2 Free radical polymerization sensitized by **CDs**

**CD-1**, **CD-2**, and **CD-3** were made to expand the availability for excitation at longer wavelengths. These materials sufficiently absorb at the mentioned excitation wavelengths in Tables S2-S5.  $R_p^{max}$  relates to the maximum of the polymerization rate,  $t_{max}$  stands for time to approach  $R_p^{max}$  and  $x_\infty$  represents the conversion degree at very long exposure time when no polymerization anymore occurs. Tripropylene glycol diacrylate (TPGDA) served as monomer for all experiments.

**Table S2.** Photopolymerization of TPGDA using **CDs** with 405 nm LED (intensity: 200mW/cm<sup>2</sup>)

CD	IS	$R_p^{max}$ (s <sup>-1</sup> )	$t_{max}$	$x_\infty$	$\lambda_{exc}$ (nm)
<b>CD-1</b>	ISPF6 <sup>-</sup>	0.0040	33	0.56	405
	S2430	0.0048	27	0.60	405
	S2617	0.0079	27	0.62	405
<b>CD-2</b>	ISPF6 <sup>-</sup>	0.0050	19	0.54	405
	S2430	0.0079	18	0.58	405
	S2617	0.0097	19	0.59	405
<b>CD-3</b>	ISPF6 <sup>-</sup>	0.0033	19	0.46	405
	S2430	0.00113	17	0.61	405
	S2617	0.0035	19	0.46	405

**Table S3.** Photopolymerization of TPGDA Using CDs with 525 nm LED (intensity: 10mW/cm<sup>2</sup>)

CD	IS	$R_p^{max}$ (s <sup>-1</sup> )	$t_{max}$	$x_{\infty}$	Exposure time (min)	$\lambda_{exc}$ (nm)
CD-1	ISPF6 <sup>-</sup>	0.0003	23	0.02	10	525
	S2617	0.0005	31	0.01	10	525
	S2430	0.0005	32	0.11	10	525
CD-2	ISPF6 <sup>-</sup>	0.0009	20	0.13	10	525
	S2617	0.0008	19	0.14	10	525
	S2430	0.0018	18	0.32	10	525
CD-3	ISPF6 <sup>-</sup>	0.0005	22	0.08	10	525
	S2617	0.0005	20	0.08	10	525
	S2430	0.0018	18	0.30	10	525

**Table S4.** Photopolymerization of TPGDA using CDs with 525 nm LED (intensity: 10mW/cm<sup>2</sup>)

CD	IS	$R_p^{max}$ (s <sup>-1</sup> )	$t_{max}$	$x_{\infty}$	Exposure time (min)	$\lambda_{exc}$ (nm)
CD-1	ISPF6 <sup>-</sup>	0.0006	20	0.08	20	525
	S2617	0.0003	86	0.25	20	525
	S2430	0.0008	25	0.02	20	525
CD-2	ISPF6 <sup>-</sup>	0.0012	20	0.31	20	525
	S2617	0.0009	19	0.30	20	525
	S2430	0.0021	17	0.49	20	525
CD-3	ISPF6 <sup>-</sup>	0.0027	20	0.99	20	525
	S2617	0.0007	19	0.19	20	525
	S2430	0.0021	16	0.46	20	525

**Table S5.** Photopolymerization of TPGDA using CDs with 660 nm LED (intensity: 200 mW/cm<sup>2</sup>)

CD	IS	$R_p^{\max}$ (s <sup>-1</sup> )	$t_{\max}$	$x_{\infty}$	Exposure time (min)	$\lambda_{exc}$ (nm)
CD-1	ISPF6-	0.0005	22	0.08	10	660
	S2617	0.0001	38	0.03	10	660
	S2430	0.0002	49	0.03	10	660
CD-2	ISPF6-	0.0009	19	0.13	10	660
	S2617	0.0002	26	0.03	10	660
	S2430	0.0004	26	0.06	10	660
CD-3	ISPF6-	0.0003	23	0.02	10	660
	S2617	0.0022	23	0.22	10	660
	S2430	0.0008	20	0.1	10	660

## 2.3 Fluorescence decay analysis by global analysis

### 2.3.1 Selection of linked components

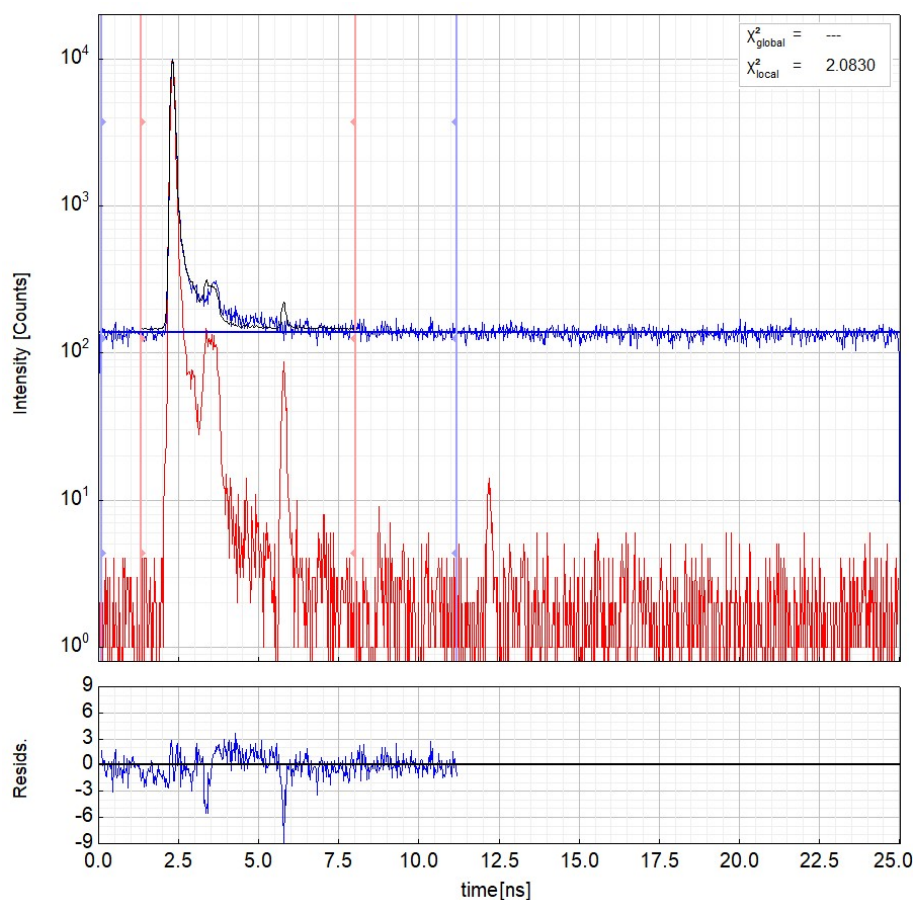
Fluorescence shown in this contribution were analyzed with four exponential functions while two of them were globally linked over all wavelengths from 520-720 nm. Decays were recorded in 20 nm intervals. Photons were counted until for both the sample and the scatter to take the IRF 10000 were filled in one channel.

This treatment sounds likely since **CD**-s do not belong to materials with defined molecular weight.

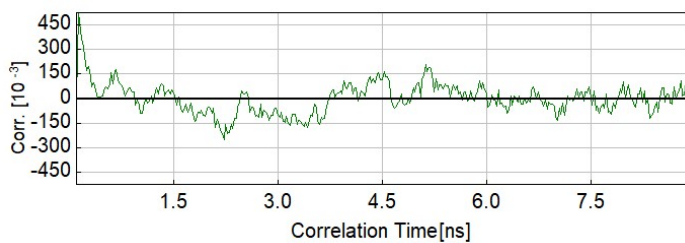
The respective results are compiled after the section author contributions.

## 2.3.2 Solid state results

Fit



Autocorrelation (Residuals)



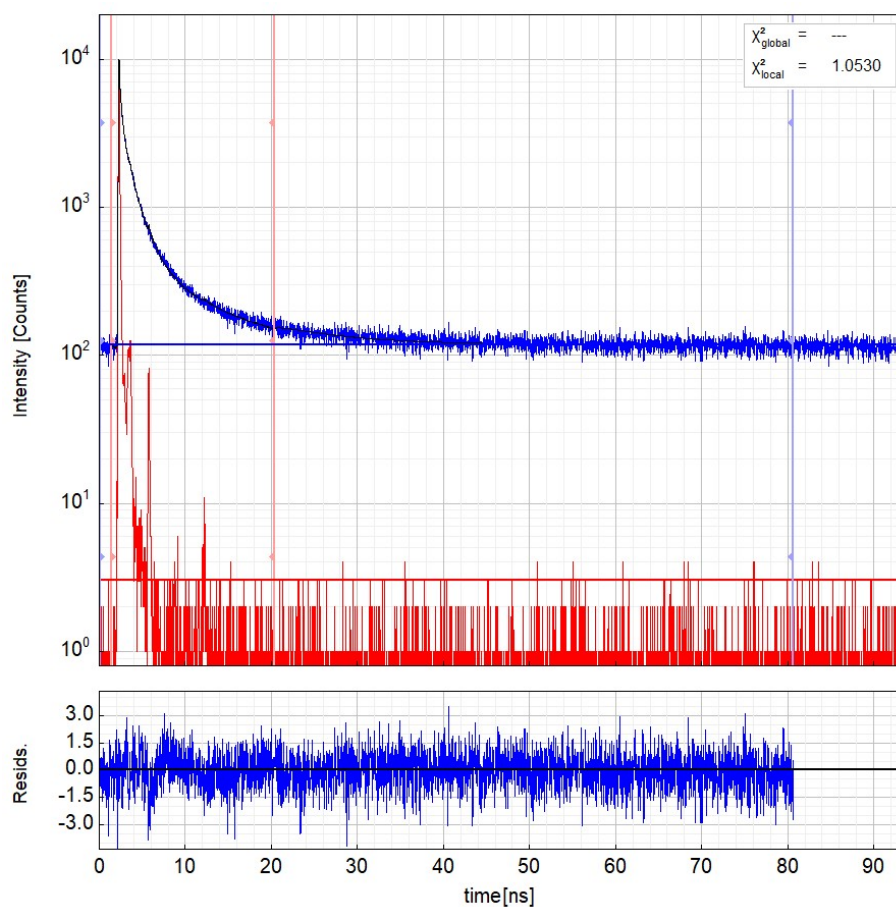
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.55	$\pm 0.25$	45%
$\tau_1$ [ns]	0.34	$\pm 0.27$	79%
$I_1$ [kCnts]	7.42	$\pm 0.40$	5.3%
$Bkg_{Dec}$ [kCnts]	0.1384	$\pm 0.0010$	0.7%
$Bkg_{IRE}$ [Cnts/Chnl]	-5.7	$\pm 3.3$	57%
$Shift_{IRE}$ [ps]	-13.25	$\pm 0.83$	6.3%
$A_{Scat}$ [kCnts]	66.07	$\pm 0.84$	1.3%

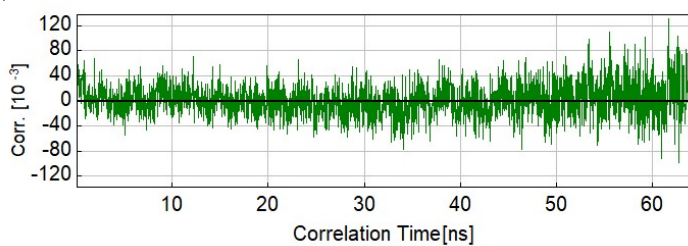
**Figure S8.** Fluorescence decay of CD-1 taken as powder at 590 nm while excitation occurred the diode laser at 376 nm.



Fit



Autocorrelation (Residuals)

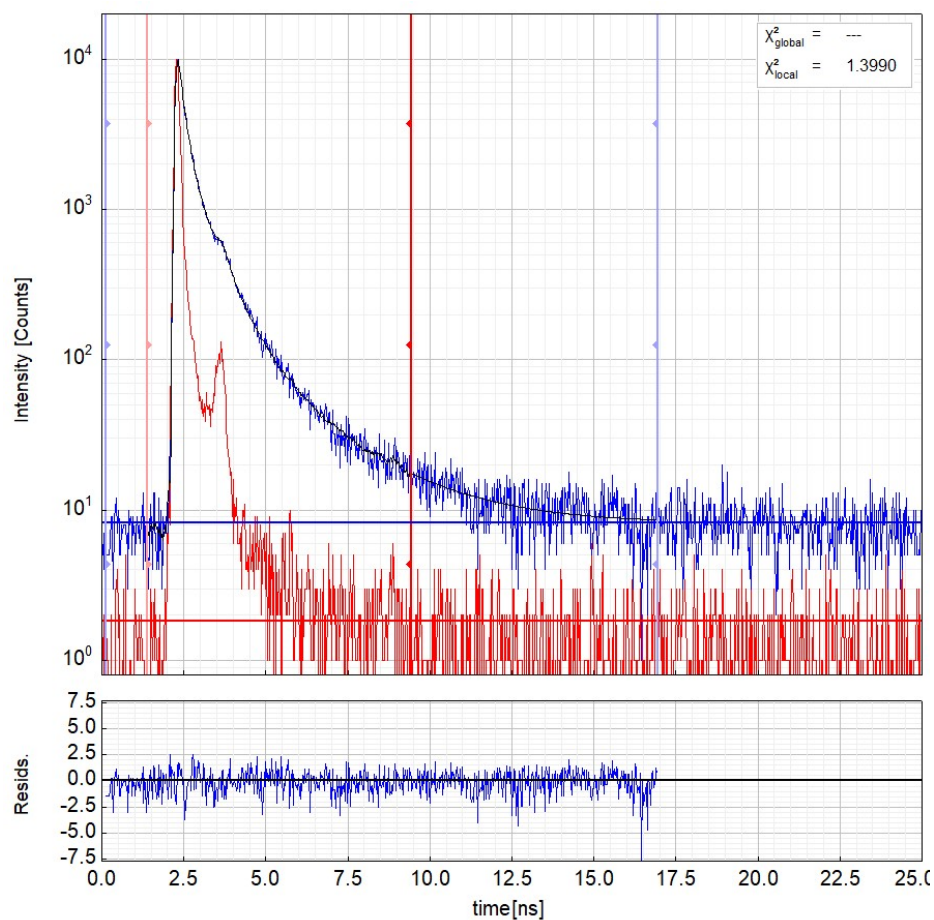


Fitted Parameters

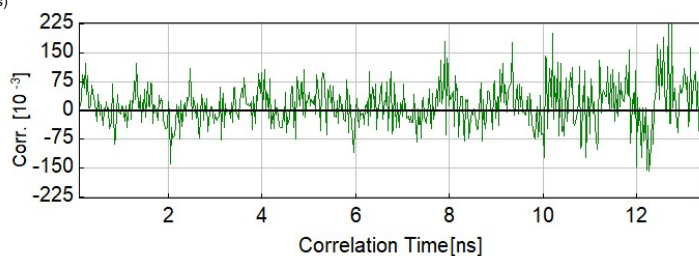
Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.385	$\pm 0.013$	3.3%
$\tau_1$ [ns]	8.57	$\pm 0.22$	2.5%
$I_1$ [kCnts]	131.8	$\pm 2.9$	2.2%
$A_2$ [kCnts/Chnl]	3.103	$\pm 0.090$	2.9%
$\tau_2$ [ns]	1.497	$\pm 0.037$	2.4%
$I_2$ [kCnts]	185.7	$\pm 2.5$	1.3%
$A_3$ [kCnts/Chnl]	4.97	$\pm 0.17$	3.4%
$\tau_3$ [ns]	0.324	$\pm 0.014$	4.1%
$I_3$ [kCnts]	64.3	$\pm 3.5$	5.4%
Bkg <sub>rec</sub> [kCnts]	0.1181	$\pm 0.0003$	0.2%
Bkg <sub>RF</sub> [Cnts/Chnl]	3.01	$\pm 0.38$	12%
Shift <sub>RF</sub> [ps]	-1.83	$\pm 0.86$	47%
$A_{\text{Scat}}$ [kCnts]	39.1	$\pm 1.1$	2.6%

Figure S9. Fluorescence decay of CD-2 taken as powder at 600 nm while excitation occurred the diode laser at 376 nm.

Fit



Autocorrelation (Residuals)

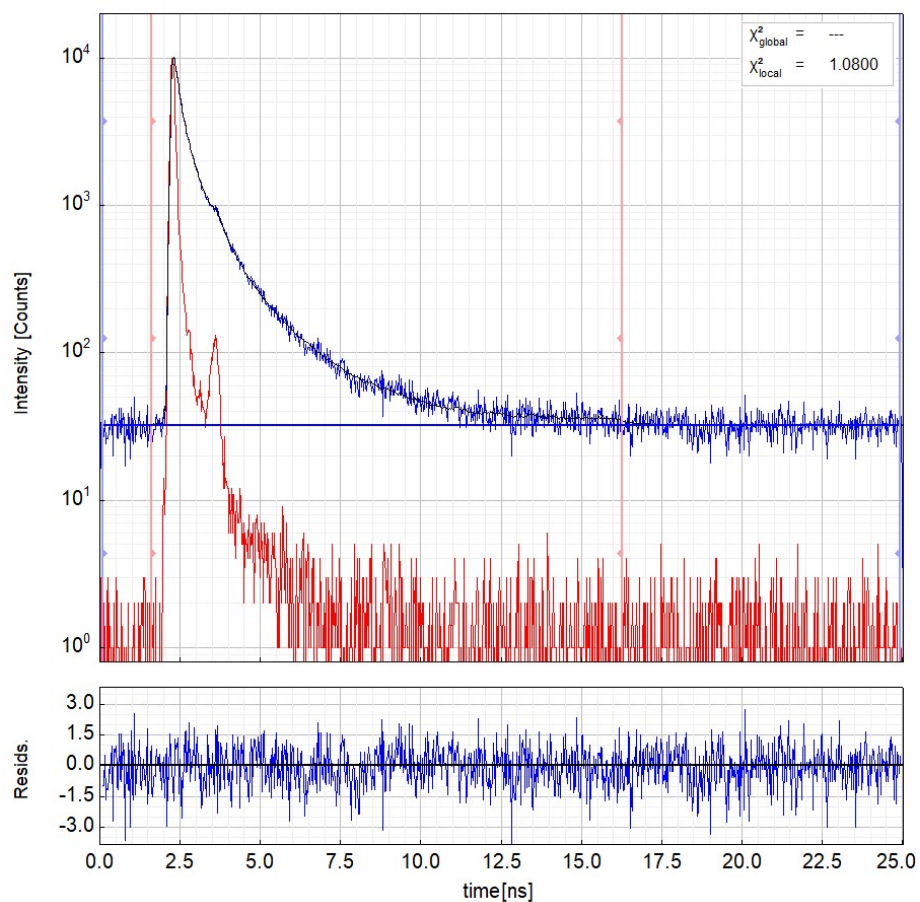


Fitted Parameters

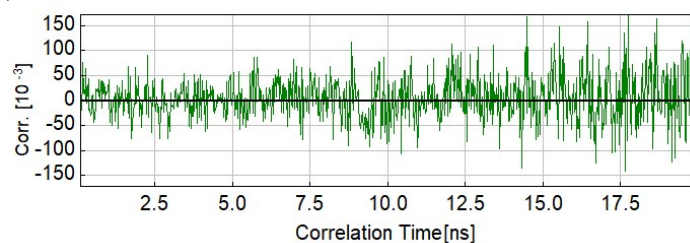
Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.187	$\pm 0.073$	39%
$\tau_1$ [ns]	2.36	$\pm 0.33$	14%
$I_1$ [kCnts]	17.6	$\pm 3.9$	22%
$A_2$ [kCnts/Chnl]	2.67	$\pm 0.25$	9.0%
$\tau_2$ [ns]	0.651	$\pm 0.062$	9.5%
$I_2$ [kCnts]	69.5	$\pm 2.3$	3.3%
$A_3$ [kCnts/Chnl]	11.75	$\pm 0.36$	3.0%
$\tau_3$ [ns]	0.1608	$\pm 0.0095$	5.9%
$I_3$ [kCnts]	75.6	$\pm 3.2$	4.2%
$Bkg_{Dye}$ [kCnts]	0.0083	$\pm 0.0004$	4.5%
$Bkg_{IRF}$ [Cnts/Chnl]	1.84	$\pm 0.42$	23%
$Shift_{IRF}$ [ps]	-26.18	$\pm 0.27$	1.0%
$A_{Scat}$ [kCnts]	28.27	$\pm 0.96$	3.4%

Figure S10. Fluorescence decay of CD-4 taken as powder at 700 nm while excitation occurred the diode laser at 376 nm.

Fit



Autocorrelation (Residuals)



Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.700	$\pm 0.092$	13%
$\tau_1$ [ns]	1.84	$\pm 0.11$	5.5%
$I_1$ [kCnts]	51.4	$\pm 5.0$	9.7%
$A_2$ [kCnts/Chnl]	11.54	$\pm 0.46$	3.9%
$\tau_2$ [ns]	0.150	$\pm 0.011$	6.7%
$I_2$ [kCnts]	68.9	$\pm 6.1$	8.8%
$A_3$ [kCnts/Chnl]	4.11	$\pm 0.47$	11%
$\tau_3$ [ns]	0.573	$\pm 0.043$	7.3%
$I_3$ [kCnts]	94.0	$\pm 3.6$	3.8%
Bkg <sub>Dee</sub> [kCnts]	0.0320	$\pm 0.0004$	1.1%
Bkg <sub>IRF</sub> [Cnts/Chnl]	0.20	$\pm 0.21$	105%
Shift <sub>IRF</sub> [ps]	-26.28	$\pm 0.60$	2.3%
$A_{Scat}$ [kCnts]	24.4	$\pm 1.9$	7.8%

Figure S11. Fluorescence decay of CD-4 taken as powder at 700 nm while excitation occurred the diode laser at 376 nm.

## References

- [1] C. Kütahya, P. Wang, S. Li, S. Liu, J. Li, Z. Chen, B. Strehmel, "Carbon Dots as a Promising Green Photocatalyst for Free Radical and ATRP-Based Radical Photopolymerization with Blue LEDs", *Angewandte Chemie International Edition* **2020**, *59*, 3166-3171.
- [2] P. Wang, D. Zheng, S. Liu, M. Luo, J. Li, S. Shen, S. Li, L. Zhu, Z. Chen, "Producing long afterglow by cellulose confinement effect: A wood-inspired design for sustainable phosphorescent materials", *Carbon* **2021**, *171*, 946-952.
- [3] T. Brömme, D. Oprych, J. Horst, P. S. Pinto, B. Strehmel, "New iodonium salts in NIR sensitized radical photopolymerization of multifunctional monomers", *RSC Advances* **2015**, *5*, 69915-69924.

## Author Contributions

CK performed all polymerization experiments, pursued fluorescence and absorption experiments, and co-authored manuscript-writing, YZ carried out the synthetic experiments of carbon dots, SLi analyzed XPS spectra of all the carbon dots and co-authored manuscript-writing, SL analyzed CV spectra of all the carbon dots, JL gave the synthetic strategies of **CD-1-3** and co-authored manuscript-writing, VS led polymer analysis and analyzed analytical data and co-authored manuscript-writing, ZC participated in the conception and design of the research, organized to get the cytotoxicity data and took lead in writing the manuscript (shared with bs), and BS supervised the project, designed and pursued the fluorescence experiments and took lead (shared with ZC) to write the manuscript.

## Results of Global Analysis Obtained in DMSO at Different Wavelengths

# EasyTau Report

9/4/2020 7:31:23 PM



## Container Curves

TRES+IRF\_20200617\_1546.etc: crv[0 - 12]

## Container Properties

Measurement Context: Time Resolved Emission Scan

Detection Wavelength: 520.0 - 740.0 (Step: 20.0) nm

Summary:

Sample: CD1  
Solvent: Dimethyl sulfoxide  
Excitation: V pol 376±1nm with LDH-P-C-375  
Detection: M pol 520...740nm 20nm steps  
19.0s integration time  
grating 1200/500+  
detector UV-red [PMT]

## Comment

[\[Edit Comment\]](#)

## Model: Exponential [Reconv.]

$$\text{Dec}(t) = \left[ \int_{-\infty}^t dt' [\text{IRF}(t - \text{Shift}_{\text{IRF}}) - \text{Bkg}_{\text{IRF}}] \left[ \sum_{i=1}^{n_{\text{Exp}}} A_i e^{-\frac{t-t'}{\tau_i}} + A_{\text{Scatt}} \delta(t-t') \right] \right] + \text{Bkg}_{\text{Dec}}$$

$$I_m = A_m \tau_m$$

$$A_{\text{Rel } m} = A_m / \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i$$

$$I_{\text{Rel } m} = I_m / \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i$$

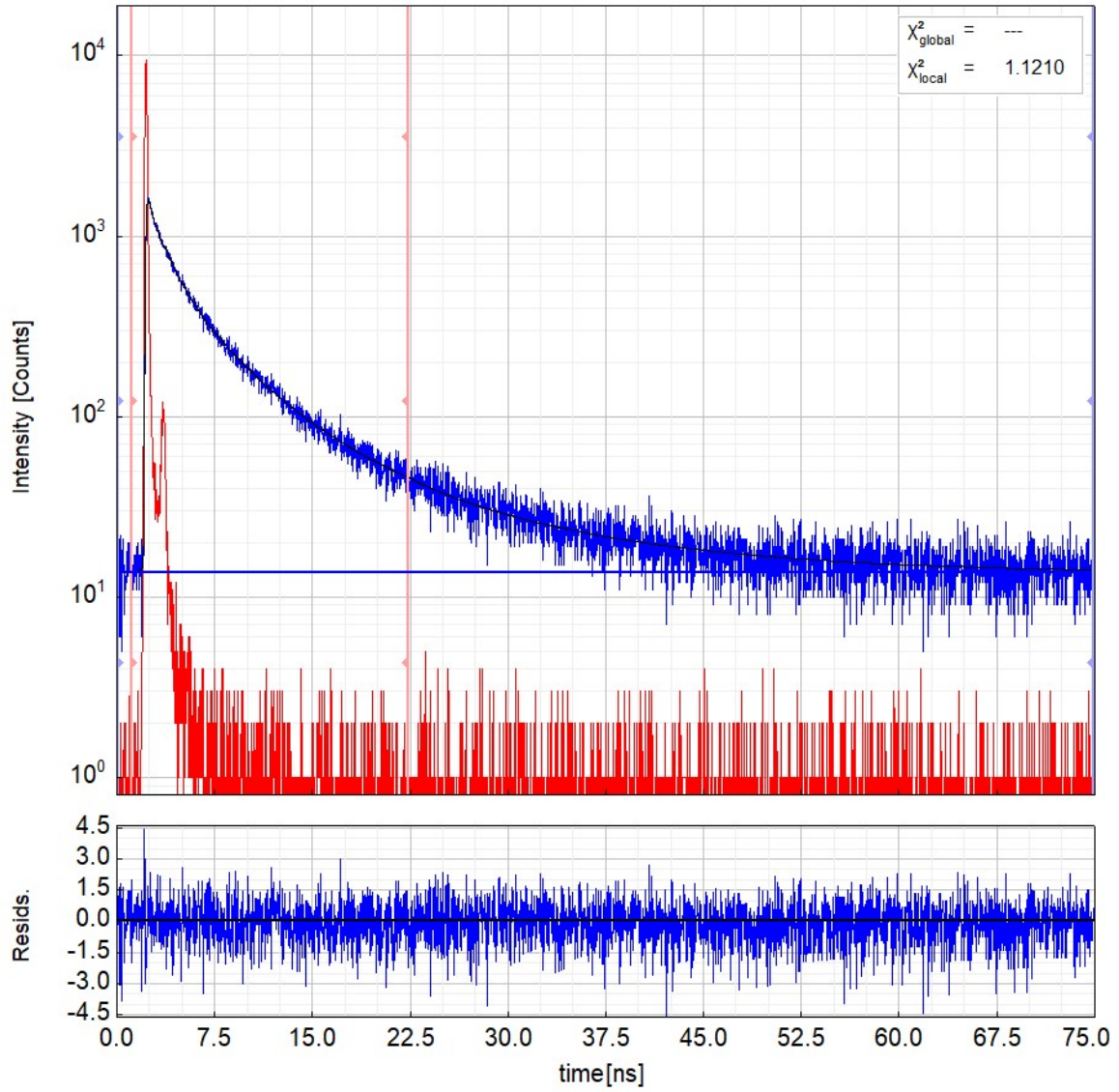
$$\tau_{\text{Av Amp}} = \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i \tau_i / \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i$$

$$\tau_{\text{Av Int}} = \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i \tau_i / \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i$$

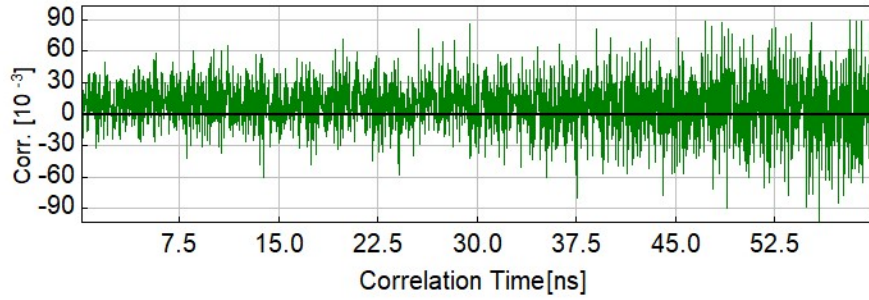
**Data Set: 1 / 12**

Decay: crv[1]; IRF: crv[0]

Fit



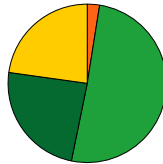
Autocorrelation (Residuals)



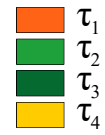
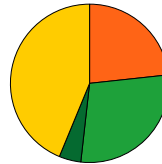
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.494	$\pm 0.083$	17%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	5.52	$\pm 0.70$	13%
$A_2$ [kCnts/Chnl]	0.603	$\pm 0.015$	2.5%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	111.7	$\pm 2.4$	2.1%
$A_3$ [kCnts/Chnl]	0.0945	$\pm 0.0027$	2.8%
$\tau_3$ [ns]	13.97	$\pm 0.28$	1.9%
$I_3$ [kCnts]	52.8	$\pm 1.9$	3.4%
$A_4$ [kCnts/Chnl]	0.927	$\pm 0.022$	2.3%
$\tau_4$ [ns]	1.355	$\pm 0.042$	3.1%
$I_4$ [kCnts]	50.2	$\pm 1.5$	2.9%
$Bkg_{Dec}$ [kCnts]	0.0136	$\pm 0.0002$	1.0%
$Bkg_{RF}$ [Cnts/Chnl]	-0.15	$\pm 0.35$	238%
$Shift_{RF}$ [ps]	-23.8	$\pm 9.8$	41%
$A_{Scat}$ [kCnts]	-0.27	$\pm 0.89$	336%
$\lambda_{Det}$ [nm]	520.0000	---	---

Relative Intensities



Relative Amplitudes

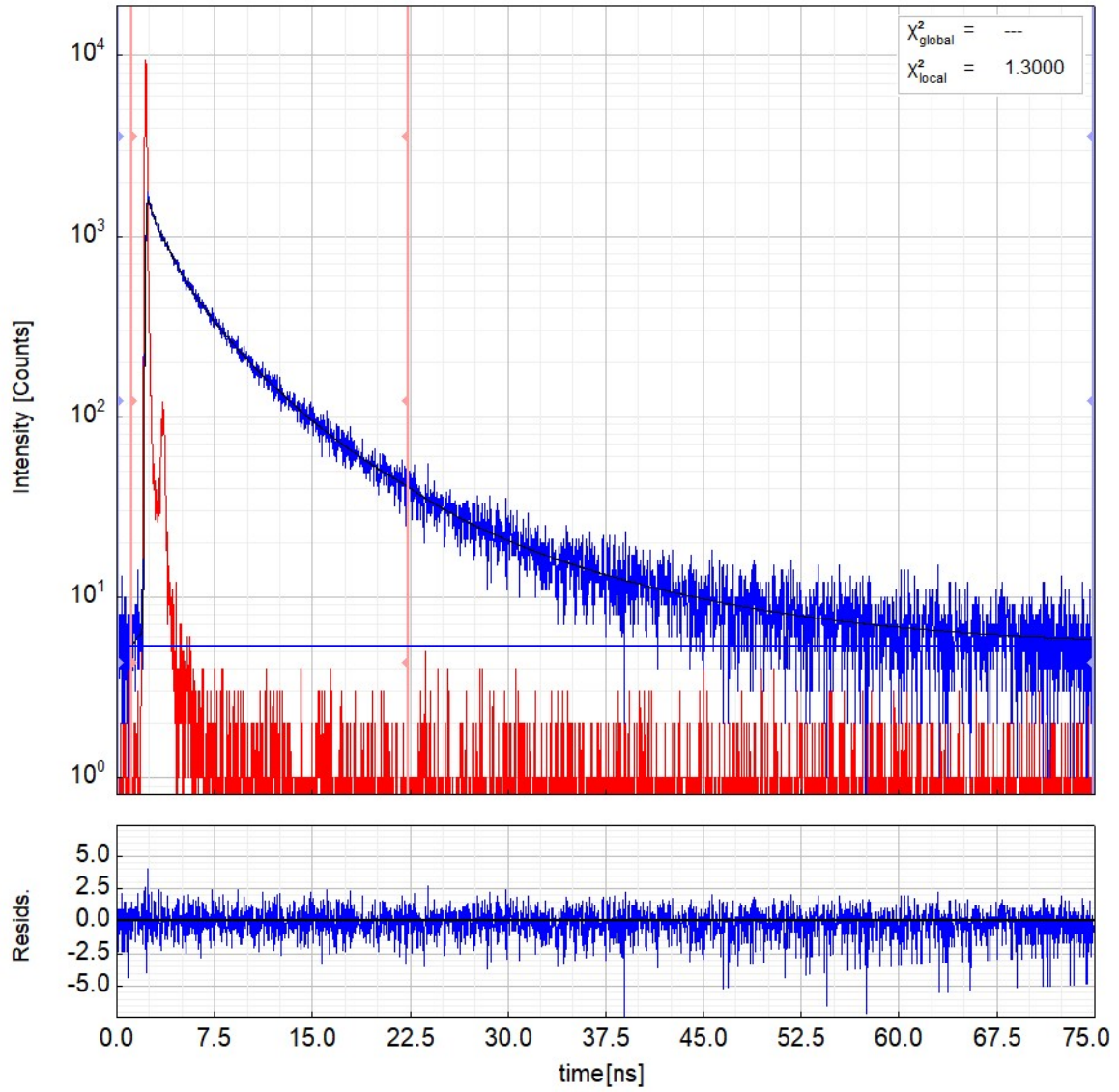




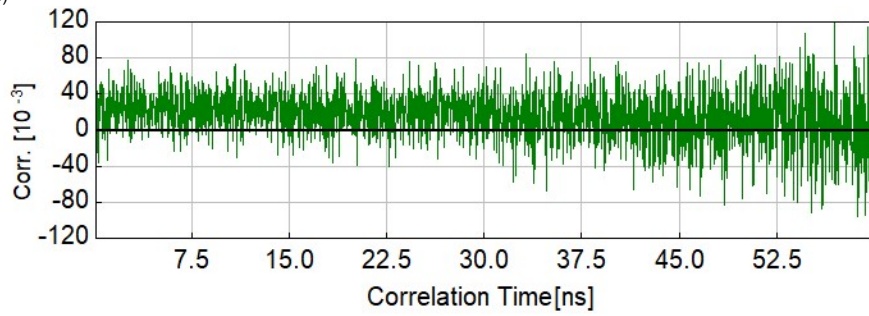
**Data Set: 2 / 12**

Decay: crv[2]; IRF: crv[0]

Fit



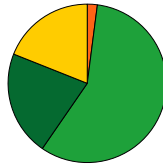
Autocorrelation (Residuals)



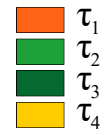
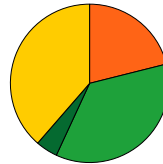
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.45	$\pm 0.11$	23%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	4.98	$\pm 0.99$	20%
$A_2$ [kCnts/Chnl]	0.756	$\pm 0.017$	2.1%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	139.9	$\pm 2.7$	1.9%
$A_3$ [kCnts/Chnl]	0.0947	$\pm 0.0045$	4.7%
$\tau_3$ [ns]	13.74	$\pm 0.35$	2.5%
$I_3$ [kCnts]	52.1	$\pm 1.7$	3.1%
$A_4$ [kCnts/Chnl]	0.815	$\pm 0.035$	4.2%
$\tau_4$ [ns]	1.415	$\pm 0.067$	4.7%
$I_4$ [kCnts]	46.1	$\pm 1.3$	2.7%
$Bkg_{Dec}$ [kCnts]	0.0054	$\pm 0.0002$	2.7%
$Bkg_{RF}$ [Cnts/Chnl]	-0.61	$\pm 0.44$	71%
$Shift_{RF}$ [ps]	-38.5	$\pm 4.0$	10%
$A_{Scat}$ [kCnts]	-1.23	$\pm 0.35$	28%
$\lambda_{Det}$ [nm]	540.0000	---	---

Relative Intensities



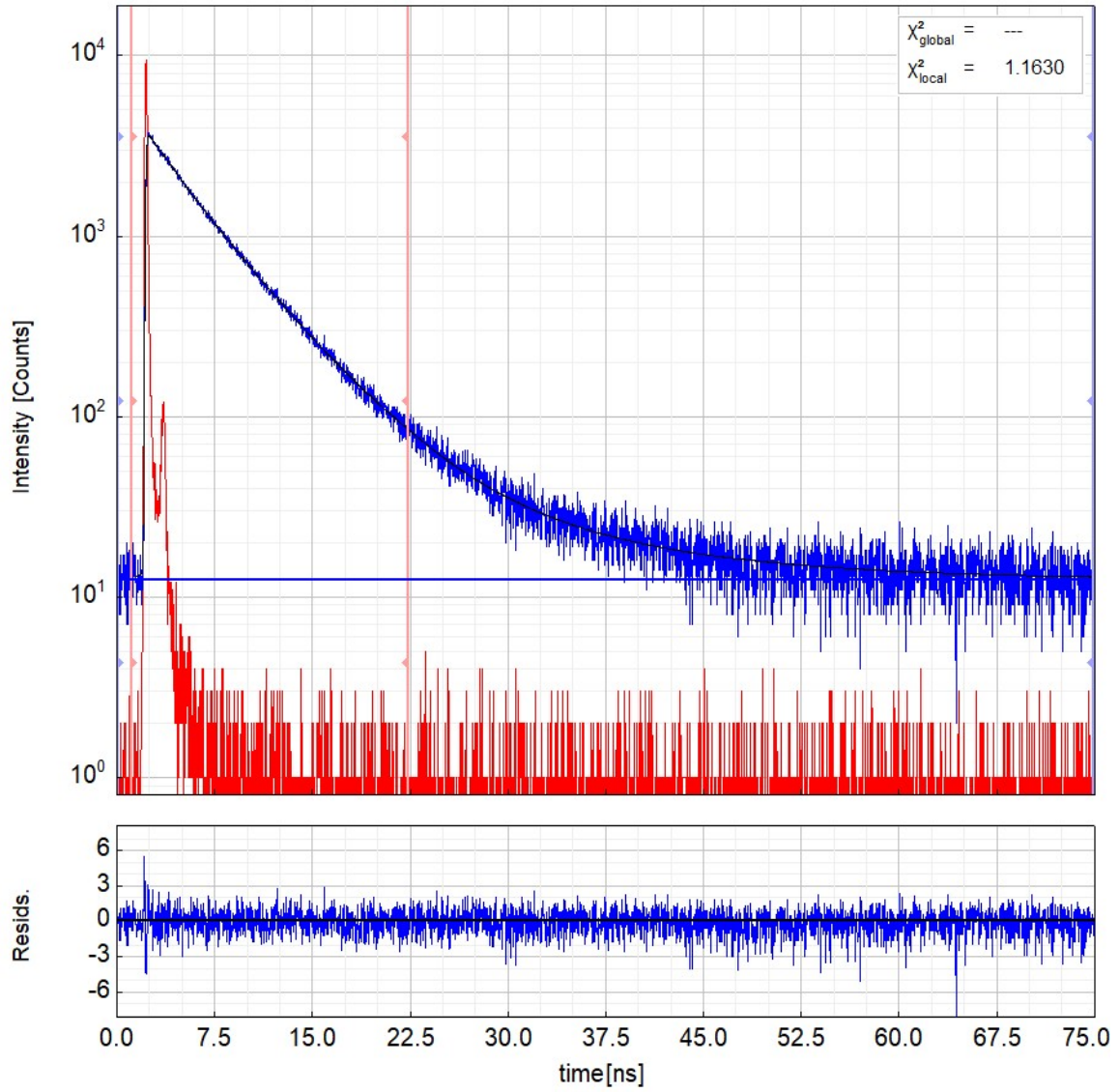
Relative Amplitudes



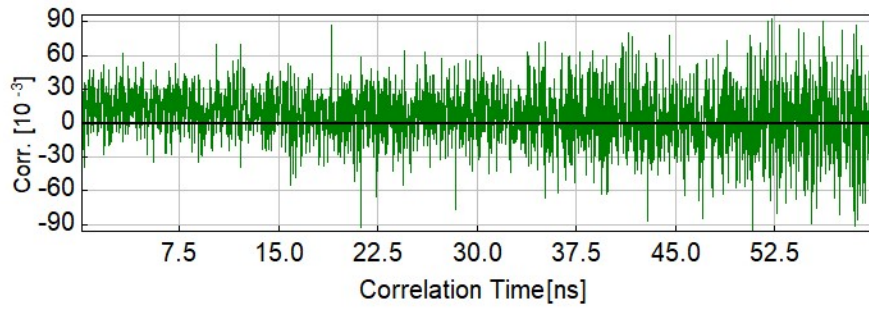
**Data Set: 3 / 12**

Decay: crv[3]; IRF: crv[0]

Fit



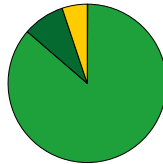
Autocorrelation (Residuals)



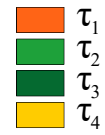
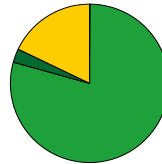
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	-0.08	$\pm 0.14$	172%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	-0.9	$\pm 1.5$	168%
$A_2$ [kCnts/Chnl]	3.325	$\pm 0.019$	0.5%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	615.4	$\pm 4.8$	0.8%
$A_3$ [kCnts/Chnl]	0.118	$\pm 0.014$	12%
$\tau_3$ [ns]	12.99	$\pm 0.53$	4.1%
$I_3$ [kCnts]	61.0	$\pm 4.5$	7.3%
$A_4$ [kCnts/Chnl]	0.751	$\pm 0.026$	3.5%
$\tau_4$ [ns]	1.220	$\pm 0.088$	7.2%
$I_4$ [kCnts]	36.7	$\pm 1.1$	2.9%
$Bkg_{Dec}$ [kCnts]	0.0125	$\pm 0.0002$	1.0%
$Bkg_{RF}$ [Cnts/Chnl]	0.21	$\pm 0.11$	51%
$Shift_{RF}$ [ps]	-22	$\pm 12$	53%
$A_{Scat}$ [kCnts]	-0.3	$\pm 2.3$	1061%
$\lambda_{Det}$ [nm]	560.0000	---	---

Relative Intensities



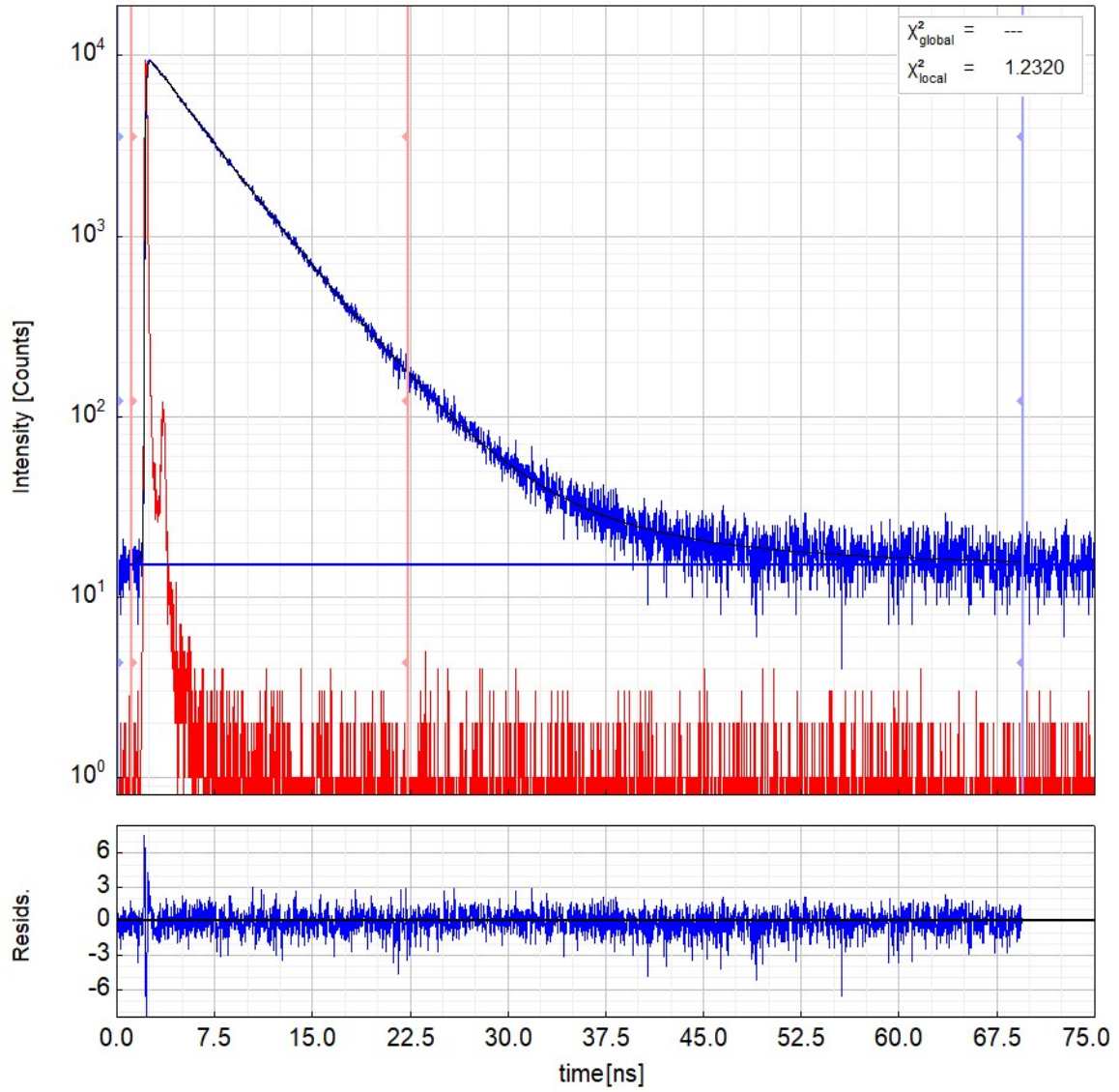
Relative Amplitudes



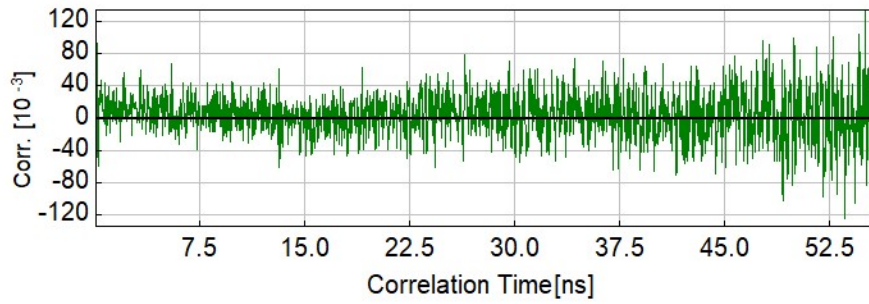
**Data Set: 4 / 12**

Decay: crv[4]; IRF: crv[0]

Fit

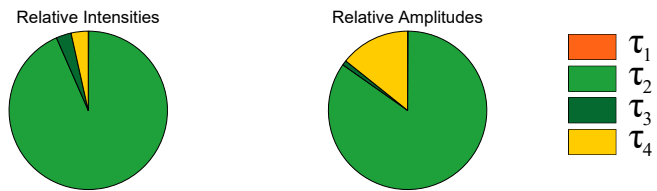


Autocorrelation (Residuals)



Fitted Parameters

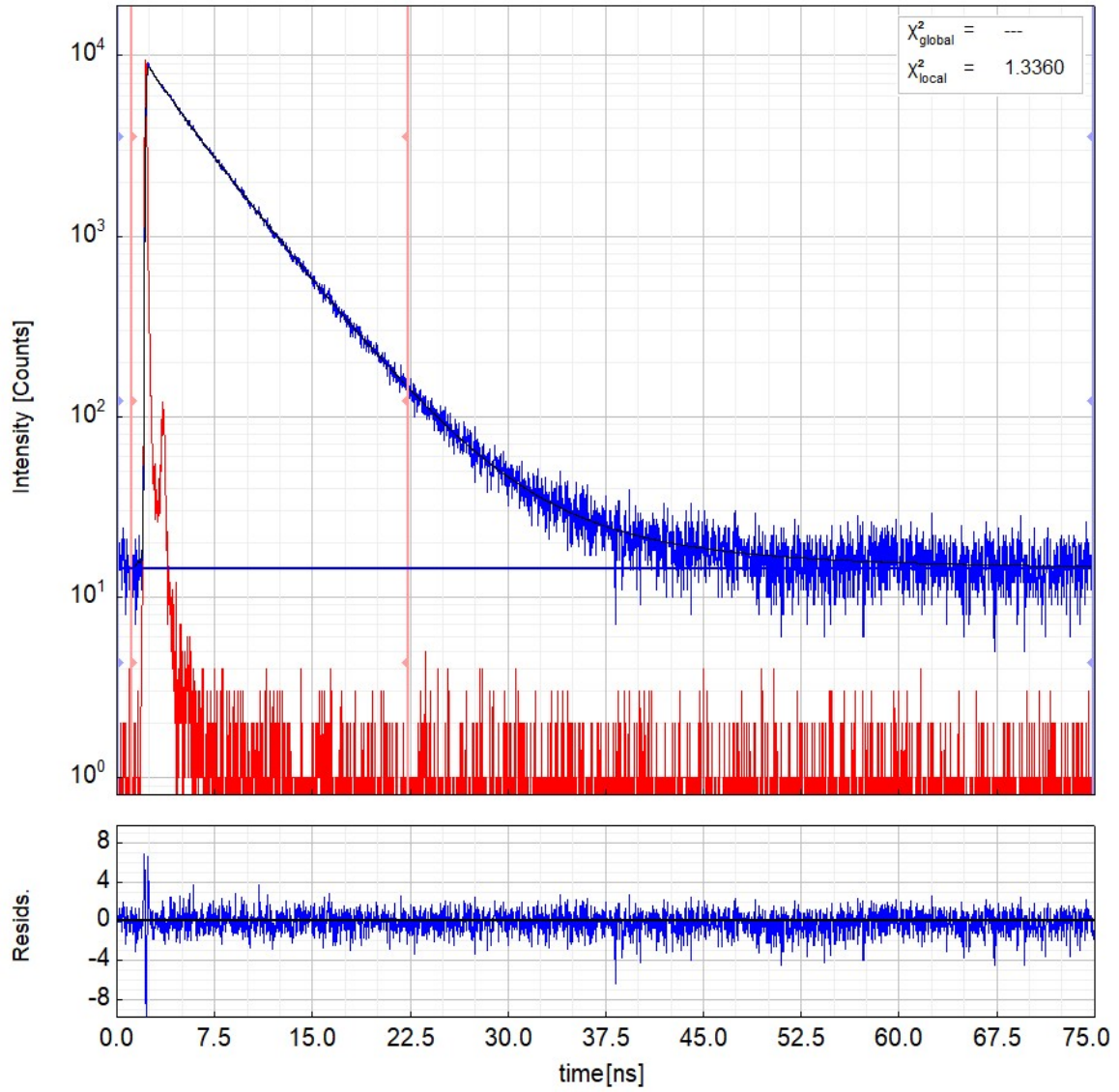
Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	-1.91	$\pm 0.76$	39%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	-21.4	$\pm 9.4$	44%
$A_2$ [kCnts/Chnl]	9.778	$\pm 0.039$	0.4%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	1 809.9	$\pm 7.1$	0.4%
$A_3$ [kCnts/Chnl]	0.114	$\pm 0.035$	30%
$\tau_3$ [ns]	13.3	$\pm 1.2$	9.0%
$I_3$ [kCnts]	60	$\pm 11$	18%
$A_4$ [kCnts/Chnl]	1.65	$\pm 0.36$	22%
$\tau_4$ [ns]	1.03	$\pm 0.20$	19%
$I_4$ [kCnts]	67.7	$\pm 4.6$	6.8%
$Bkg_{Dec}$ [kCnts]	0.0151	$\pm 0.0002$	0.8%
$Bkg_{RF}$ [Cnts/Chnl]	0.36	$\pm 0.11$	30%
$Shift_{RF}$ [ps]	-24	$\pm 11$	40%
$A_{Scat}$ [kCnts]	-2.5	$\pm 3.6$	144%
$\lambda_{Det}$ [nm]	580.0000	---	---



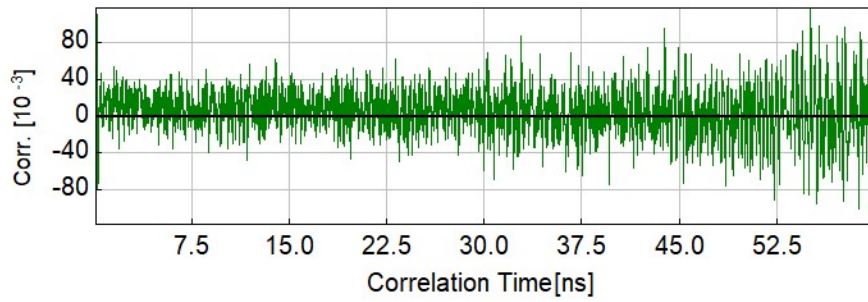
**Data Set: 5 / 12**

Decay: crv[5]; IRF: crv[0]

Fit

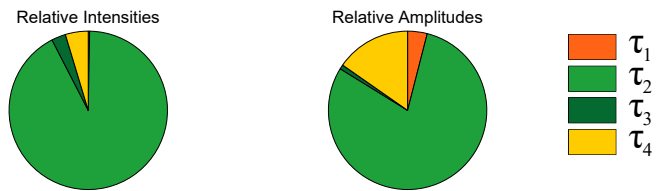


Autocorrelation (Residuals)



Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.41	$\pm 0.74$	181%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	4.6	$\pm 7.9$	173%
$A_2$ [kCnts/Chnl]	8.167	$\pm 0.035$	0.4%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	1 511.7	$\pm 6.4$	0.4%
$A_3$ [kCnts/Chnl]	0.093	$\pm 0.026$	28%
$\tau_3$ [ns]	12.91	$\pm 0.91$	7.0%
$I_3$ [kCnts]	47.6	$\pm 7.9$	16%
$A_4$ [kCnts/Chnl]	1.57	$\pm 0.23$	14%
$\tau_4$ [ns]	1.22	$\pm 0.13$	10%
$I_4$ [kCnts]	76.5	$\pm 4.9$	6.4%
$Bkg_{Dec}$ [kCnts]	0.0144	$\pm 0.0003$	1.5%
$Bkg_{RF}$ [Cnts/Chnl]	0.432	$\pm 0.075$	17%
$Shift_{RF}$ [ps]	-35.4	$\pm 3.9$	11%
$A_{Scat}$ [kCnts]	-4.7	$\pm 1.9$	39%
$\lambda_{Det}$ [nm]	600.0000	---	---

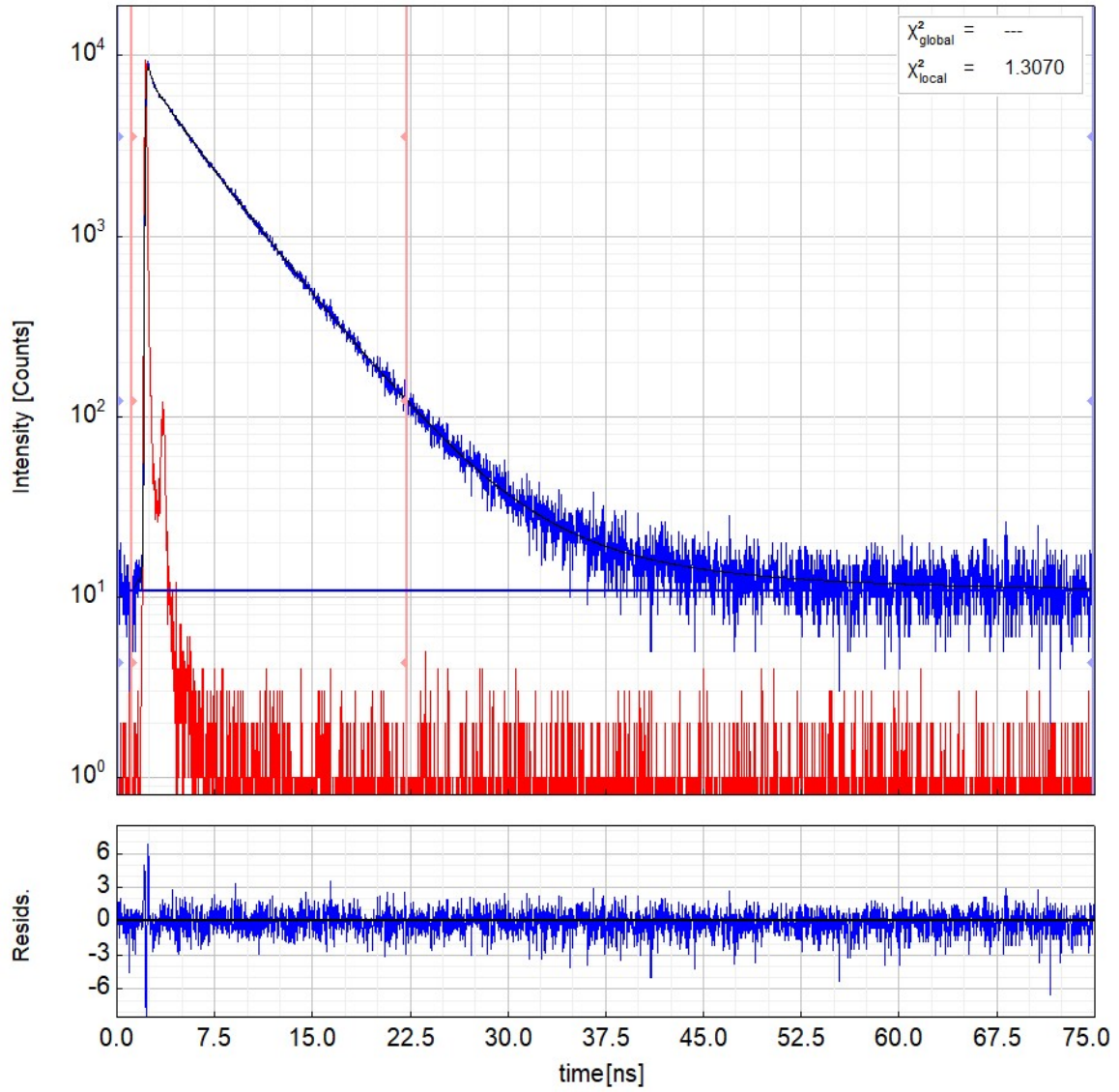




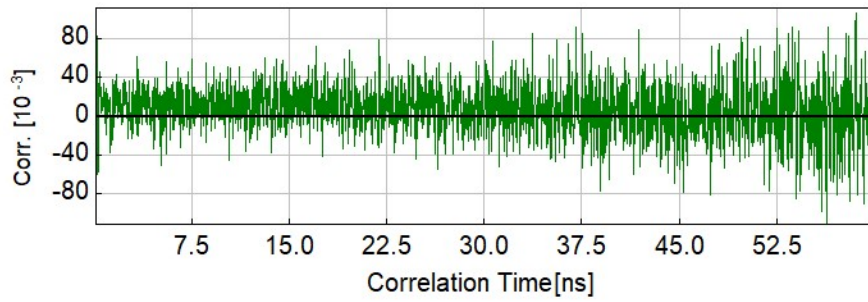
Data Set: 6 / 12

Decay: crv[6]; IRF: crv[0]

Fit



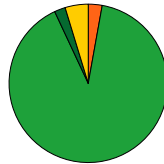
Autocorrelation (Residuals)



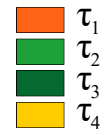
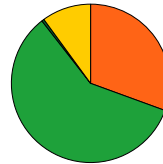
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	3.62	$\pm 0.47$	13%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	40.5	$\pm 6.8$	17%
$A_2$ [kCnts/Chnl]	6.961	$\pm 0.035$	0.5%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	1 288.5	$\pm 4.8$	0.4%
$A_3$ [kCnts/Chnl]	0.058	$\pm 0.014$	24%
$\tau_3$ [ns]	13.90	$\pm 0.88$	6.3%
$I_3$ [kCnts]	32.1	$\pm 5.2$	16%
$A_4$ [kCnts/Chnl]	1.19	$\pm 0.11$	9.2%
$\tau_4$ [ns]	1.42	$\pm 0.13$	8.9%
$I_4$ [kCnts]	67.4	$\pm 3.8$	5.6%
$Bkg_{Dec}$ [kCnts]	0.0109	$\pm 0.0002$	1.0%
$Bkg_{IRF}$ [Cnts/Chnl]	0.326	$\pm 0.093$	28%
$Shift_{IRF}$ [ps]	-39.9	$\pm 2.9$	7.2%
$A_{Scat}$ [kCnts]	-5.7	$\pm 1.3$	22%
$\lambda_{Det}$ [nm]	620.0000	---	---

Relative Intensities



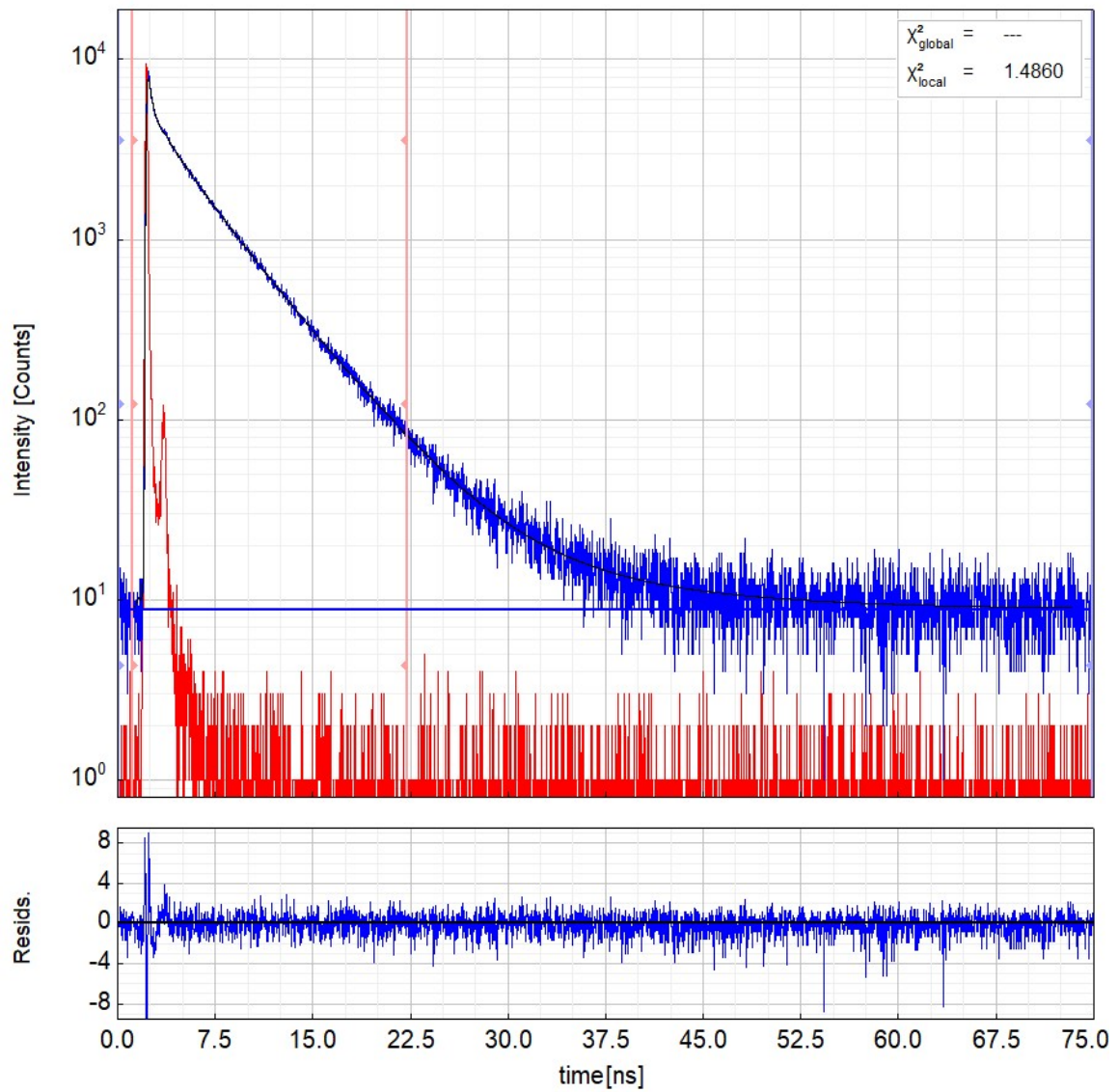
Relative Amplitudes



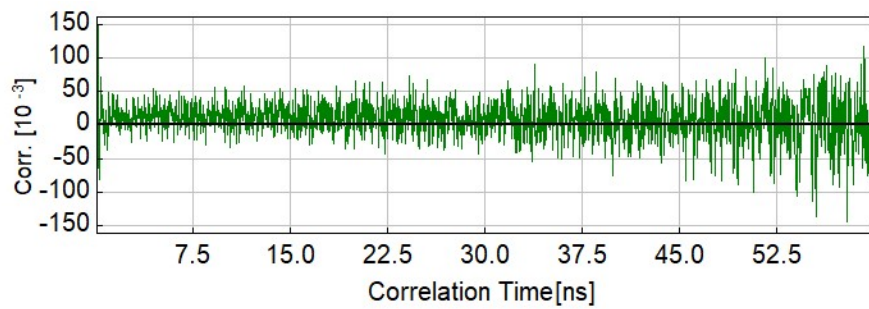
**Data Set: 7 / 12**

Decay: crv[7]; IRF: crv[0]

Fit



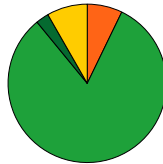
Autocorrelation (Residuals)



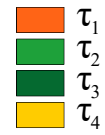
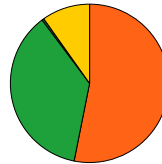
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	6.35	$\pm 0.29$	4.6%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	71.0	$\pm 4.9$	6.8%
$A_2$ [kCnts/Chnl]	4.372	$\pm 0.022$	0.5%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	809.3	$\pm 5.6$	0.7%
$A_3$ [kCnts/Chnl]	0.050	$\pm 0.020$	38%
$\tau_3$ [ns]	13.2	$\pm 1.4$	10%
$I_3$ [kCnts]	26.3	$\pm 5.8$	22%
$A_4$ [kCnts/Chnl]	1.18	$\pm 0.11$	9.3%
$\tau_4$ [ns]	1.75	$\pm 0.16$	8.6%
$I_4$ [kCnts]	81.9	$\pm 2.9$	3.5%
$Bkg_{Dec}$ [kCnts]	0.0088	$\pm 0.0002$	2.2%
$Bkg_{IRF}$ [Cnts/Chnl]	0.302	$\pm 0.092$	30%
$Shift_{IRF}$ [ps]	-41.9	$\pm 5.3$	13%
$A_{Scat}$ [kCnts]	-5.1	$\pm 3.4$	66%
$\lambda_{Det}$ [nm]	640.0000	---	---

Relative Intensities



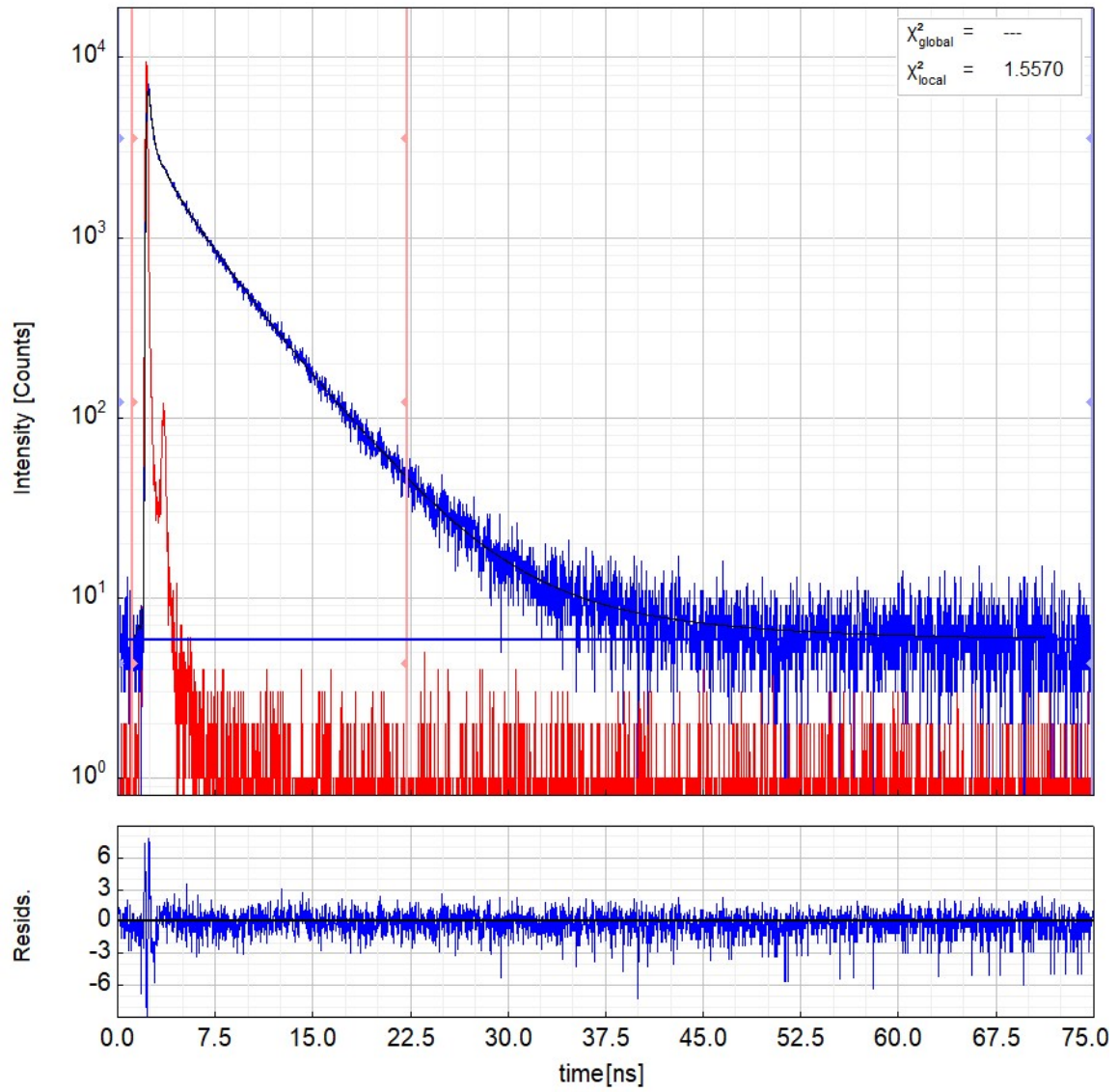
Relative Amplitudes



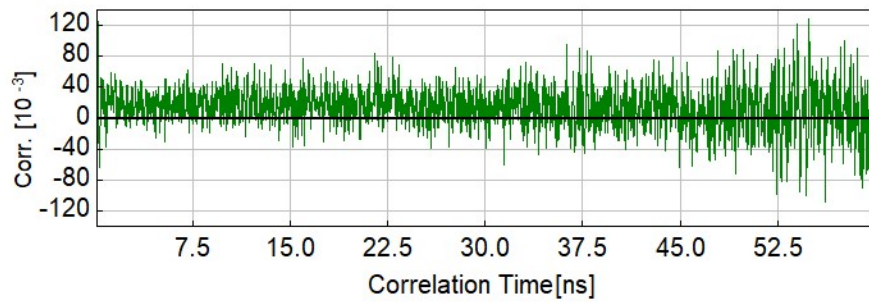
**Data Set: 8 / 12**

Decay: crv[8]; IRF: crv[0]

Fit



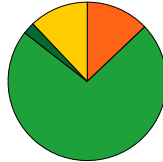
Autocorrelation (Residuals)



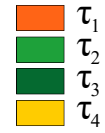
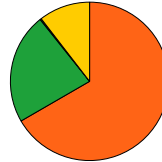
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	7.13	$\pm 0.30$	4.2%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	79.7	$\pm 6.0$	7.4%
$A_2$ [kCnts/Chnl]	2.418	$\pm 0.015$	0.6%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	447.5	$\pm 2.5$	0.5%
$A_3$ [kCnts/Chnl]	0.028	$\pm 0.015$	52%
$\tau_3$ [ns]	13.5	$\pm 1.8$	13%
$I_3$ [kCnts]	15.1	$\pm 5.0$	33%
$A_4$ [kCnts/Chnl]	1.120	$\pm 0.096$	8.5%
$\tau_4$ [ns]	1.66	$\pm 0.12$	6.8%
$I_4$ [kCnts]	74.3	$\pm 2.2$	2.9%
$Bkg_{Dec}$ [kCnts]	0.0059	$\pm 0.0001$	1.5%
$Bkg_{IRF}$ [Cnts/Chnl]	0.32	$\pm 0.20$	64%
$Shift_{IRF}$ [ps]	-42.8	$\pm 3.9$	9.0%
$A_{Scat}$ [kCnts]	-4.6	$\pm 1.5$	33%
$\lambda_{Det}$ [nm]	660.0000	---	---

Relative Intensities



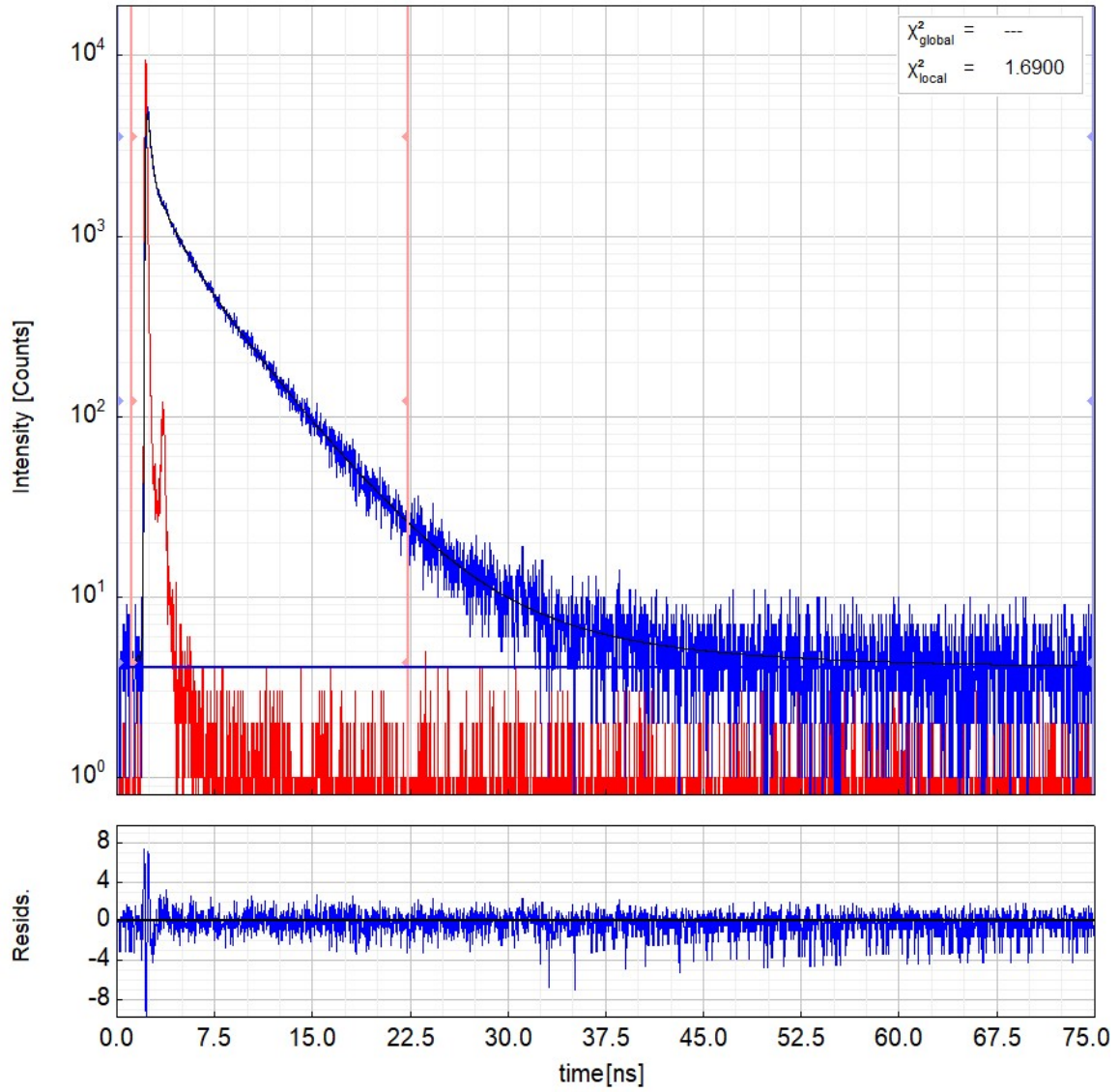
Relative Amplitudes



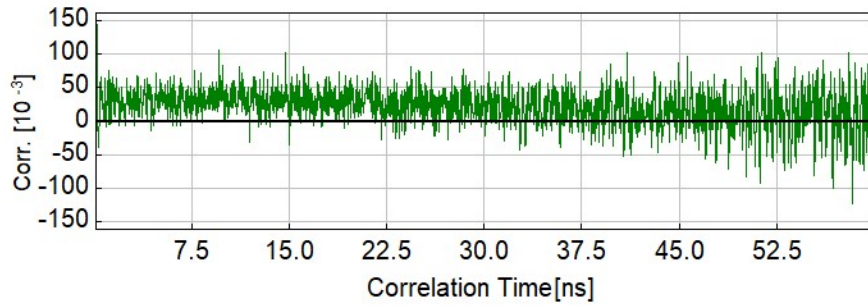
**Data Set: 9 / 12**

Decay: crv[9]; IRF: crv[0]

Fit



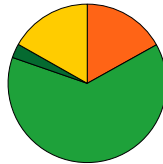
Autocorrelation (Residuals)



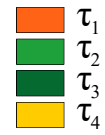
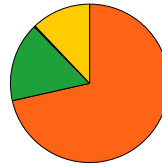
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	5.63	$\pm 0.41$	7.2%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	63.0	$\pm 3.1$	4.9%
$A_2$ [kCnts/Chnl]	1.274	$\pm 0.028$	2.2%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	235.8	$\pm 5.9$	2.5%
$A_3$ [kCnts/Chnl]	0.020	$\pm 0.012$	57%
$\tau_3$ [ns]	13.7	$\pm 2.4$	17%
$I_3$ [kCnts]	10.8	$\pm 3.4$	31%
$A_4$ [kCnts/Chnl]	0.952	$\pm 0.033$	3.4%
$\tau_4$ [ns]	1.65	$\pm 0.11$	6.2%
$I_4$ [kCnts]	62.5	$\pm 2.4$	3.7%
$Bkg_{Dec}$ [kCnts]	0.0041	$\pm 0.0002$	2.7%
$Bkg_{RF}$ [Cnts/Chnl]	0.46	$\pm 0.16$	33%
$Shift_{RF}$ [ps]	-34.1	$\pm 7.1$	21%
$A_{Scat}$ [kCnts]	-1.4	$\pm 3.4$	248%
$\lambda_{Det}$ [nm]	680.0000	---	---

Relative Intensities



Relative Amplitudes

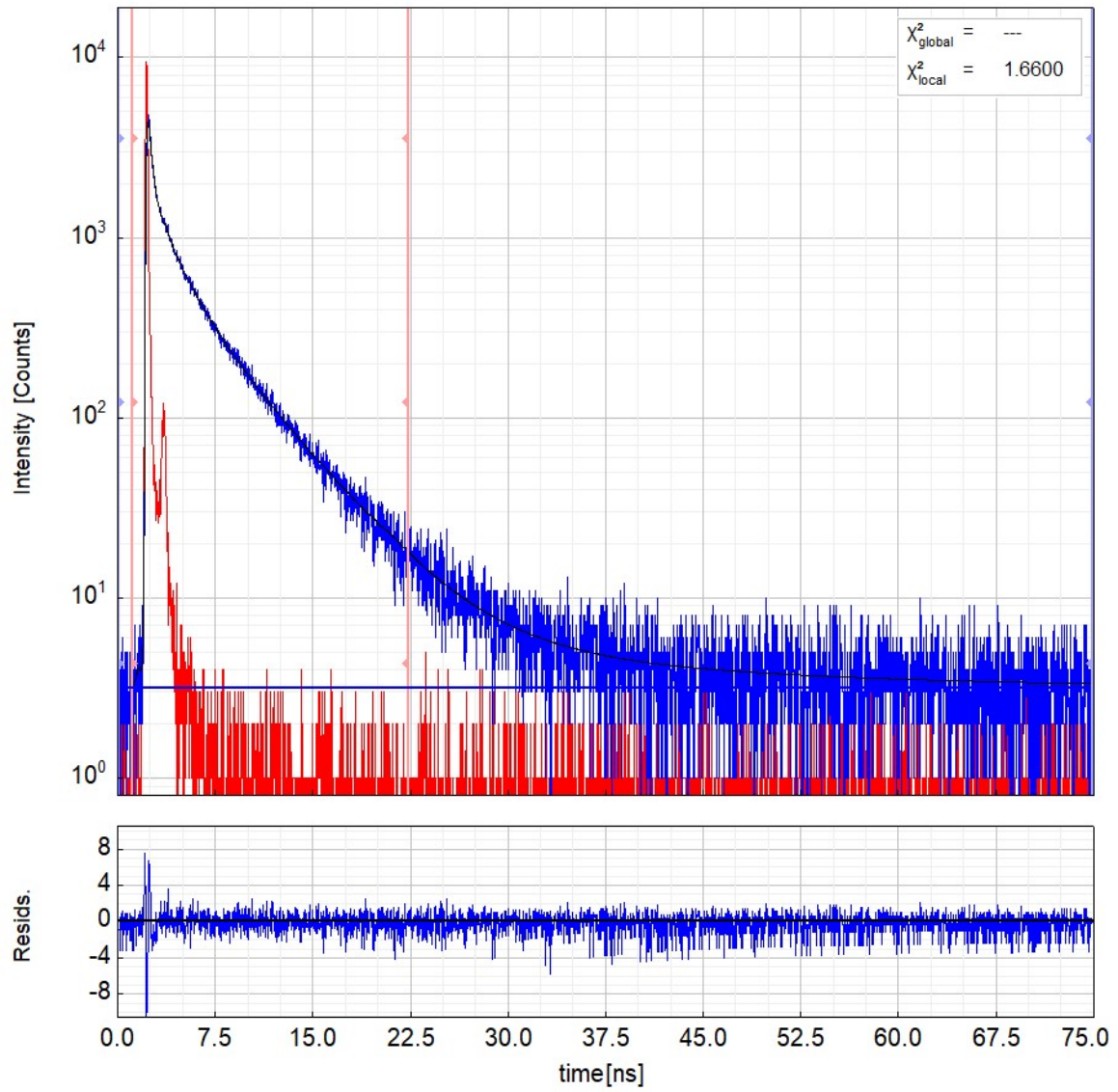




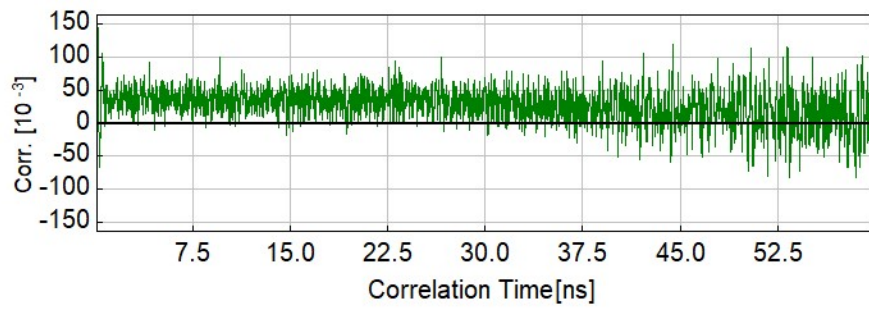
**Data Set: 10 / 12**

Decay: crv[10]; IRF: crv[0]

Fit



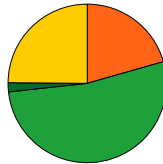
Autocorrelation (Residuals)



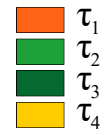
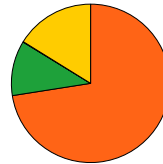
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	5.40	$\pm 0.60$	11%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	60.4	$\pm 4.1$	6.8%
$A_2$ [kCnts/Chnl]	0.835	$\pm 0.017$	1.9%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	154.6	$\pm 2.6$	1.6%
$A_3$ [kCnts/Chnl]	0.0070	$\pm 0.0019$	27%
$\tau_3$ [ns]	19.8	$\pm 4.6$	23%
$I_3$ [kCnts]	5.47	$\pm 0.62$	11%
$A_4$ [kCnts/Chnl]	1.205	$\pm 0.049$	4.0%
$\tau_4$ [ns]	1.514	$\pm 0.067$	4.4%
$I_4$ [kCnts]	73.0	$\pm 1.6$	2.1%
$Bkg_{Dec}$ [kCnts]	0.0032	$\pm 0.0003$	7.6%
$Bkg_{RF}$ [Cnts/Chnl]	0.17	$\pm 0.23$	134%
$Shift_{RF}$ [ps]	-37	$\pm 14$	35%
$A_{Scat}$ [kCnts]	-2.1	$\pm 3.5$	169%
$\lambda_{Det}$ [nm]	700.0000	---	---

Relative Intensities



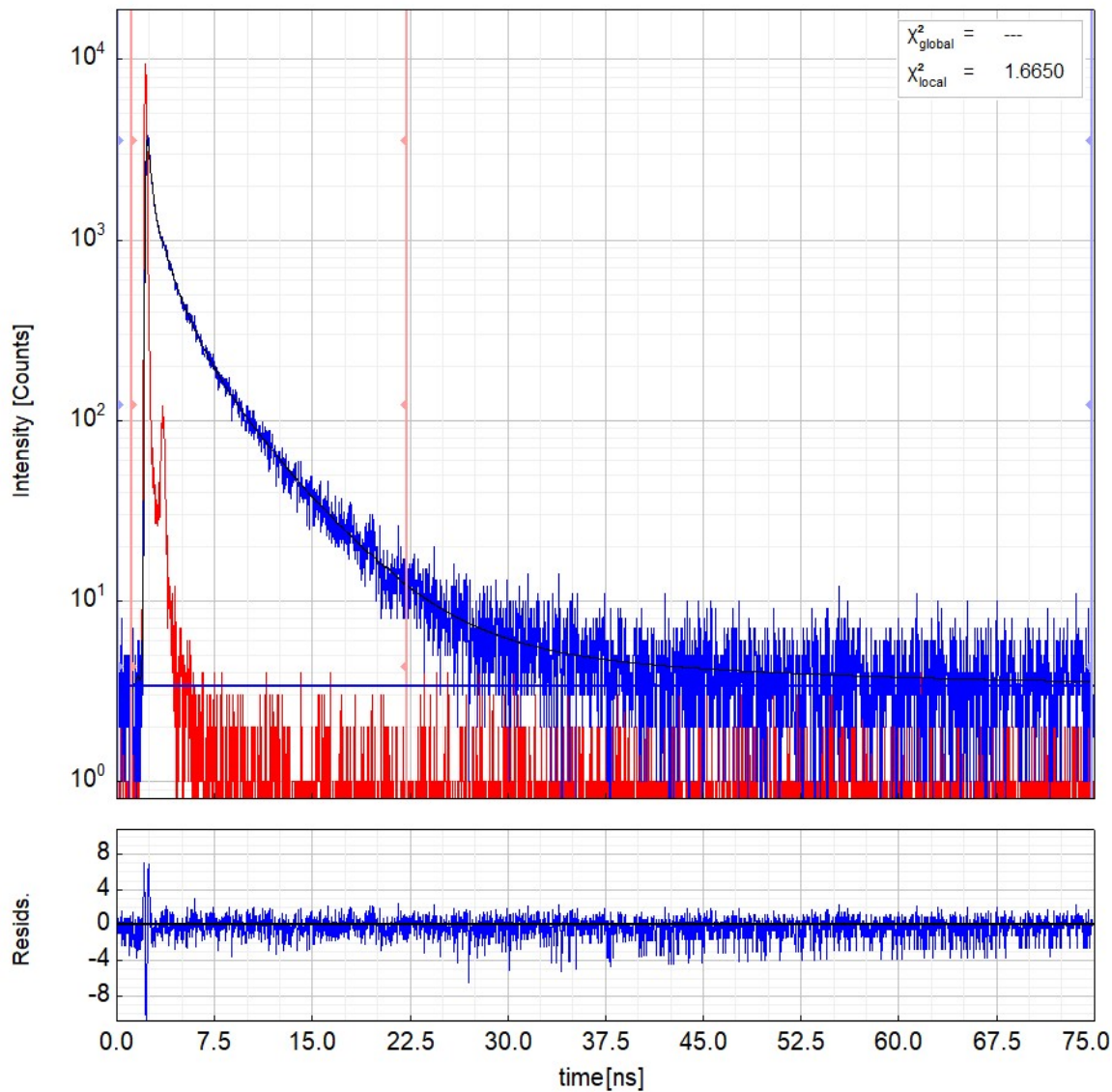
Relative Amplitudes



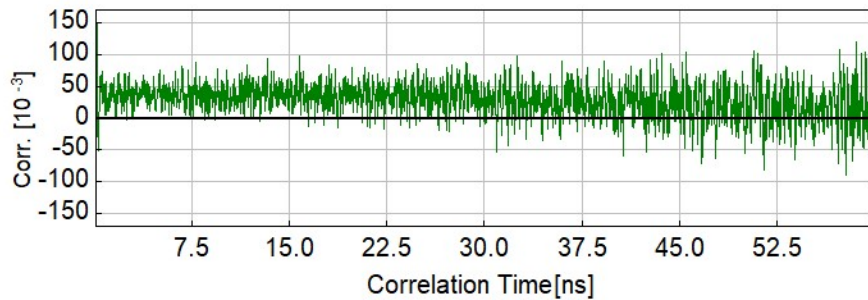
**Data Set: 11 / 12**

Decay: crv[11]; IRF: crv[0]

Fit



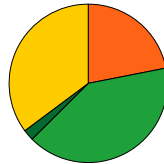
Autocorrelation (Residuals)



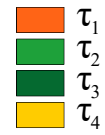
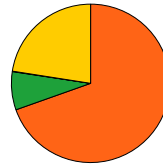
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	4.29	$\pm 0.18$	4.2%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	48.0	$\pm 2.4$	4.8%
$A_2$ [kCnts/Chnl]	0.481	$\pm 0.013$	2.7%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	89.0	$\pm 2.1$	2.3%
$A_3$ [kCnts/Chnl]	0.0056	$\pm 0.0009$	16%
$\tau_3$ [ns]	22.1	$\pm 5.0$	23%
$I_3$ [kCnts]	4.91	$\pm 0.37$	7.4%
$A_4$ [kCnts/Chnl]	1.389	$\pm 0.056$	4.0%
$\tau_4$ [ns]	1.387	$\pm 0.053$	3.8%
$I_4$ [kCnts]	77.1	$\pm 1.1$	1.4%
$Bkg_{rDec}$ [kCnts]	0.0034	$\pm 0.0002$	3.9%
$Bkg_{rRF}$ [Cnts/Chnl]	0.51	$\pm 0.16$	30%
$Shift_{rRF}$ [ps]	-51	$\pm 13$	25%
$A_{Scat}$ [kCnts]	-4.5	$\pm 2.0$	45%
$\lambda_{Det}$ [nm]	720.0000	---	---

Relative Intensities



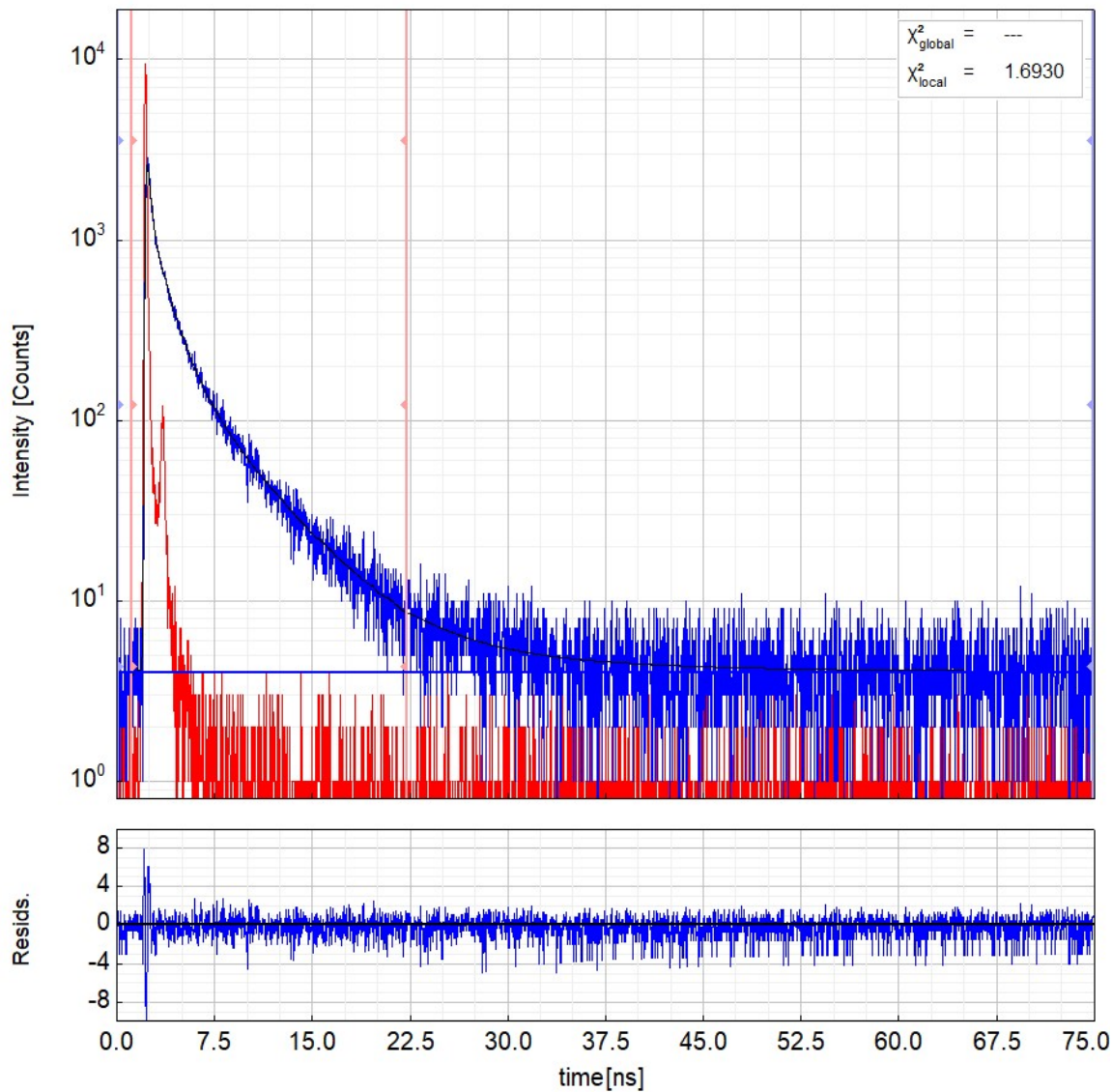
Relative Amplitudes



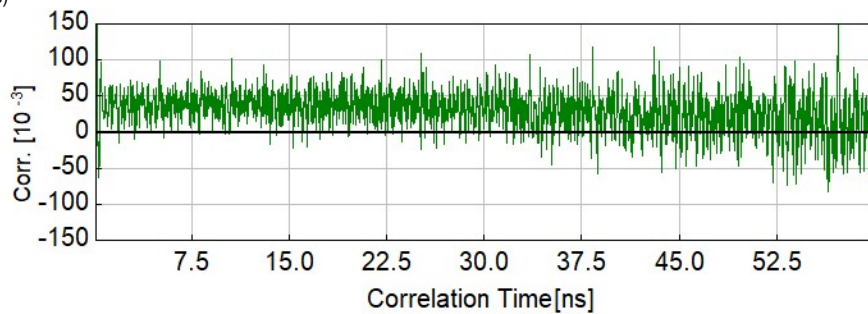
Data Set: 12 / 12

Decay: crv[12]; IRF: crv[0]

Fit



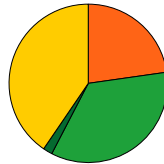
Autocorrelation (Residuals)



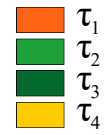
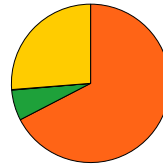
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	3.02	$\pm 0.21$	6.9%
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$I_1$ [kCnts]	33.7	$\pm 2.3$	6.7%
$A_2$ [kCnts/Chnl]	0.2788	$\pm 0.0097$	3.5%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%
$I_2$ [kCnts]	51.7	$\pm 1.6$	2.9%
$A_3$ [kCnts/Chnl]	0.0048	$\pm 0.0019$	39%
$\tau_3$ [ns]	14.8	$\pm 4.0$	27%
$I_3$ [kCnts]	2.82	$\pm 0.58$	20%
$A_4$ [kCnts/Chnl]	1.173	$\pm 0.034$	2.9%
$\tau_4$ [ns]	1.277	$\pm 0.027$	2.1%
$I_4$ [kCnts]	60.0	$\pm 1.9$	3.1%
$Bkg_{Dec}$ [kCnts]	0.0041	$\pm 0.0002$	3.5%
$Bkg_{RF}$ [Cnts/Chnl]	0.76	$\pm 0.19$	24%
$Shift_{RF}$ [ps]	-59	$\pm 26$	43%
$A_{Scat}$ [kCnts]	-3.9	$\pm 2.0$	51%
$\lambda_{Det}$ [nm]	740.0000	---	---

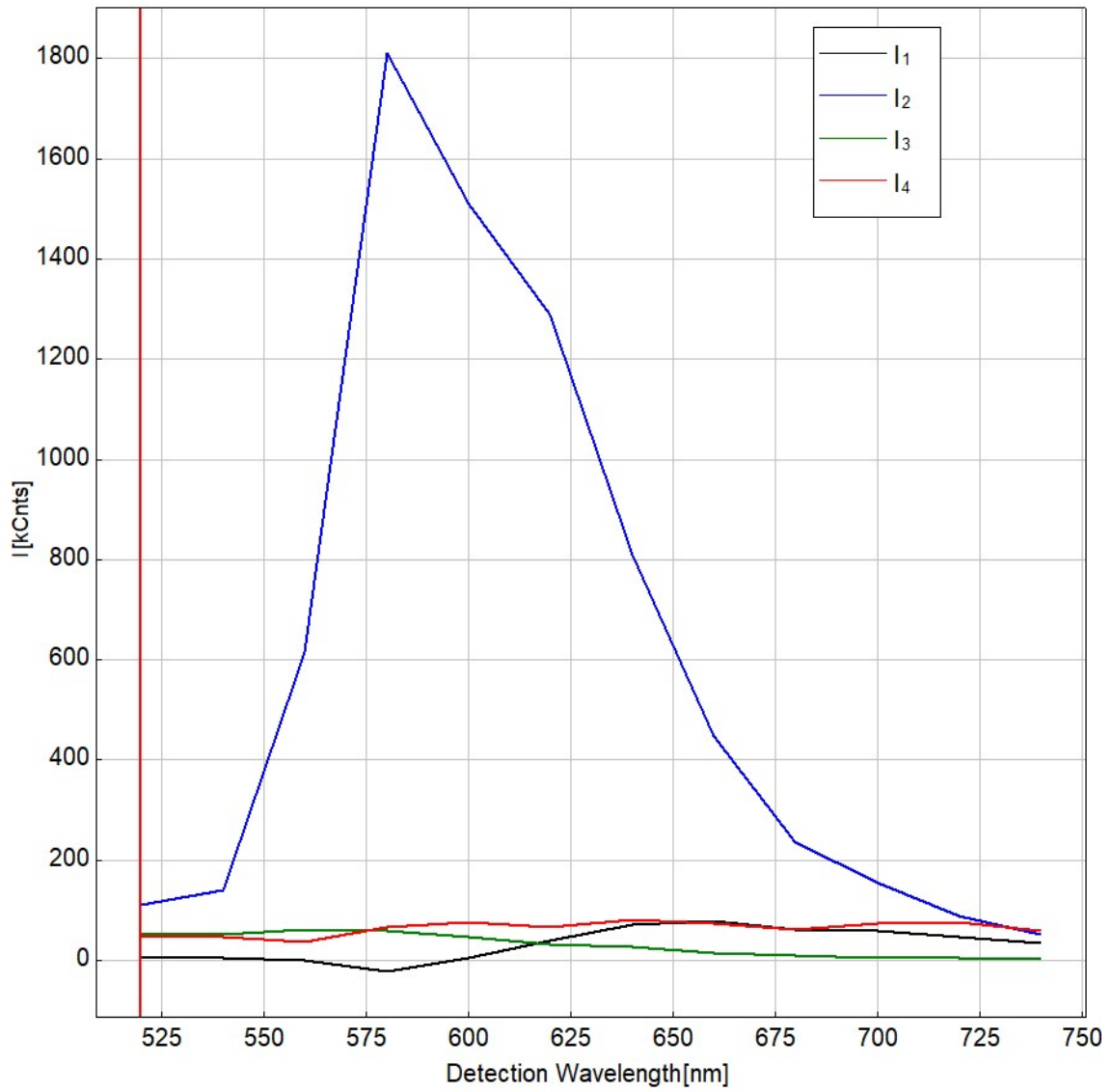
Relative Intensities



Relative Amplitudes



### Parameter Plot



### Global Parameters

Parameter	Value	$\Delta$	$\delta$
$\tau_1$ [ns]	0.280	$\pm 0.013$	4.4%
$\tau_2$ [ns]	4.628	$\pm 0.018$	0.4%

# EasyTau Report

9/4/2020 7:33:51 PM



## Container Curves

TRES+IRF\_20200617\_1601.etc: crv[0 - 17]

## Container Properties

Measurement Context: Time Resolved Emission Scan

Detection Wavelength: 440.0 - 760.0 (Step: 20.0) nm

Summary:

Sample: CD2  
Solvent: Dimethyl sulfoxide  
Excitation: V pol 376±1nm with LDH-P-C-375  
Detection: M pol 440...760nm 20nm steps  
10000 peak counts  
grating 1200/500+  
detector UV-red [PMT]

## Comment

[\[Edit Comment\]](#)

## Model: Exponential [Reconv.]

$$\text{Dec}(t) = \left[ \int_{-\infty}^t dt' [\text{IRF}(t - \text{Shift}_{\text{IRF}}) - \text{Bkg}_{\text{IRF}}] \left[ \sum_{i=1}^{n_{\text{Exp}}} A_i e^{-\frac{t-t'}{\tau_i}} + A_{\text{Scatt}} \delta(t-t') \right] \right] + \text{Bkg}_{\text{Dec}}$$

$$I_m = A_m \tau_m$$

$$A_{\text{Rel } m} = A_m / \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i$$

$$I_{\text{Rel } m} = I_m / \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i$$

$$\tau_{\text{Av Amp}} = \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i \tau_i / \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i$$

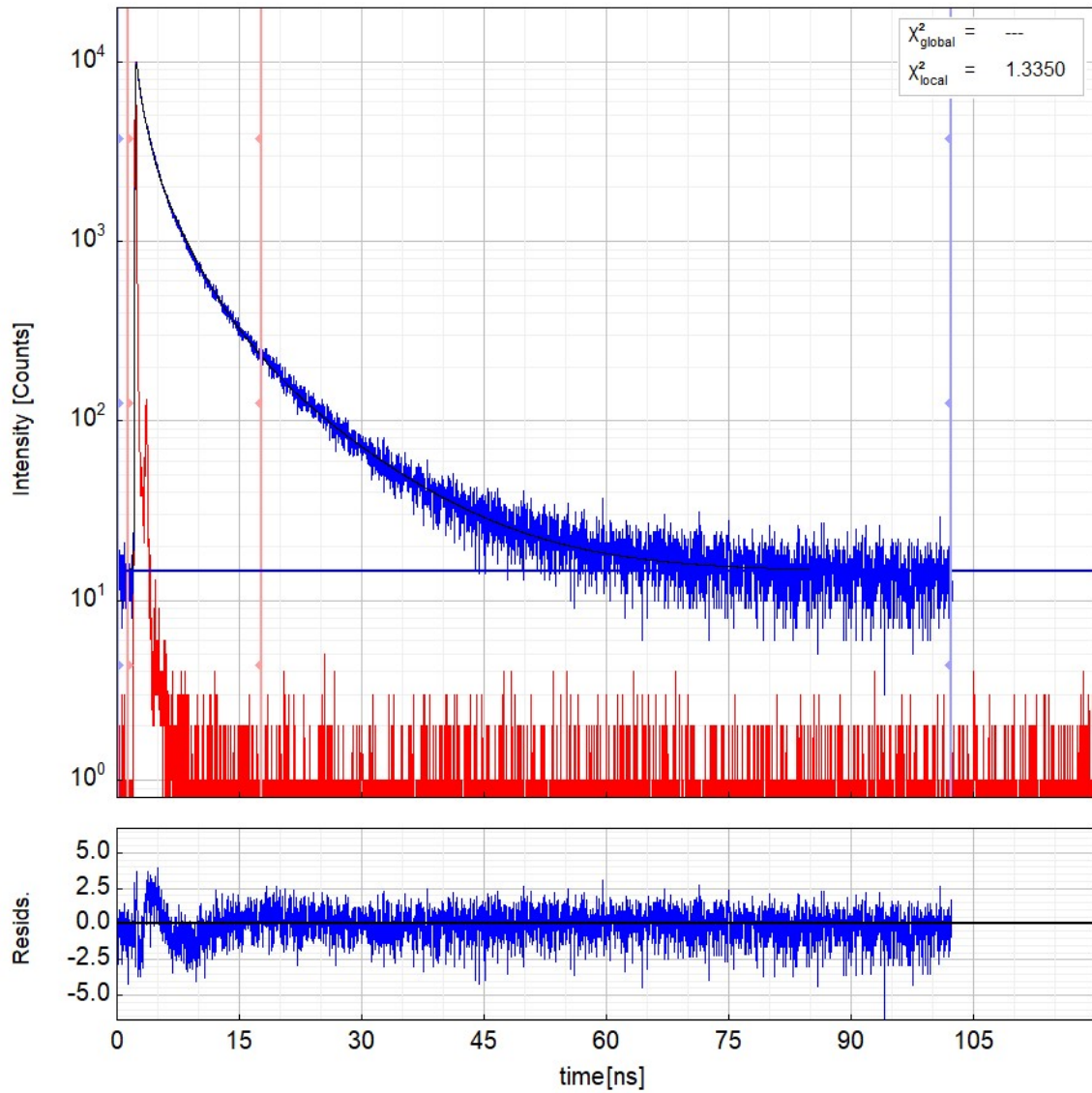
$$\tau_{\text{Av Int}} = \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i \tau_i / \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i$$



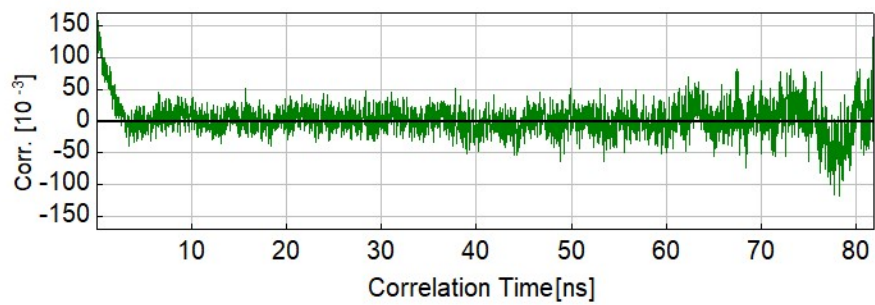
**Data Set: 1 / 17**

Decay: crv[1]; IRF: crv[0]

Fit

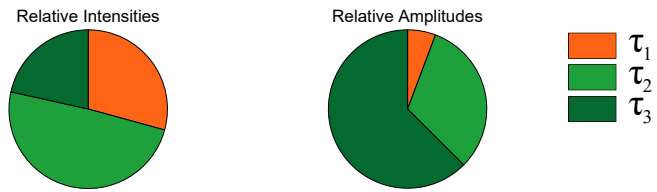


Autocorrelation (Residuals)



Fitted Parameters

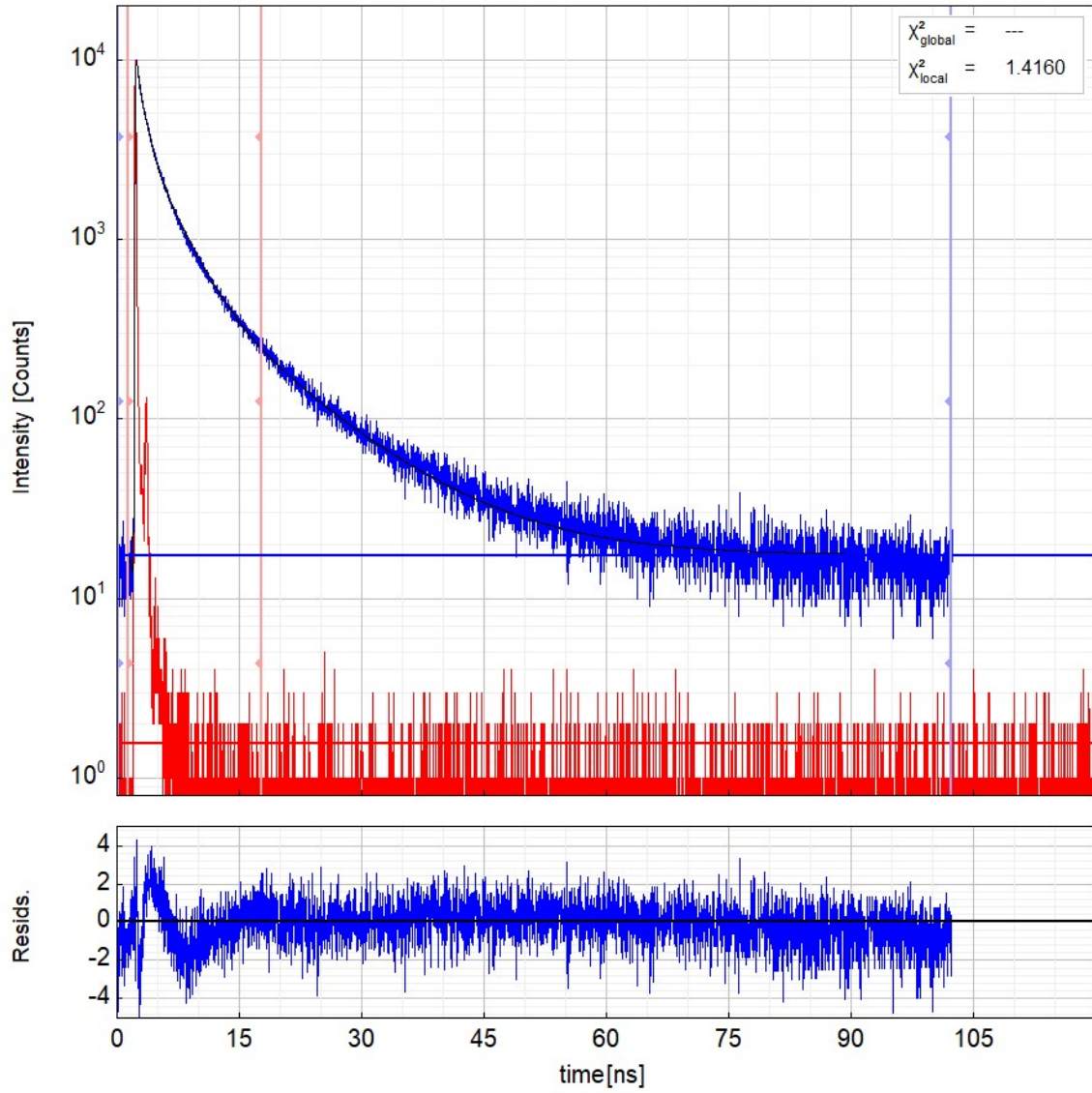
Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.6795	$\pm 0.0073$	1.1%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	301.0	$\pm 2.8$	0.9%
$A_2$ [kCnts/Chnl]	3.765	$\pm 0.038$	1.0%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	506.3	$\pm 2.0$	0.4%
$A_3$ [kCnts/Chnl]	7.42	$\pm 0.19$	2.5%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	221.4	$\pm 2.8$	1.2%
Bkgr <sub>Dec</sub> [kCnts]	0.0145	$\pm 0.0001$	0.6%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	0.017	$\pm 0.092$	560%
Shift <sub>IRF</sub> [ps]	9.1	$\pm 3.2$	34%
$A_{Scat}$ [kCnts]	15.2	$\pm 2.5$	16%
$\lambda_{Det}$ [nm]	440.0000	---	---



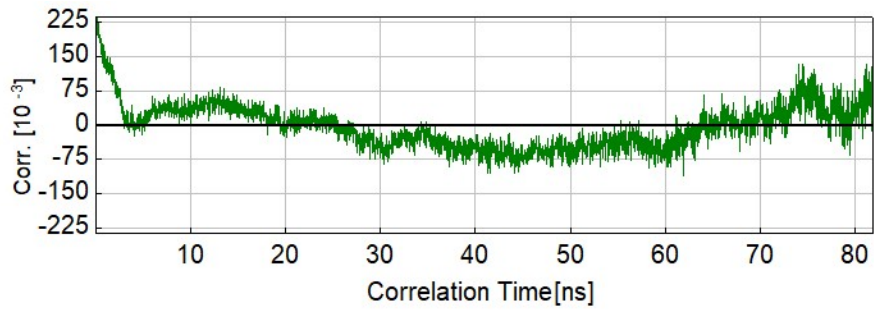
**Data Set: 2 / 17**

Decay: crv[2]; IRF: crv[0]

Fit



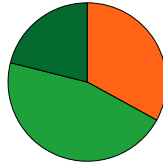
Autocorrelation (Residuals)



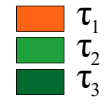
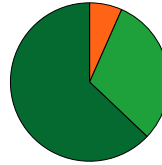
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.811	$\pm 0.015$	1.8%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	359.0	$\pm 6.1$	1.7%
$A_2$ [kCnts/Chnl]	3.718	$\pm 0.052$	1.4%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	499.9	$\pm 4.7$	0.9%
$A_3$ [kCnts/Chnl]	7.683	$\pm 0.084$	1.1%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	229.4	$\pm 6.3$	2.7%
Bkgr <sub>Dec</sub> [kCnts]	0.0175	$\pm 0.0002$	0.6%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	1.57	$\pm 0.38$	24%
Shift <sub>IRF</sub> [ps]	-4.1	$\pm 2.2$	52%
$A_{Scat}$ [kCnts]	7.1	$\pm 1.7$	24%
$\lambda_{Det}$ [nm]	460.0000	---	---

Relative Intensities



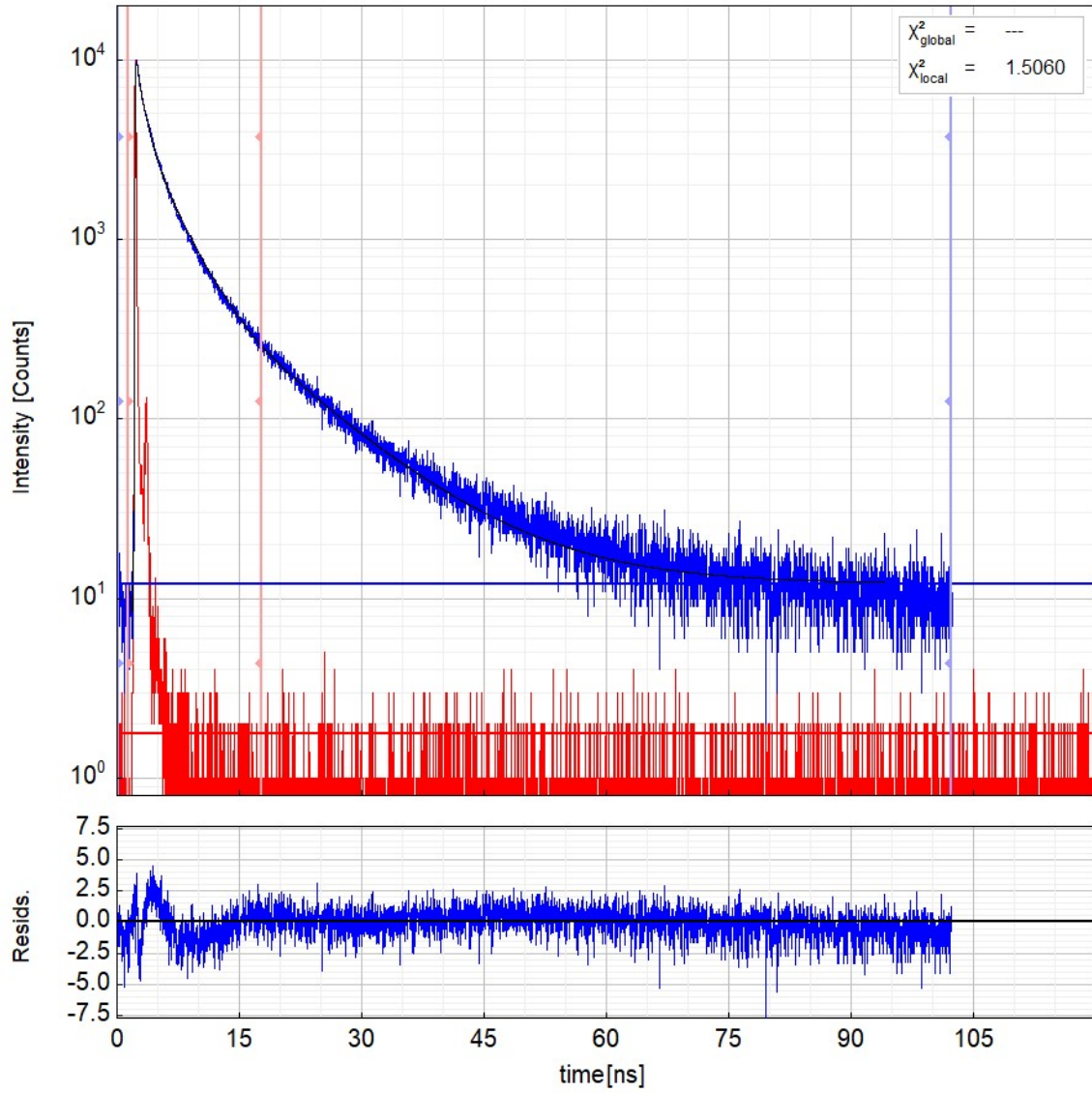
Relative Amplitudes



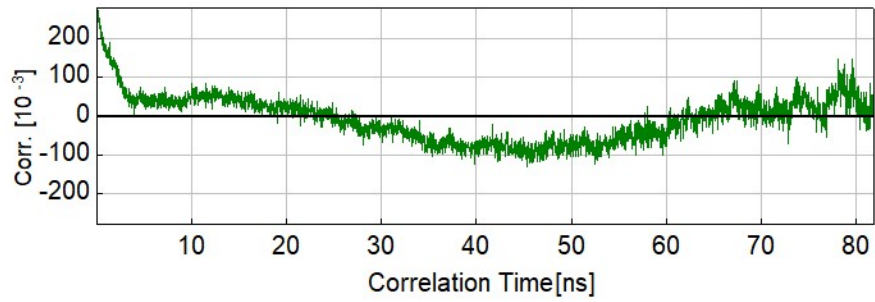
**Data Set: 3 / 17**

Decay: crv[3]; IRF: crv[0]

Fit



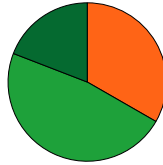
Autocorrelation (Residuals)



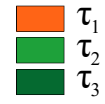
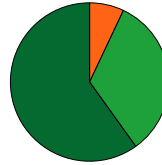
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.8683	$\pm 0.0098$	1.1%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	384.6	$\pm 2.7$	0.7%
$A_2$ [kCnts/Chnl]	4.086	$\pm 0.037$	0.9%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	549.5	$\pm 2.0$	0.3%
$A_3$ [kCnts/Chnl]	7.41	$\pm 0.11$	1.4%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	221.0	$\pm 1.5$	0.7%
$Bkgr_{Dec}$ [kCnts]	0.0121	$\pm 0.0001$	0.6%
$Bkgr_{IRF}$ [Cnts/Chnl]	1.78	$\pm 0.12$	6.6%
$Shift_{IRF}$ [ps]	-12.1	$\pm 3.8$	31%
$A_{Scat}$ [kCnts]	2.8	$\pm 2.4$	84%
$\lambda_{Det}$ [nm]	480.0000	---	---

Relative Intensities



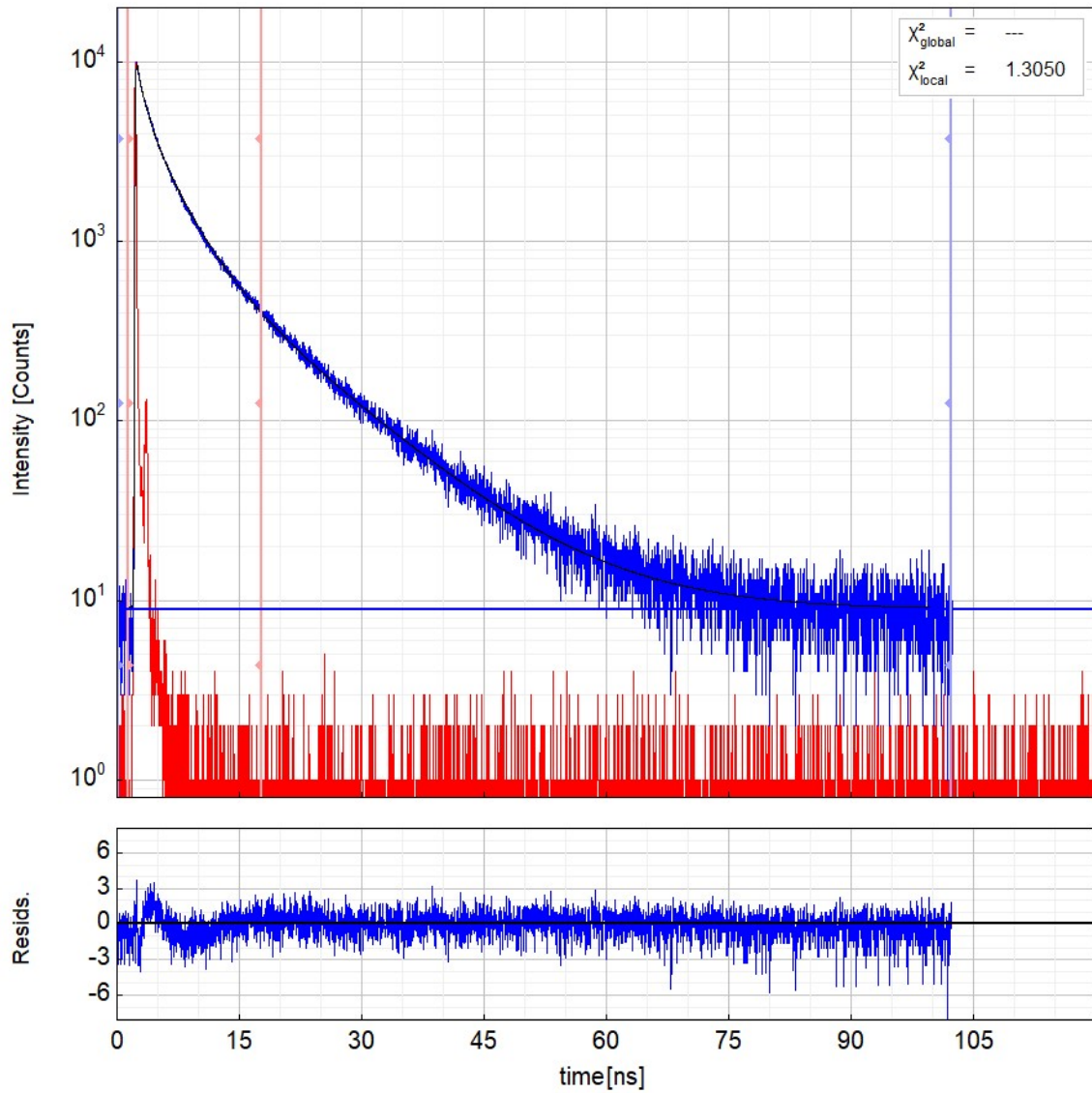
Relative Amplitudes



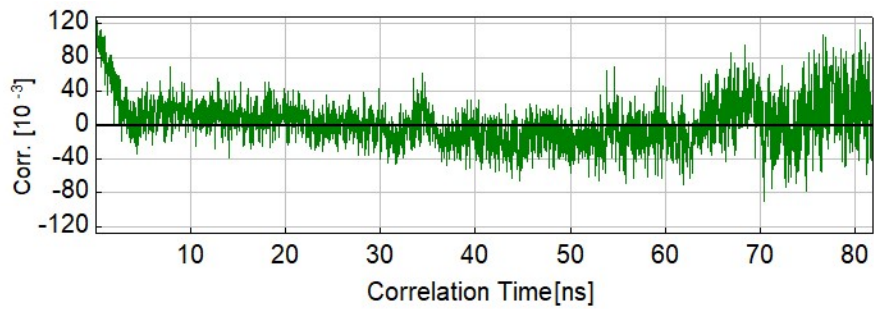
**Data Set: 4 / 17**

Decay: crv[4]; IRF: crv[0]

Fit



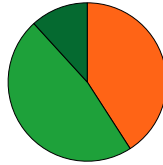
Autocorrelation (Residuals)



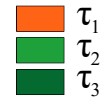
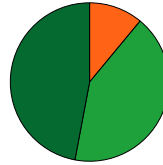
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.345	$\pm 0.013$	1.0%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	595.4	$\pm 4.1$	0.7%
$A_2$ [kCnts/Chnl]	5.125	$\pm 0.035$	0.7%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	689.2	$\pm 4.4$	0.6%
$A_3$ [kCnts/Chnl]	5.743	$\pm 0.059$	1.0%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	171.5	$\pm 3.6$	2.1%
$Bkgr_{Dec}$ [kCnts]	0.0090	$\pm 0.0001$	0.4%
$Bkgr_{IRF}$ [Cnts/Chnl]	0.21	$\pm 0.19$	86%
$Shift_{IRF}$ [ps]	-18.1	$\pm 1.8$	9.7%
$A_{Scat}$ [kCnts]	-2.45	$\pm 0.97$	40%
$\lambda_{Det}$ [nm]	500.0000	---	---

Relative Intensities



Relative Amplitudes

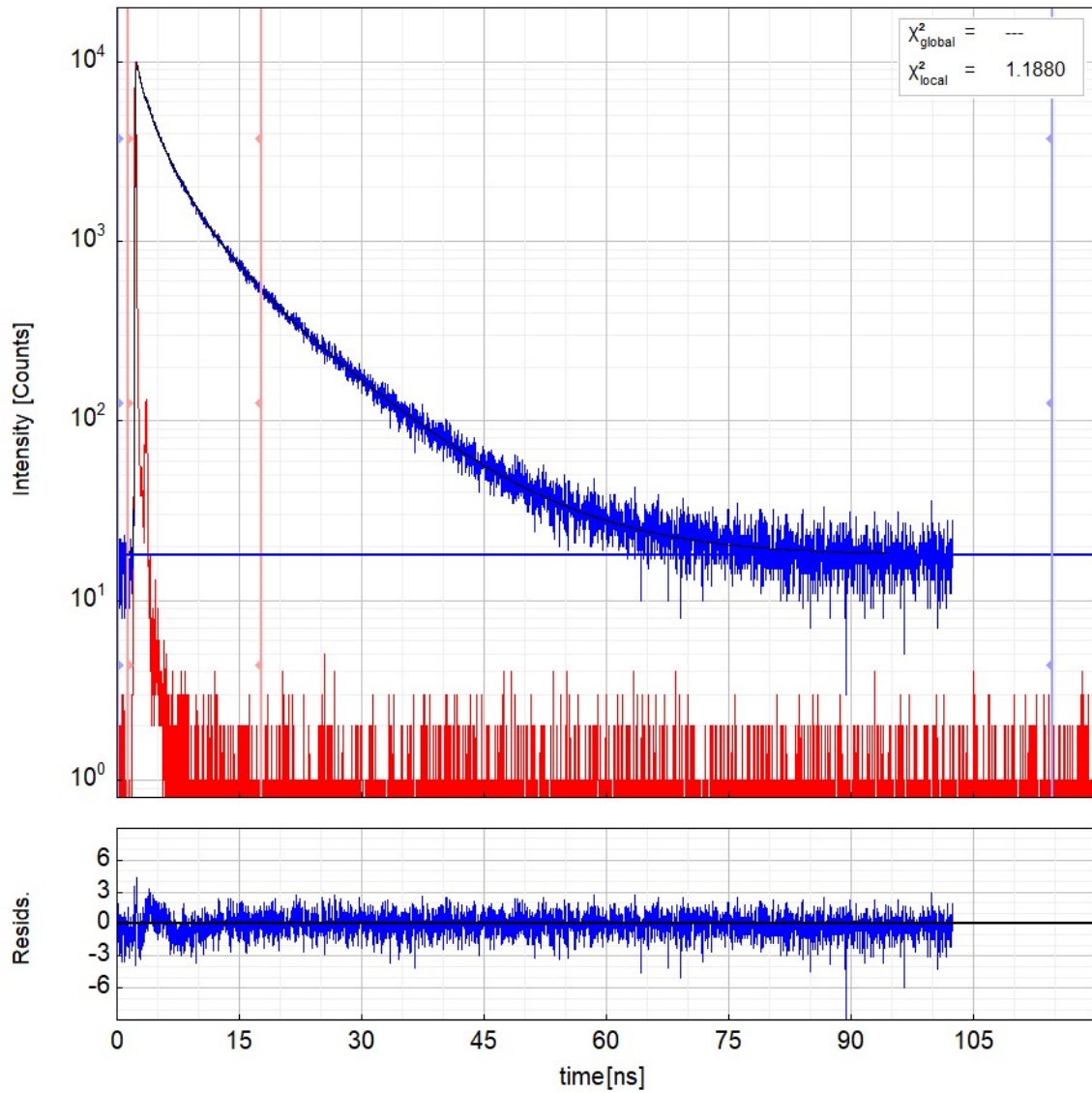




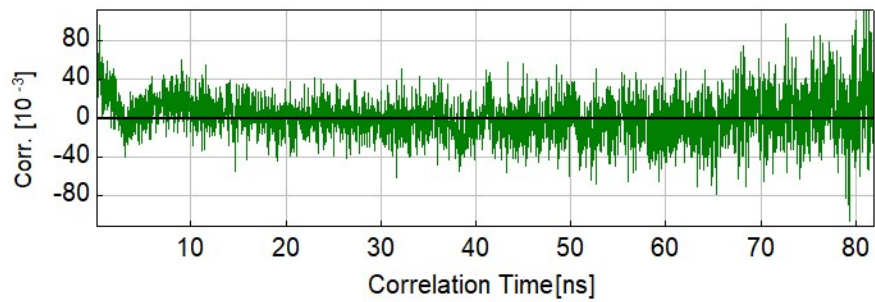
**Data Set: 5 / 17**

Decay: crv[5]; IRF: crv[0]

Fit



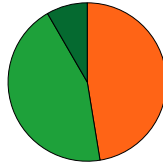
Autocorrelation (Residuals)



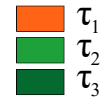
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.801	$\pm 0.019$	1.0%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	797.5	$\pm 4.7$	0.6%
$A_2$ [kCnts/Chnl]	5.529	$\pm 0.055$	1.0%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	743.5	$\pm 4.0$	0.5%
$A_3$ [kCnts/Chnl]	4.712	$\pm 0.080$	1.7%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	140.7	$\pm 4.1$	2.9%
Bkgr <sub>Dec</sub> [kCnts]	0.0179	$\pm 0.0002$	1.0%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	-0.36	$\pm 0.21$	56%
Shift <sub>IRF</sub> [ps]	-19.2	$\pm 1.3$	6.5%
$A_{Scat}$ [kCnts]	-2.95	$\pm 0.66$	22%
$\lambda_{Det}$ [nm]	520.0000	---	---

Relative Intensities



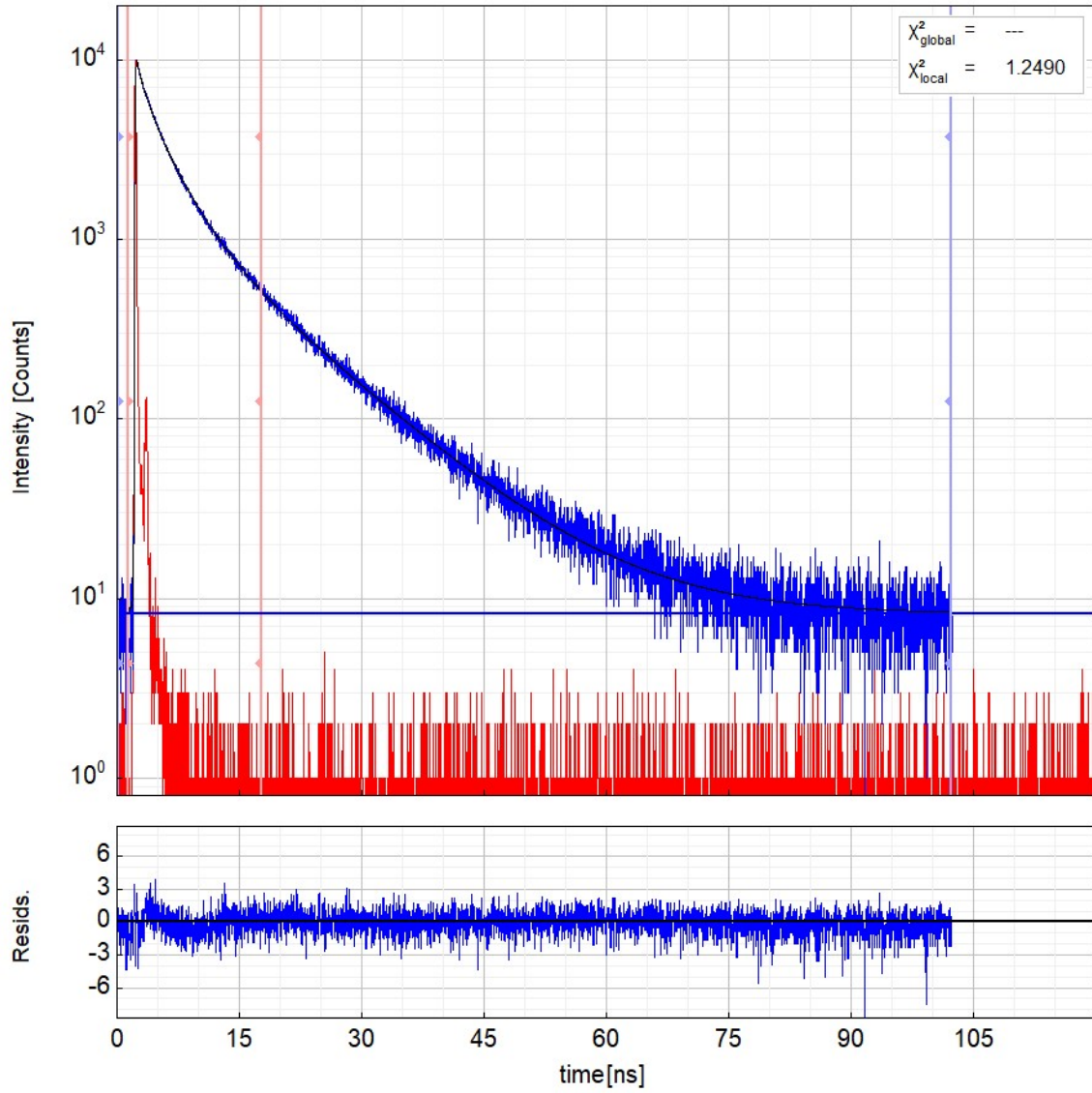
Relative Amplitudes



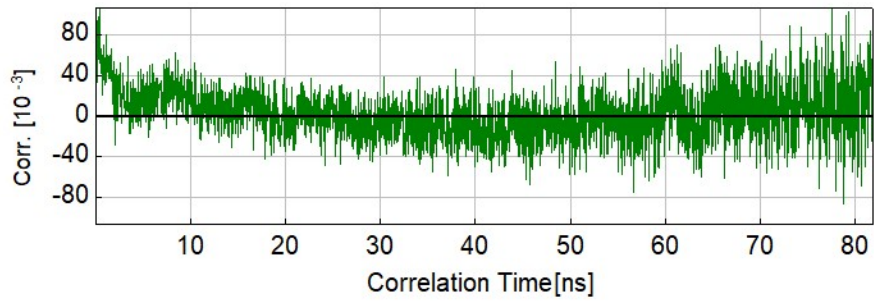
**Data Set: 6 / 17**

Decay: crv[6]; IRF: crv[0]

Fit



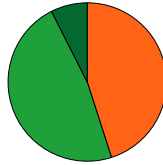
Autocorrelation (Residuals)



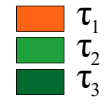
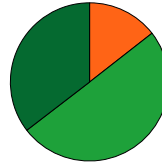
Fitted Parameters

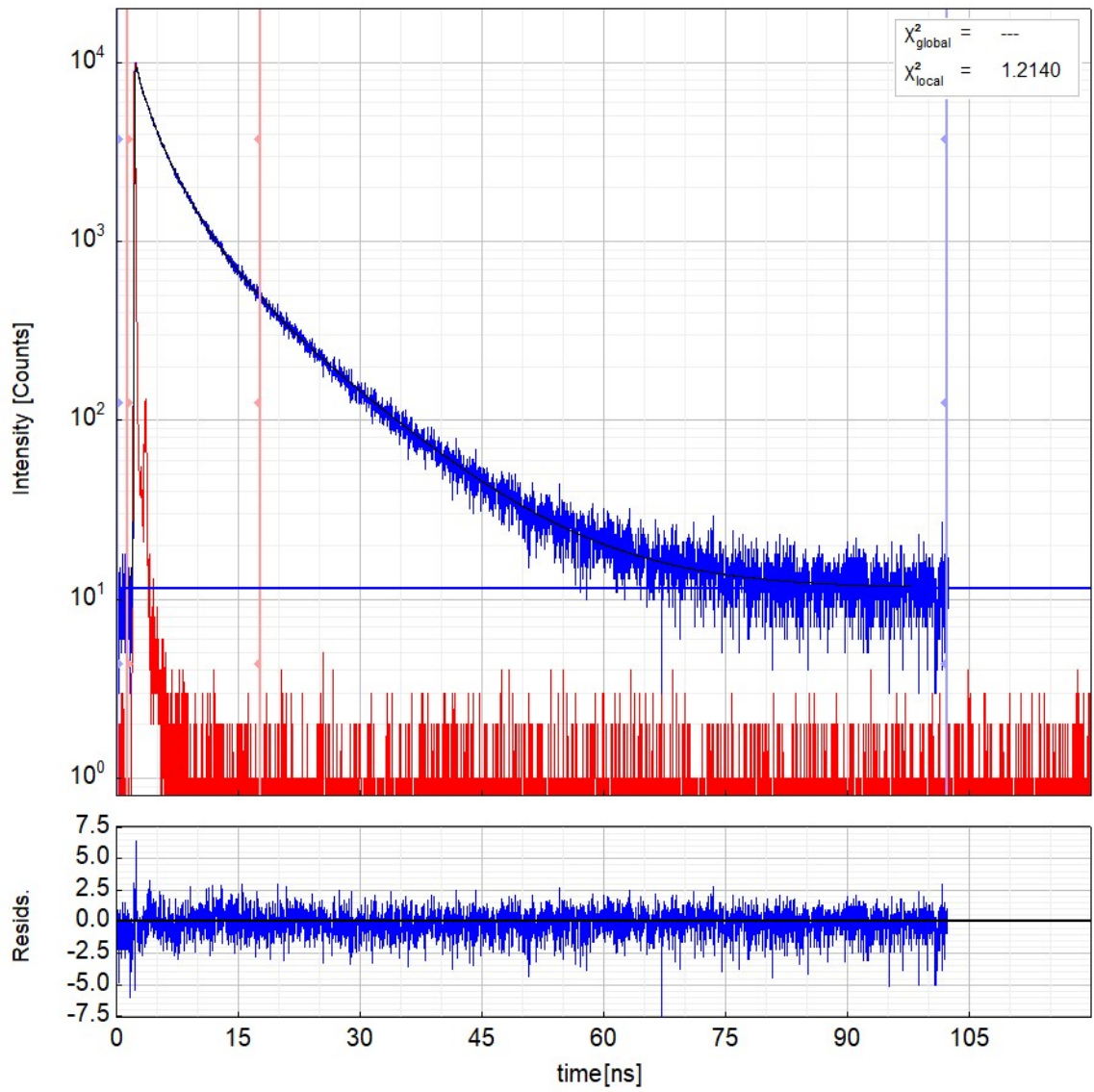
Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.739	$\pm 0.016$	0.9%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	770.0	$\pm 4.9$	0.6%
$A_2$ [kCnts/Chnl]	6.038	$\pm 0.040$	0.6%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	811.9	$\pm 3.7$	0.4%
$A_3$ [kCnts/Chnl]	4.266	$\pm 0.053$	1.2%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	127.4	$\pm 2.1$	1.6%
Bkgr <sub>Dec</sub> [kCnts]	0.0083	$\pm 0.0002$	1.4%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	-0.19	$\pm 0.19$	100%
Shift <sub>IRF</sub> [ps]	-19.41	$\pm 0.81$	4.1%
$A_{Scat}$ [kCnts]	-2.87	$\pm 0.99$	34%
$\lambda_{Det}$ [nm]	540.0000	---	---

Relative Intensities



Relative Amplitudes

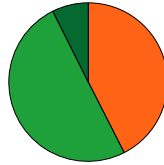




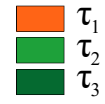
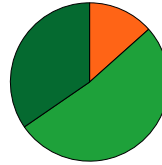
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.586	$\pm 0.017$	1.0%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	702.1	$\pm 4.8$	0.7%
$A_2$ [kCnts/Chnl]	6.152	$\pm 0.027$	0.4%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	827.4	$\pm 3.0$	0.4%
$A_3$ [kCnts/Chnl]	4.092	$\pm 0.072$	1.8%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	122.2	$\pm 3.0$	2.5%
Bkgr <sub>Dec</sub> [kCnts]	0.0115	$\pm 0.0001$	0.5%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	-0.81	$\pm 0.22$	27%
Shift <sub>IRF</sub> [ps]	-33.14	$\pm 0.82$	2.5%
$A_{Scat}$ [kCnts]	-8.08	$\pm 0.29$	3.6%
$\lambda_{Det}$ [nm]	560.0000	---	---

Relative Intensities



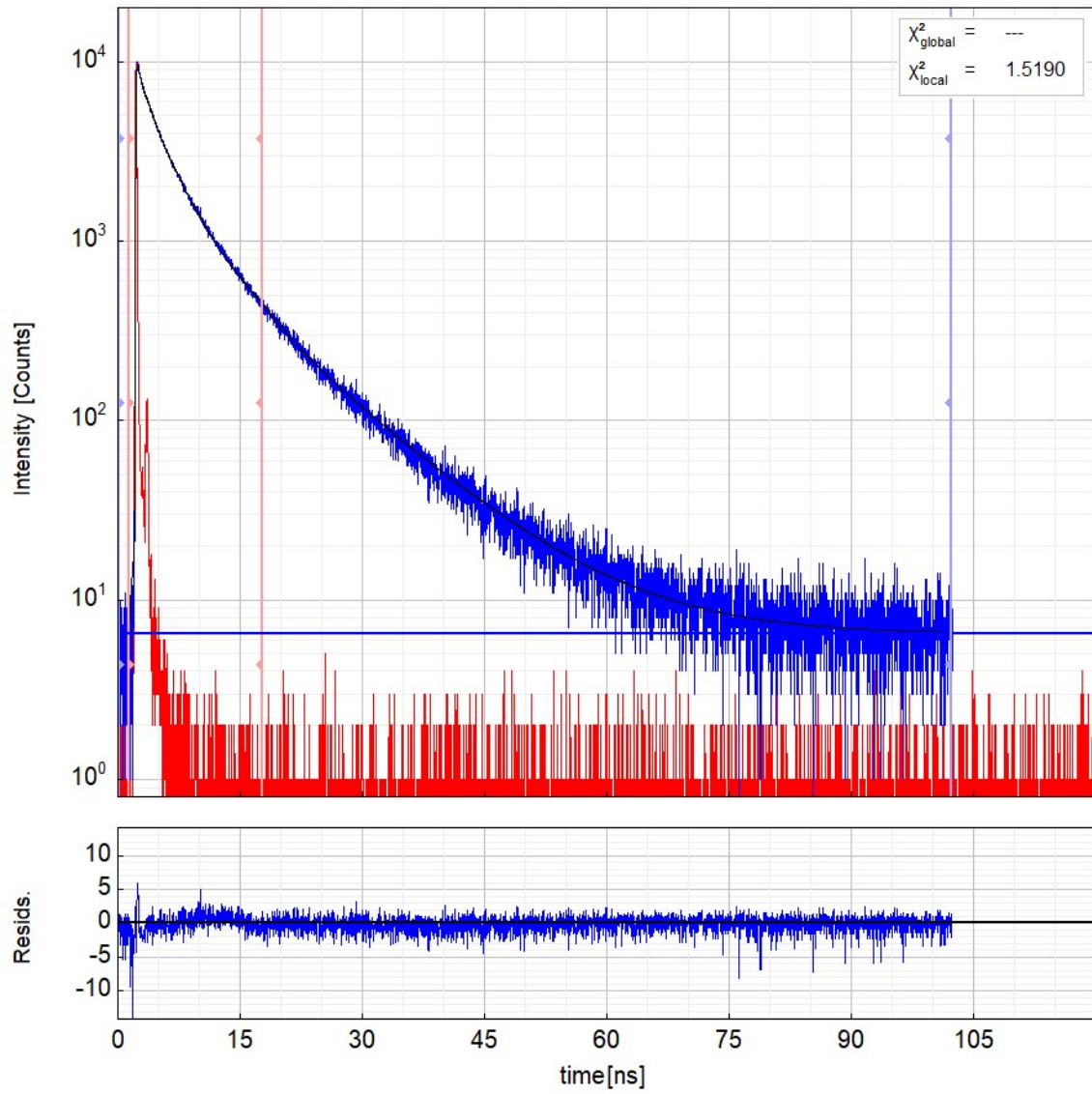
Relative Amplitudes



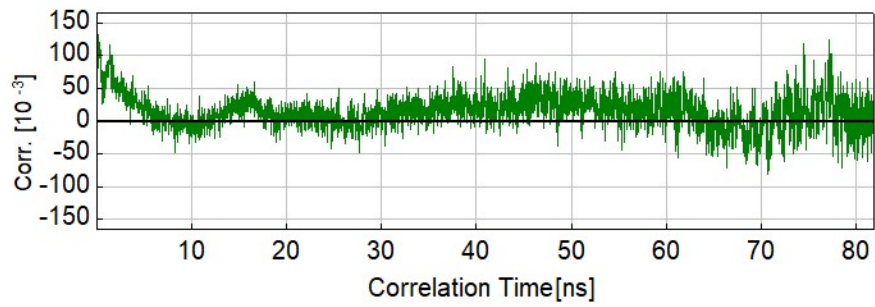
**Data Set: 8 / 17**

Decay: crv[8]; IRF: crv[0]

Fit



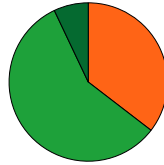
Autocorrelation (Residuals)



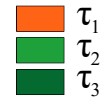
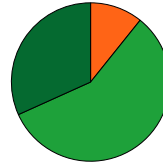
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.254	$\pm 0.026$	2.0%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	555.2	$\pm 9.1$	1.6%
$A_2$ [kCnts/Chnl]	6.701	$\pm 0.030$	0.4%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	901.2	$\pm 3.6$	0.4%
$A_3$ [kCnts/Chnl]	3.700	$\pm 0.053$	1.4%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	110.5	$\pm 2.7$	2.4%
$Bkgr_{Dec}$ [kCnts]	0.0065	$\pm 0.0001$	0.8%
$Bkgr_{IRF}$ [Cnts/Chnl]	-3.25	$\pm 0.25$	7.7%
$Shift_{IRF}$ [ps]	-35.6	$\pm 4.5$	13%
$A_{Scat}$ [kCnts]	-7.7	$\pm 1.3$	16%
$\lambda_{Det}$ [nm]	580.0000	---	---

Relative Intensities



Relative Amplitudes

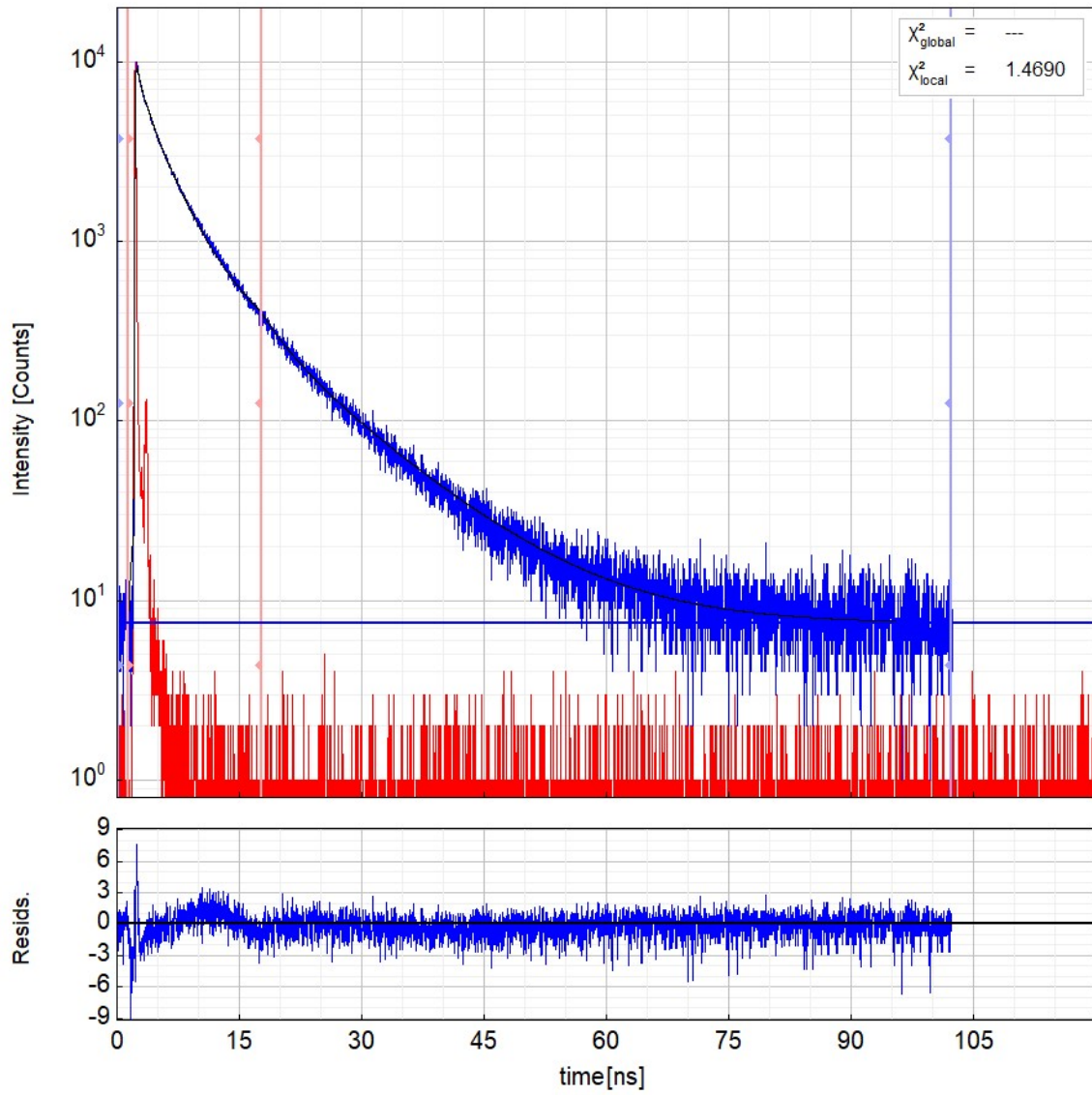




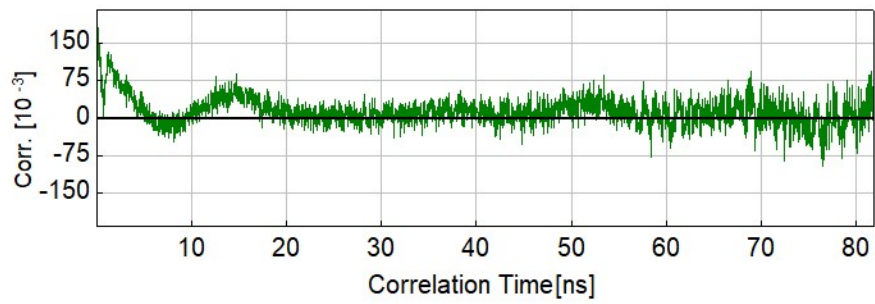
**Data Set: 9 / 17**

Decay: crv[9]; IRF: crv[0]

Fit



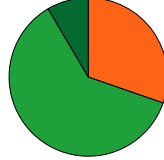
Autocorrelation (Residuals)



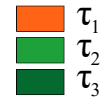
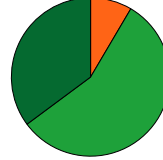
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.975	$\pm 0.016$	1.6%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	431.6	$\pm 5.8$	1.3%
$A_2$ [kCnts/Chnl]	6.479	$\pm 0.038$	0.6%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	871.2	$\pm 3.7$	0.4%
$A_3$ [kCnts/Chnl]	4.05	$\pm 0.11$	2.5%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	120.7	$\pm 3.9$	3.2%
Bkgr <sub>Dec</sub> [kCnts]	0.0075	$\pm 0.0001$	1.3%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	-4.49	$\pm 0.23$	5.1%
Shift <sub>IRF</sub> [ps]	-35.8	$\pm 1.4$	3.8%
$A_{Scat}$ [kCnts]	-7.22	$\pm 0.47$	6.4%
$\lambda_{Det}$ [nm]	600.0000	---	---

Relative Intensities



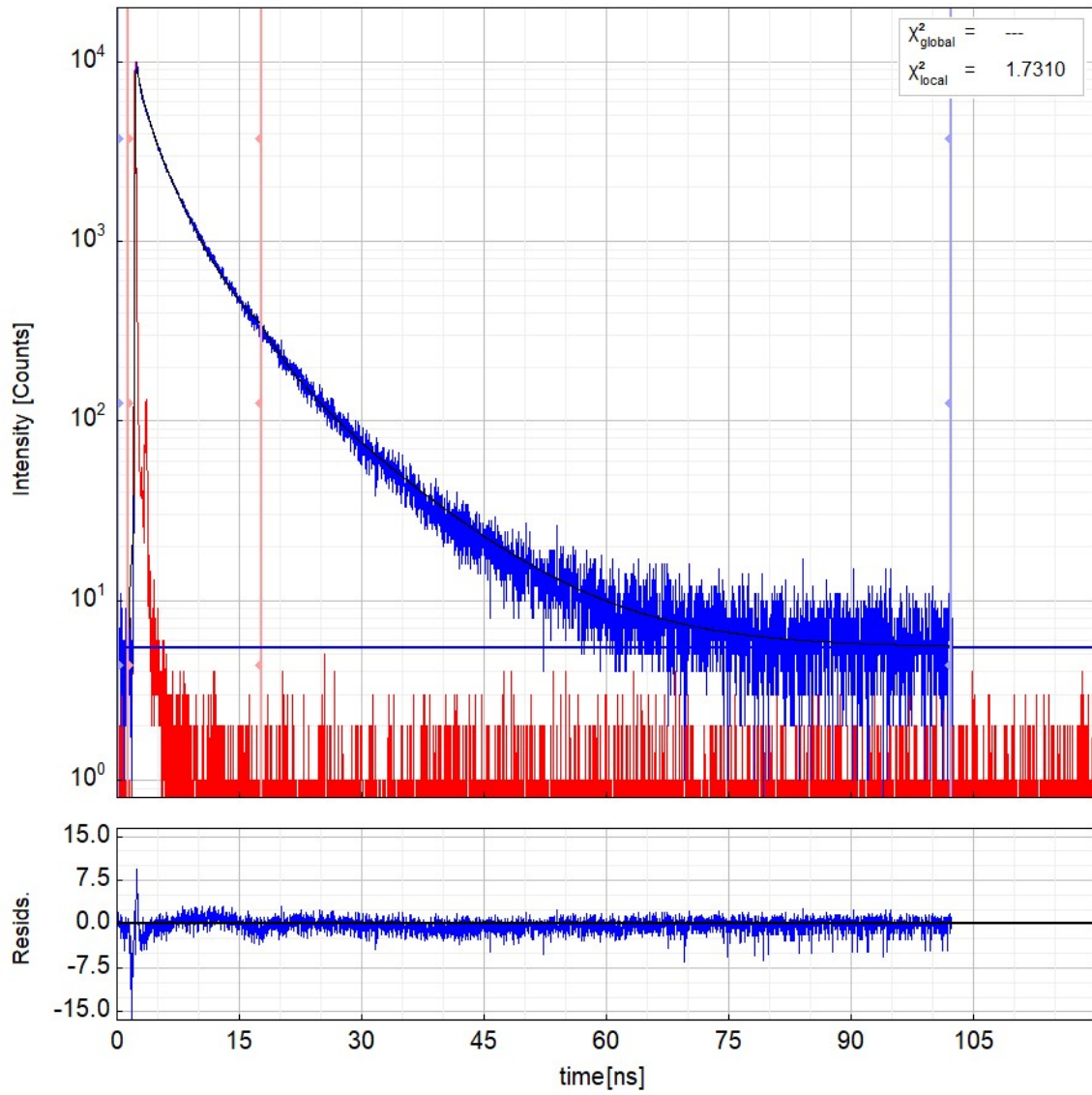
Relative Amplitudes



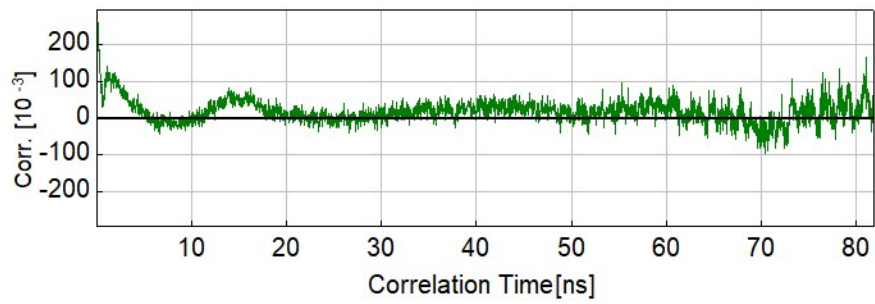
**Data Set: 10 / 17**

Decay: crv[10]; IRF: crv[0]

Fit



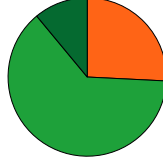
Autocorrelation (Residuals)



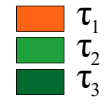
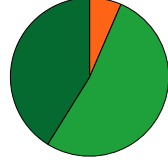
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.7414	$\pm 0.0075$	1.0%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	328.4	$\pm 2.8$	0.8%
$A_2$ [kCnts/Chnl]	5.982	$\pm 0.063$	1.0%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	804.4	$\pm 3.3$	0.4%
$A_3$ [kCnts/Chnl]	4.70	$\pm 0.16$	3.3%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	140.3	$\pm 6.2$	4.4%
Bkgr <sub>Dec</sub> [kCnts]	0.0055	$\pm 0.0001$	1.8%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	-5.40	$\pm 0.30$	5.4%
Shift <sub>IRF</sub> [ps]	-40.2	$\pm 2.8$	6.8%
$A_{Scat}$ [kCnts]	-7.6	$\pm 1.3$	16%
$\lambda_{Det}$ [nm]	620.0000	---	---

Relative Intensities



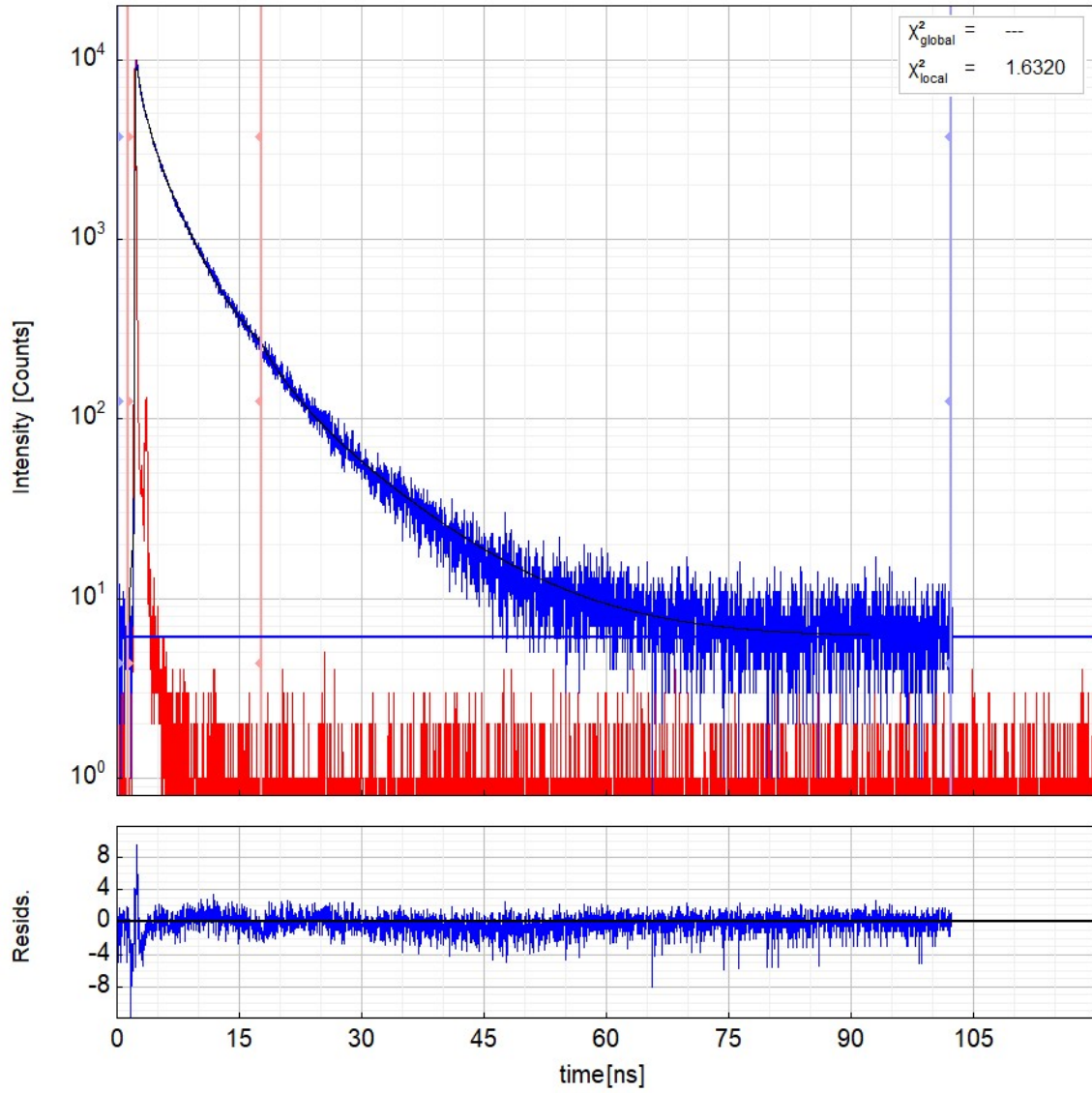
Relative Amplitudes



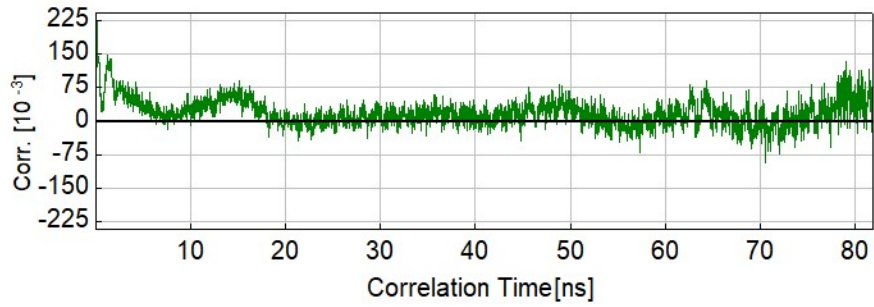
**Data Set: 11 / 17**

Decay: crv[11]; IRF: crv[0]

Fit



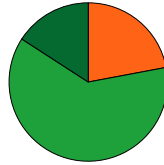
Autocorrelation (Residuals)



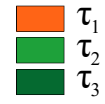
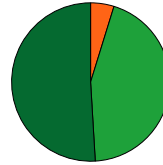
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.5551	$\pm 0.0048$	0.9%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	245.9	$\pm 2.1$	0.8%
$A_2$ [kCnts/Chnl]	5.149	$\pm 0.045$	0.9%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	692.4	$\pm 1.5$	0.2%
$A_3$ [kCnts/Chnl]	5.93	$\pm 0.13$	2.2%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	176.9	$\pm 4.1$	2.3%
Bkgr <sub>Dec</sub> [kCnts]	0.0061	$\pm 0.0001$	1.3%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	-4.46	$\pm 0.24$	5.2%
Shift <sub>IRF</sub> [ps]	-38.3	$\pm 4.3$	11%
$A_{Scat}$ [kCnts]	-6.8	$\pm 1.2$	16%
$\lambda_{Det}$ [nm]	640.0000	---	---

Relative Intensities



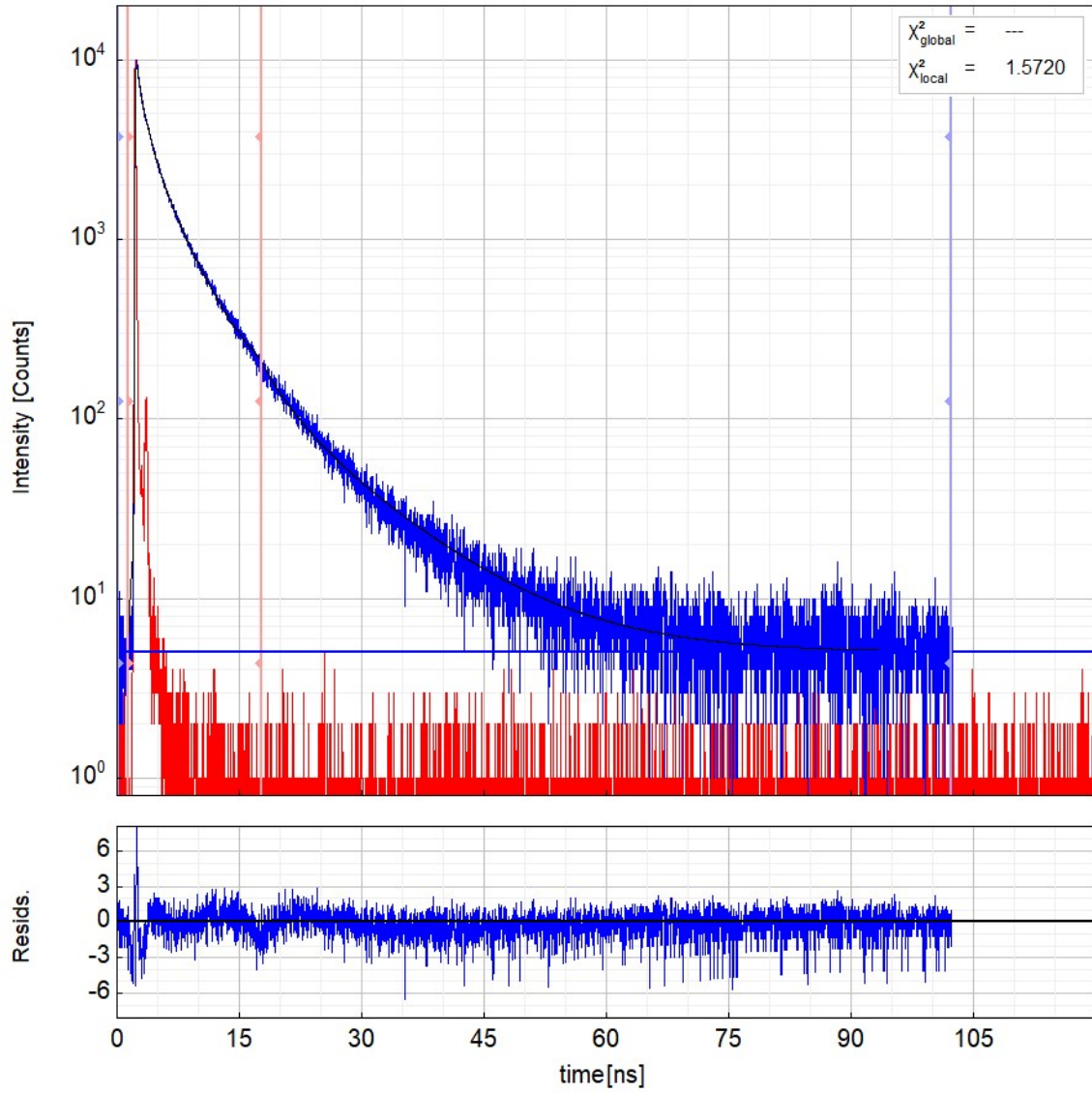
Relative Amplitudes



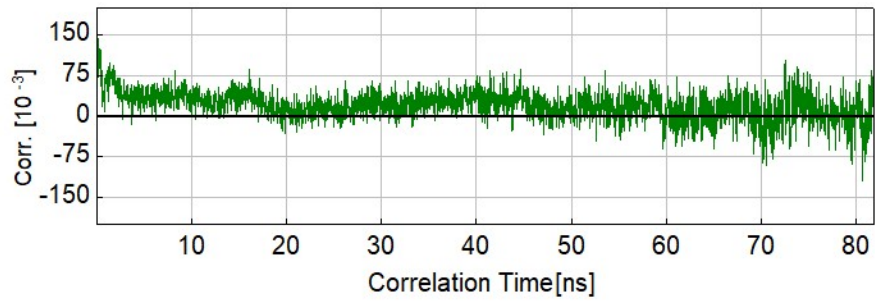
**Data Set: 12 / 17**

Decay: crv[12]; IRF: crv[0]

Fit



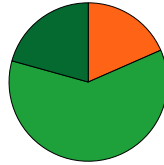
Autocorrelation (Residuals)



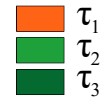
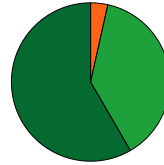
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.4217	$\pm 0.0052$	1.2%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	186.8	$\pm 1.9$	1.0%
$A_2$ [kCnts/Chnl]	4.590	$\pm 0.025$	0.5%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	617.3	$\pm 2.9$	0.5%
$A_3$ [kCnts/Chnl]	7.025	$\pm 0.082$	1.2%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	209.7	$\pm 3.8$	1.8%
$Bkgr_{Dec}$ [kCnts]	0.0051	$\pm 0.0001$	1.6%
$Bkgr_{IRF}$ [Cnts/Chnl]	-3.85	$\pm 0.22$	5.6%
$Shift_{IRF}$ [ps]	-37.4	$\pm 2.0$	5.2%
$A_{Scat}$ [kCnts]	-6.6	$\pm 1.3$	18%
$\lambda_{Det}$ [nm]	660.0000	---	---

Relative Intensities



Relative Amplitudes

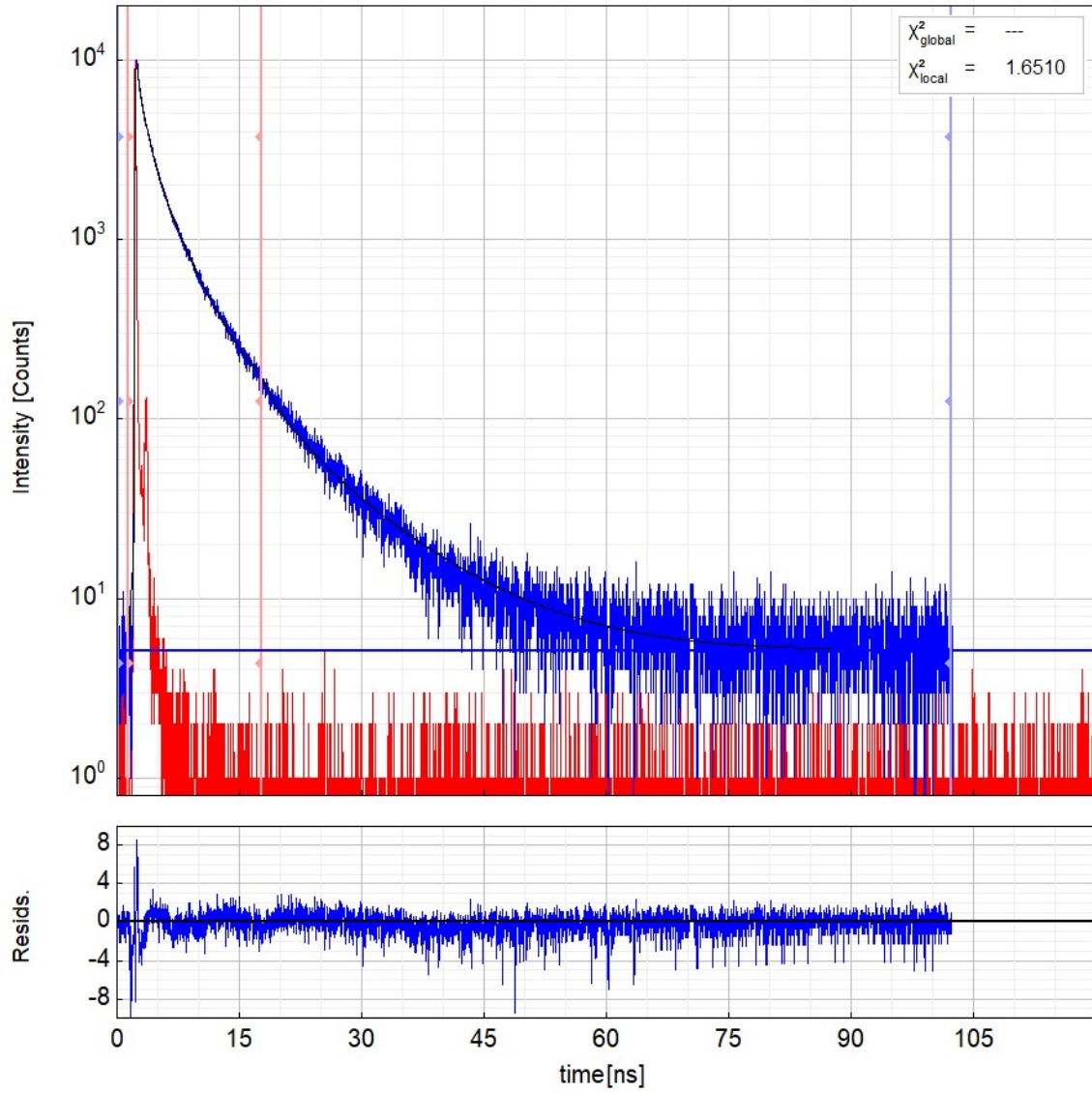




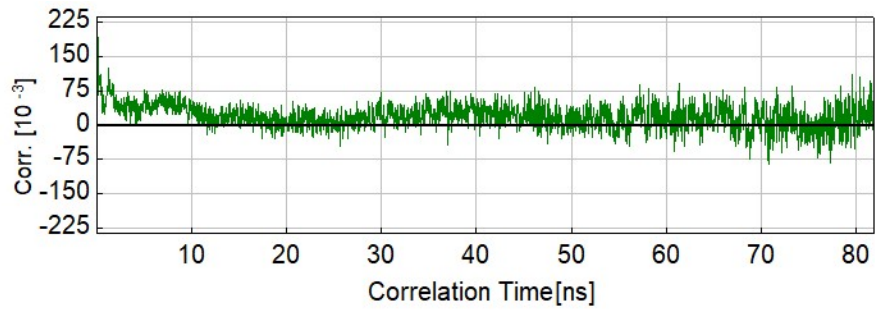
**Data Set: 13 / 17**

Decay: crv[13]; IRF: crv[0]

Fit



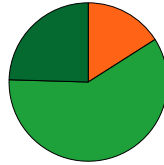
Autocorrelation (Residuals)



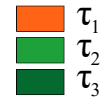
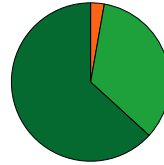
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.3362	$\pm 0.0070$	2.1%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	148.9	$\pm 2.7$	1.8%
$A_2$ [kCnts/Chnl]	4.120	$\pm 0.046$	1.1%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	554.1	$\pm 4.1$	0.7%
$A_3$ [kCnts/Chnl]	7.66	$\pm 0.25$	3.2%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	228.7	$\pm 5.4$	2.3%
$Bkgr_{Dec}$ [kCnts]	0.0051	$\pm 0.0001$	1.1%
$Bkgr_{IRF}$ [Cnts/Chnl]	-3.02	$\pm 0.18$	5.7%
$Shift_{IRF}$ [ps]	-37.4	$\pm 3.9$	10%
$A_{Scat}$ [kCnts]	-7.3	$\pm 1.5$	20%
$\lambda_{Det}$ [nm]	680.0000	---	---

Relative Intensities



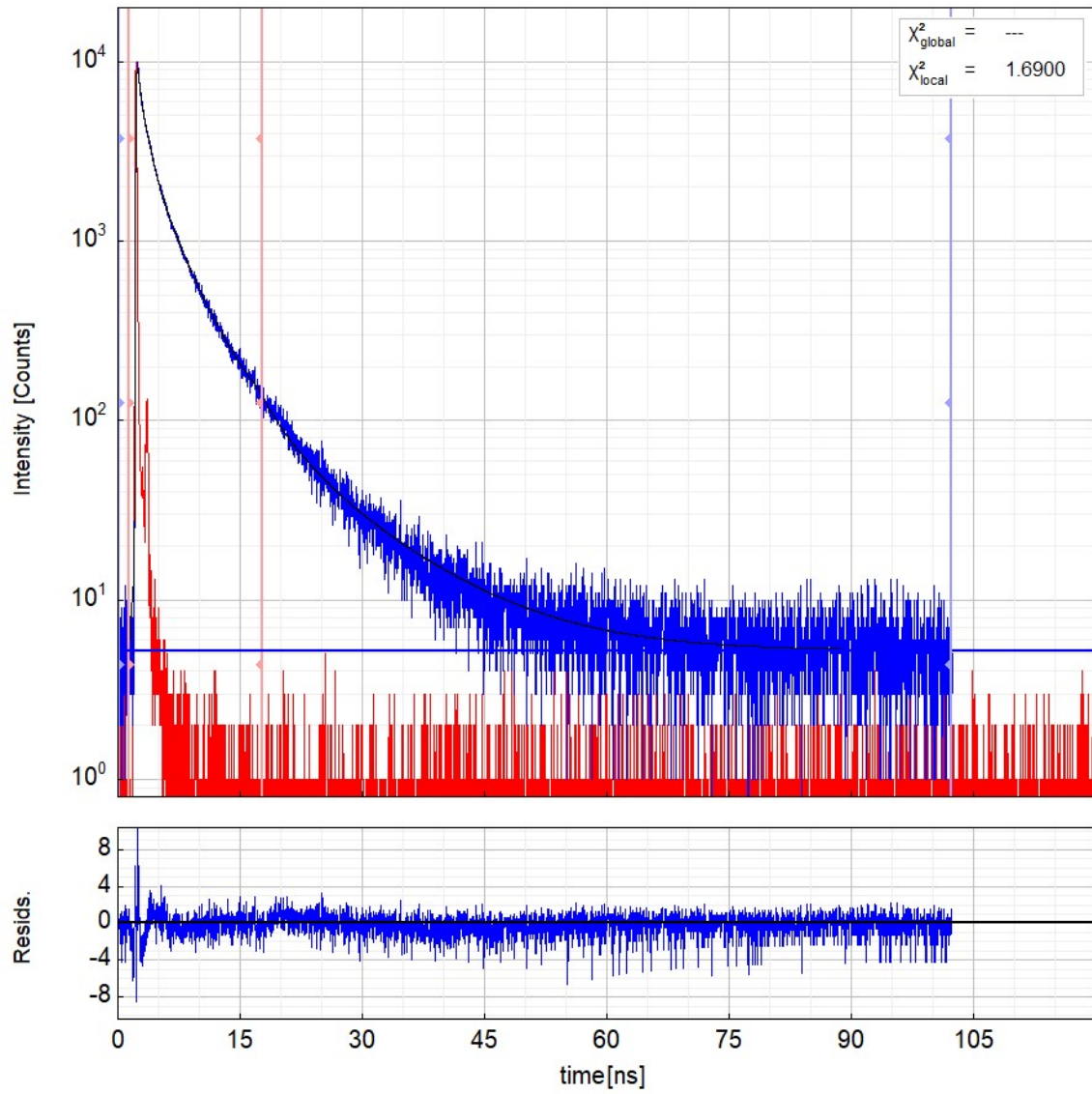
Relative Amplitudes



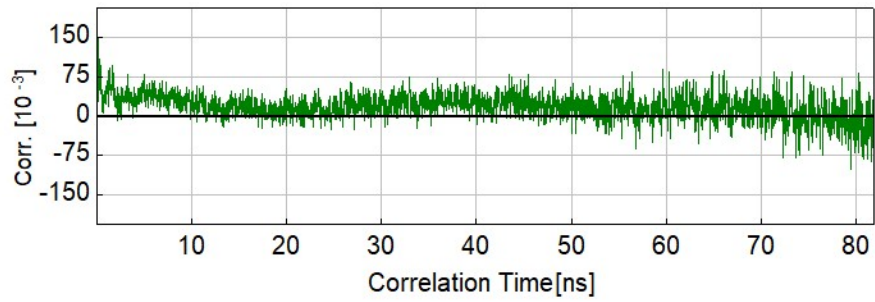
**Data Set: 14 / 17**

Decay: crv[14]; IRF: crv[0]

Fit



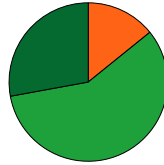
Autocorrelation (Residuals)



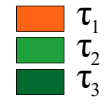
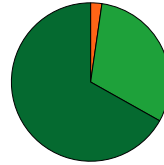
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.2751	$\pm 0.0032$	1.1%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	121.9	$\pm 1.2$	0.9%
$A_2$ [kCnts/Chnl]	3.698	$\pm 0.053$	1.4%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	497.4	$\pm 3.2$	0.6%
$A_3$ [kCnts/Chnl]	8.02	$\pm 0.16$	1.9%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	239.3	$\pm 3.7$	1.5%
$Bkgr_{Dec}$ [kCnts]	0.0052	$\pm 0.0001$	0.6%
$Bkgr_{IRF}$ [Cnts/Chnl]	-2.190	$\pm 0.075$	3.4%
$Shift_{IRF}$ [ps]	-38.2	$\pm 6.4$	17%
$A_{Scat}$ [kCnts]	-7.2	$\pm 2.8$	38%
$\lambda_{Det}$ [nm]	700.0000	---	---

Relative Intensities



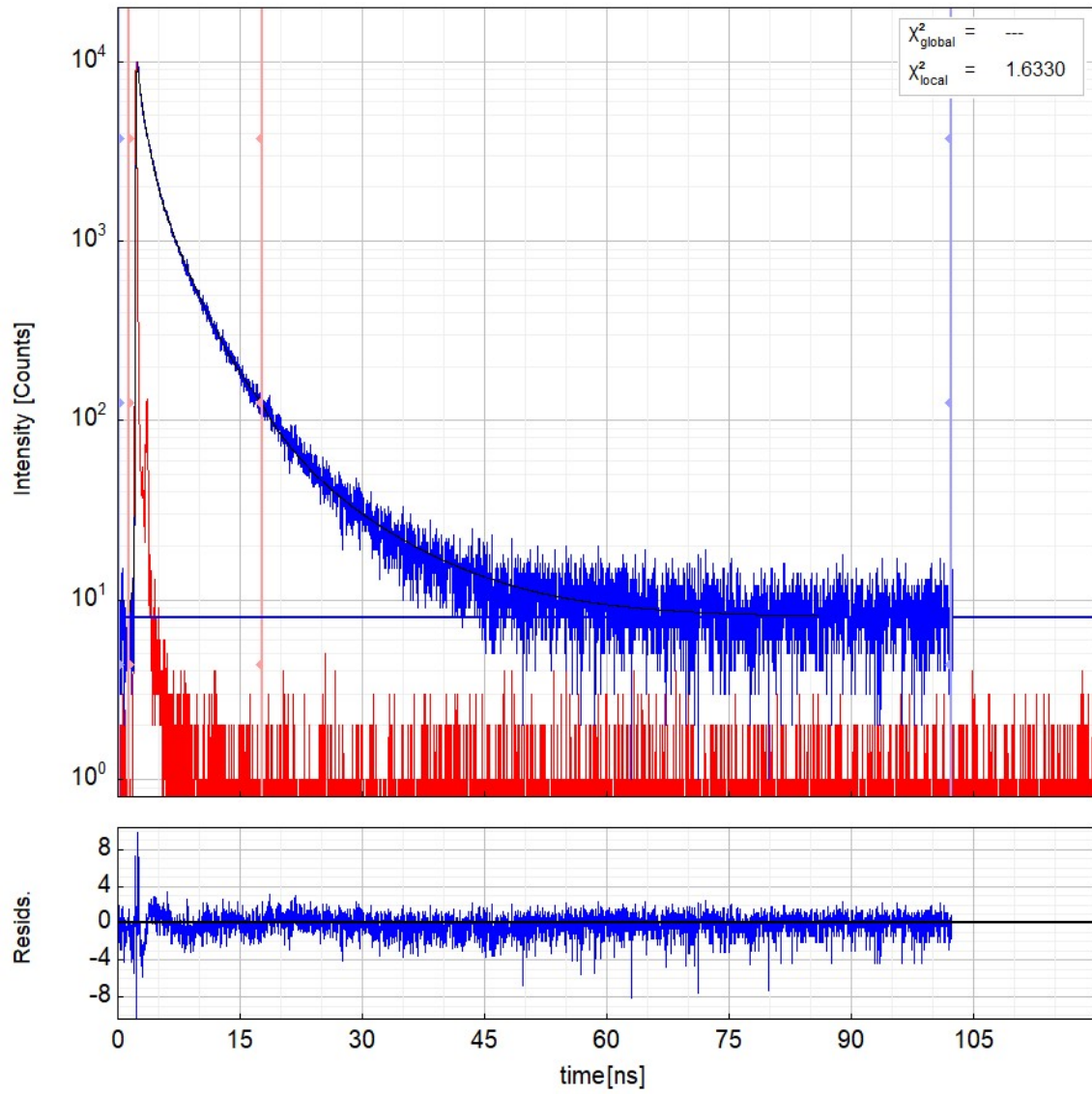
Relative Amplitudes



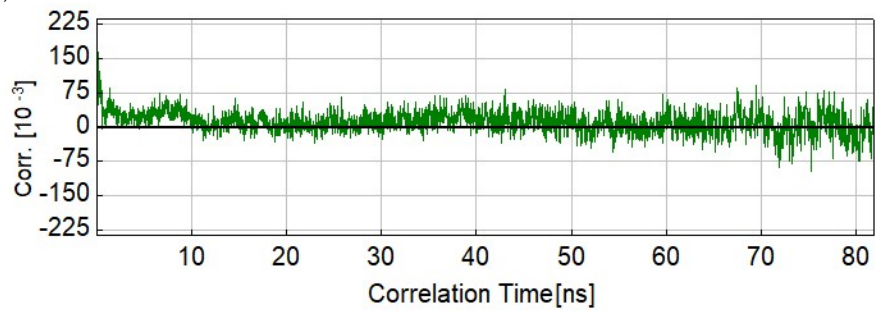
**Data Set: 15 / 17**

Decay: crv[15]; IRF: crv[0]

Fit



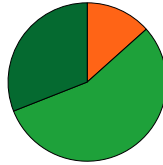
Autocorrelation (Residuals)



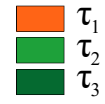
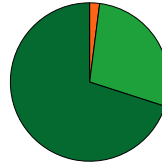
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.2481	$\pm 0.0049$	1.9%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	109.9	$\pm 1.9$	1.7%
$A_2$ [kCnts/Chnl]	3.397	$\pm 0.049$	1.4%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	456.8	$\pm 3.2$	0.7%
$A_3$ [kCnts/Chnl]	8.52	$\pm 0.17$	1.9%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	254.3	$\pm 4.9$	1.9%
$Bkgr_{Dec}$ [kCnts]	0.0081	$\pm 0.0001$	1.2%
$Bkgr_{IRF}$ [Cnts/Chnl]	-1.41	$\pm 0.19$	13%
$Shift_{IRF}$ [ps]	-40.9	$\pm 4.2$	10%
$A_{Scat}$ [kCnts]	-7.8	$\pm 2.4$	31%
$\lambda_{Det}$ [nm]	720.0000	---	---

Relative Intensities



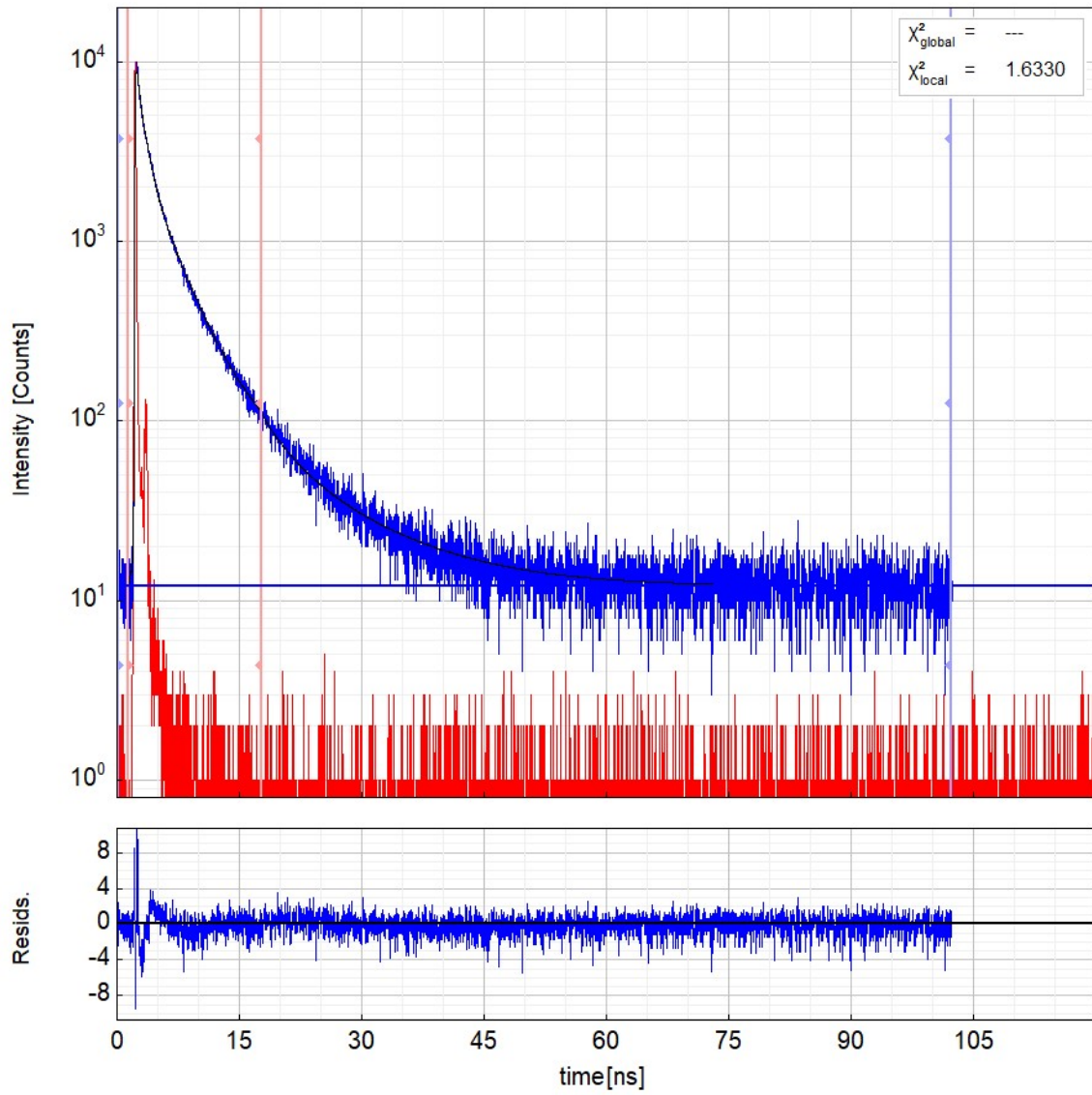
Relative Amplitudes



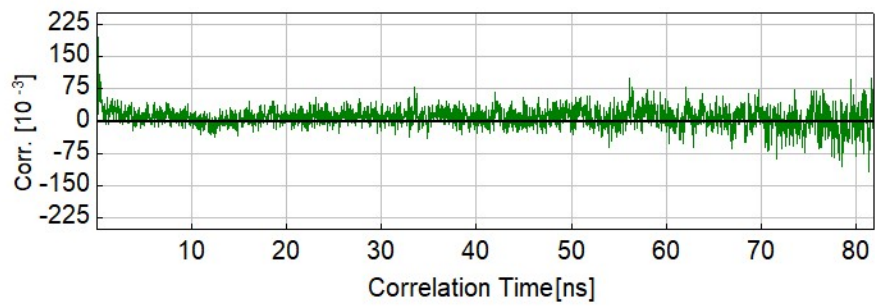
**Data Set: 16 / 17**

Decay: crv[16]; IRF: crv[0]

Fit



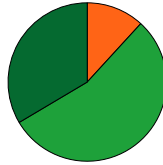
Autocorrelation (Residuals)



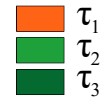
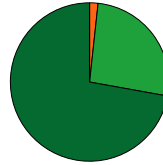
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.2059	$\pm 0.0027$	1.3%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	91.2	$\pm 1.3$	1.4%
$A_2$ [kCnts/Chnl]	3.141	$\pm 0.041$	1.3%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	422.4	$\pm 3.1$	0.7%
$A_3$ [kCnts/Chnl]	8.68	$\pm 0.18$	2.0%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	259.0	$\pm 3.7$	1.4%
$Bkgr_{Dec}$ [kCnts]	0.0120	$\pm 0.0002$	1.0%
$Bkgr_{IRF}$ [Cnts/Chnl]	-1.19	$\pm 0.14$	11%
$Shift_{IRF}$ [ps]	-42	$\pm 11$	25%
$A_{Scat}$ [kCnts]	-7.2	$\pm 4.8$	66%
$\lambda_{Det}$ [nm]	740.0000	---	---

Relative Intensities



Relative Amplitudes

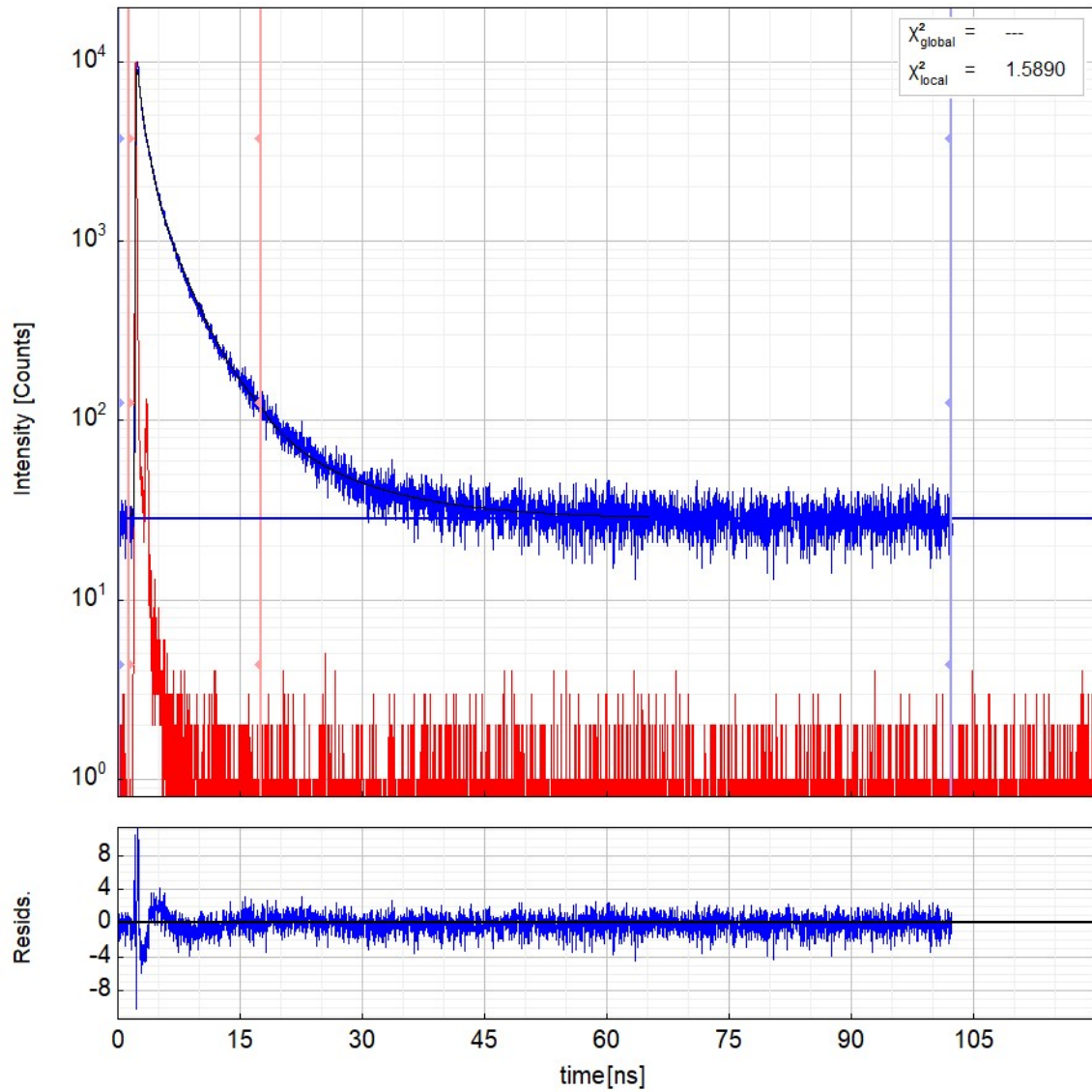




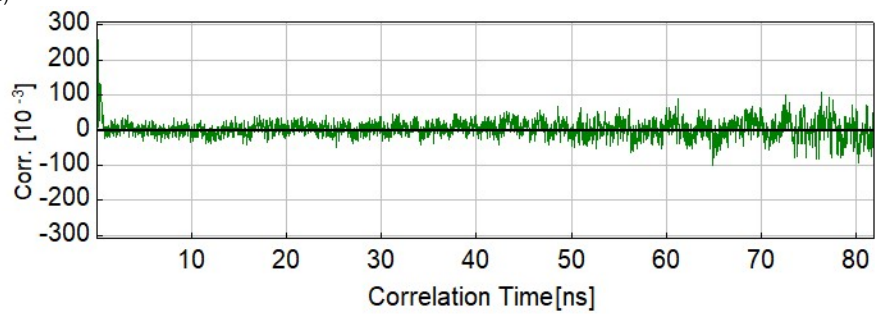
### Data Set: 17 / 17

Decay: crv[17]; IRF: crv[0]

Fit



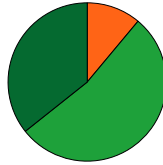
Autocorrelation (Residuals)



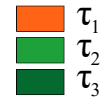
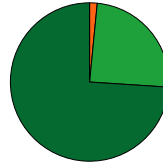
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.1867	$\pm 0.0060$	3.2%
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$I_1$ [kCnts]	82.7	$\pm 2.7$	3.2%
$A_2$ [kCnts/Chnl]	2.954	$\pm 0.038$	1.3%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$I_2$ [kCnts]	397.3	$\pm 3.0$	0.7%
$A_3$ [kCnts/Chnl]	8.93	$\pm 0.29$	3.2%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%
$I_3$ [kCnts]	266.4	$\pm 5.1$	1.9%
Bkgr <sub>Dec</sub> [kCnts]	0.0284	$\pm 0.0002$	0.5%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	-0.80	$\pm 0.24$	30%
Shift <sub>IRF</sub> [ps]	-55.5	$\pm 8.8$	16%
$A_{Scat}$ [kCnts]	-5.2	$\pm 4.1$	79%
$\lambda_{Det}$ [nm]	760.0000	---	---

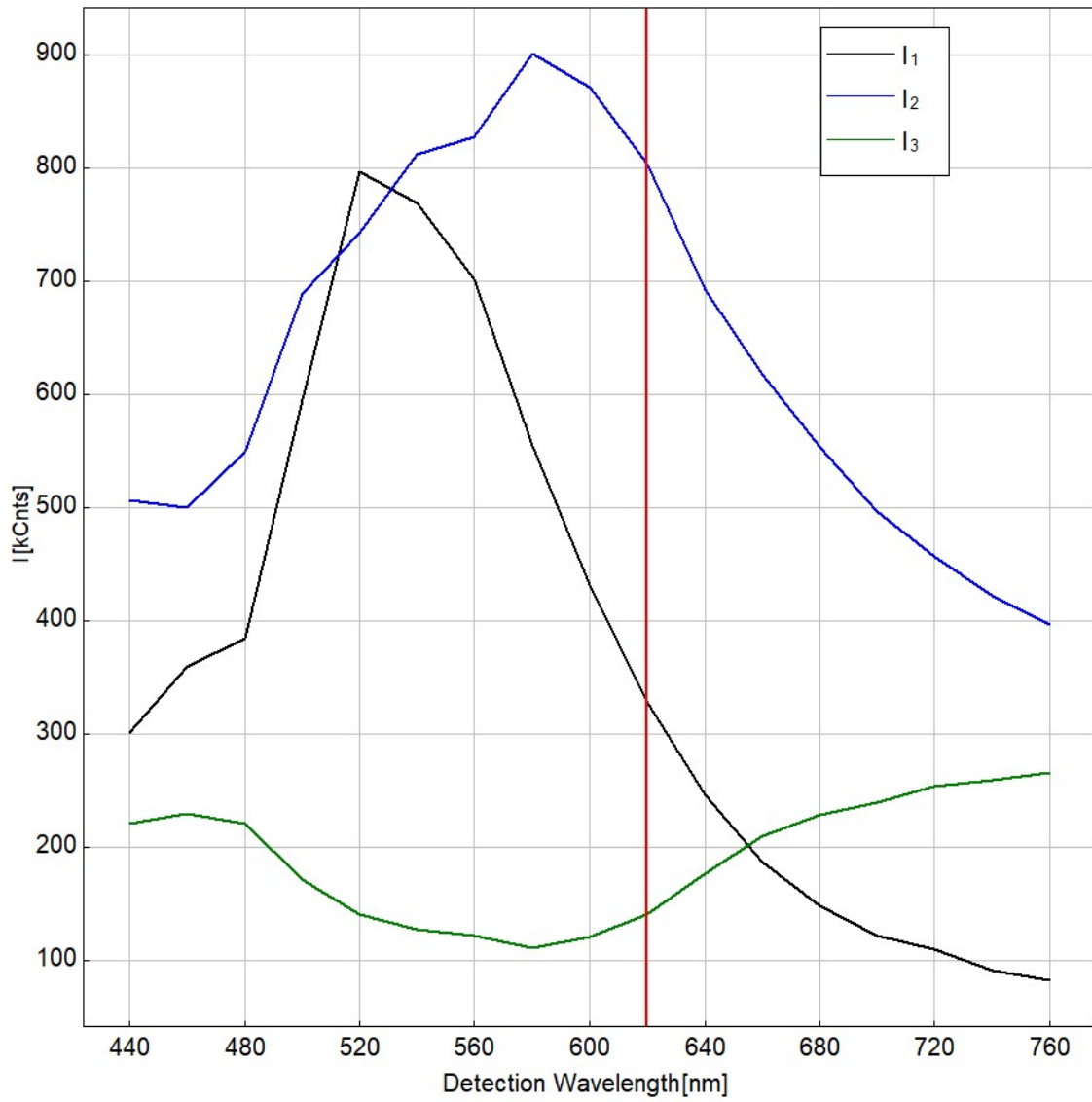
Relative Intensities



Relative Amplitudes



### Parameter Plot



### Global Parameters

Parameter	Value	$\Delta$	$\delta$
$\tau_1$ [ns]	11.072	$\pm 0.040$	0.4%
$\tau_2$ [ns]	3.363	$\pm 0.021$	0.6%
$\tau_3$ [ns]	0.747	$\pm 0.011$	1.4%

# EasyTau Report

9/4/2020 7:35:25 PM



## Container Curves

TRES+IRF\_20200617\_1628.etc: crv[0 - 16]

## Container Properties

Measurement Context: Time Resolved Emission Scan

Detection Wavelength: 440.0 - 740.0 (Step: 20.0) nm

Summary:

Sample: CD3  
Solvent: Dimethyl sulfoxide  
Excitation: V pol 376±1nm with LDH-P-C-375  
Detection: M pol 440...740nm 20nm steps  
10000 peak counts  
grating 1200/500+  
detector UV-red [PMT]

## Comment

[\[Edit Comment\]](#)

## Model: Exponential [Reconv.]

$$\text{Dec}(t) = \left[ \int_{-\infty}^t dt' [\text{IRF}(t - \text{Shift}_{\text{IRF}}) - \text{Bkg}_{\text{IRF}}] \left[ \sum_{i=1}^{n_{\text{Exp}}} A_i e^{-\frac{t-t'}{\tau_i}} + A_{\text{Scatt}} \delta(t-t') \right] \right] + \text{Bkg}_{\text{Dec}}$$

$$I_m = A_m \tau_m$$

$$A_{\text{Rel } m} = A_m / \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i$$

$$I_{\text{Rel } m} = I_m / \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i$$

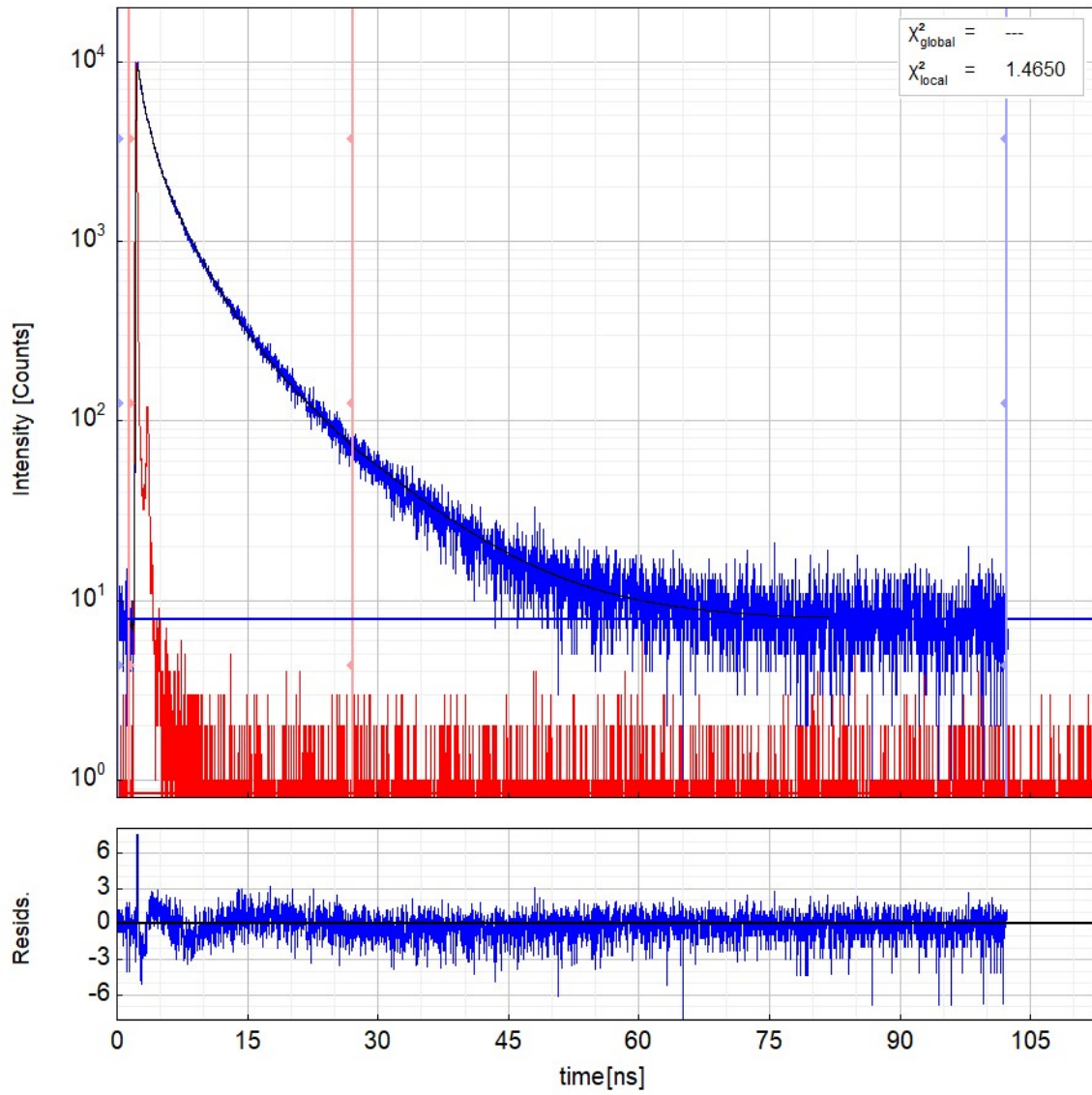
$$\tau_{\text{Av Amp}} = \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i \tau_i / \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i$$

$$\tau_{\text{Av Int}} = \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i \tau_i / \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i$$

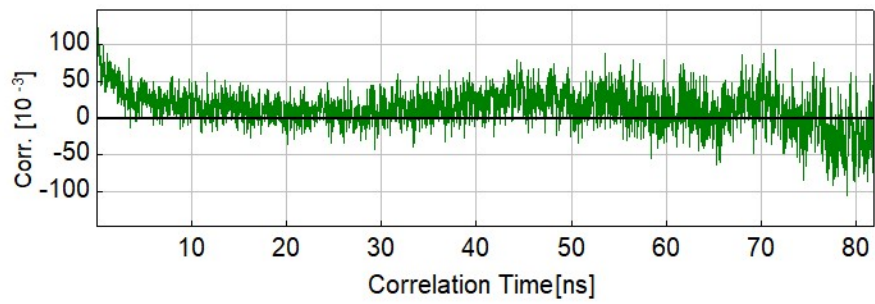
**Data Set: 1 / 16**

Decay: crv[1]; IRF: crv[0]

Fit



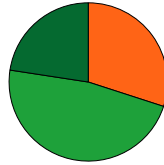
Autocorrelation (Residuals)



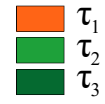
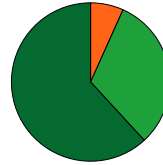
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.825	$\pm 0.023$	2.7%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	324.6	$\pm 6.3$	1.9%
$A_2$ [kCnts/Chnl]	3.861	$\pm 0.050$	1.3%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	513.5	$\pm 2.6$	0.5%
$A_3$ [kCnts/Chnl]	7.593	$\pm 0.097$	1.3%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	244.5	$\pm 5.0$	2.0%
Bkgr <sub>Dec</sub> [kCnts]	0.0078	$\pm 0.0001$	0.8%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	0.836	$\pm 0.098$	12%
Shift <sub>IRF</sub> [ps]	-50.4	$\pm 1.5$	2.9%
$A_{Scat}$ [kCnts]	-15.11	$\pm 0.40$	2.6%
$\lambda_{Det}$ [nm]	440.0000	---	---

Relative Intensities



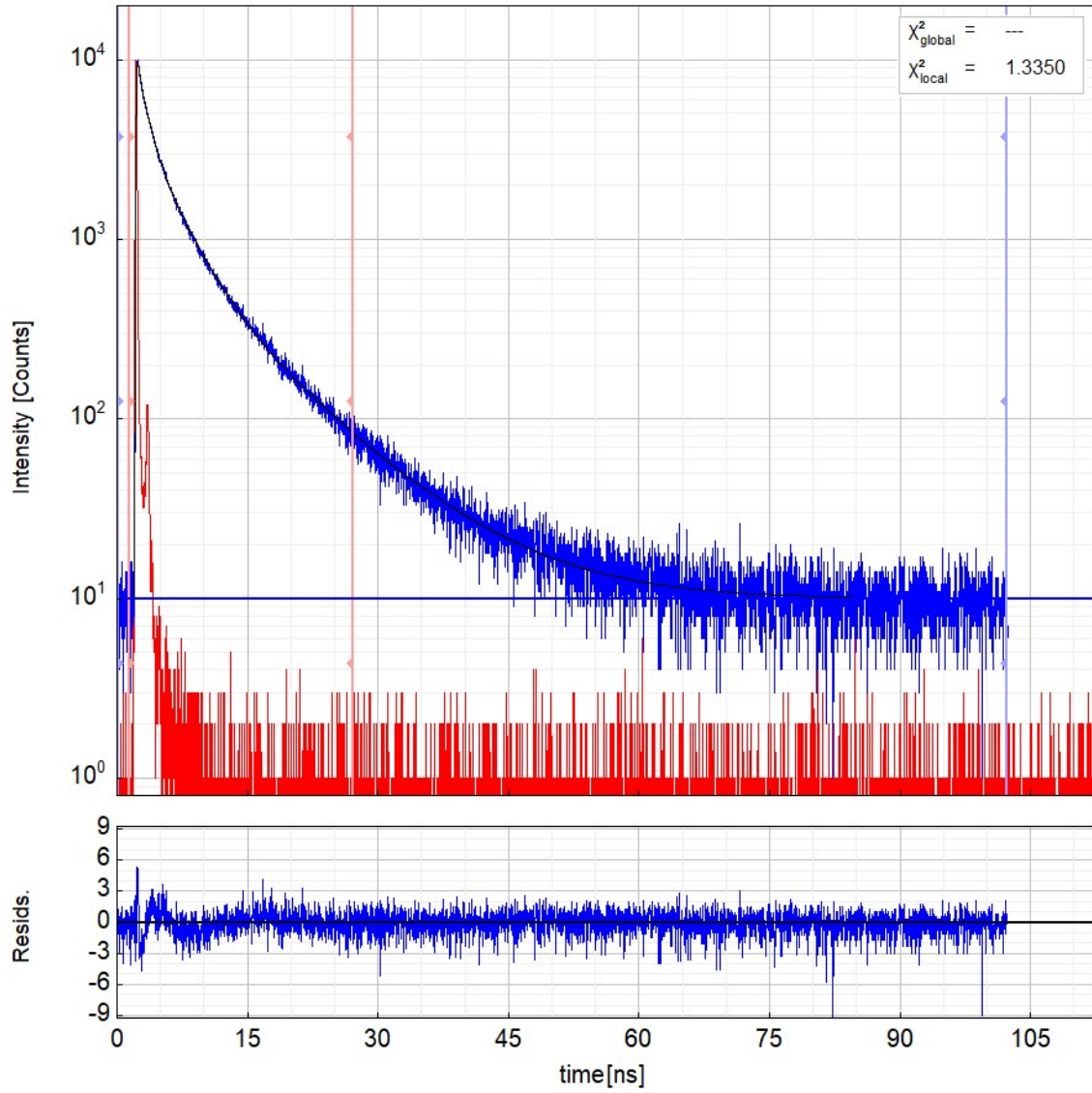
Relative Amplitudes



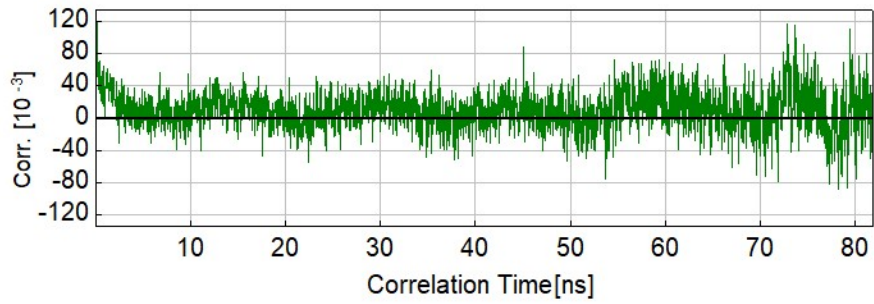
**Data Set: 2 / 16**

Decay: crv[2]; IRF: crv[0]

Fit



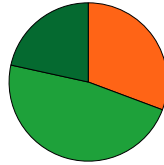
Autocorrelation (Residuals)



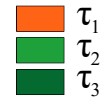
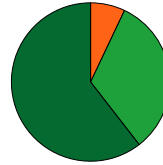
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.879	$\pm 0.015$	1.7%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	345.9	$\pm 4.4$	1.3%
$A_2$ [kCnts/Chnl]	4.045	$\pm 0.055$	1.3%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	537.9	$\pm 3.8$	0.7%
$A_3$ [kCnts/Chnl]	7.544	$\pm 0.090$	1.2%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	243.0	$\pm 4.2$	1.7%
$Bkgr_{Dec}$ [kCnts]	0.0100	$\pm 0.0001$	0.6%
$Bkgr_{IRF}$ [Cnts/Chnl]	0.415	$\pm 0.065$	16%
$Shift_{IRF}$ [ps]	-50.0	$\pm 2.9$	5.7%
$A_{Scat}$ [kCnts]	-14.59	$\pm 0.73$	5.0%
$\lambda_{Det}$ [nm]	460.0000	---	---

Relative Intensities



Relative Amplitudes

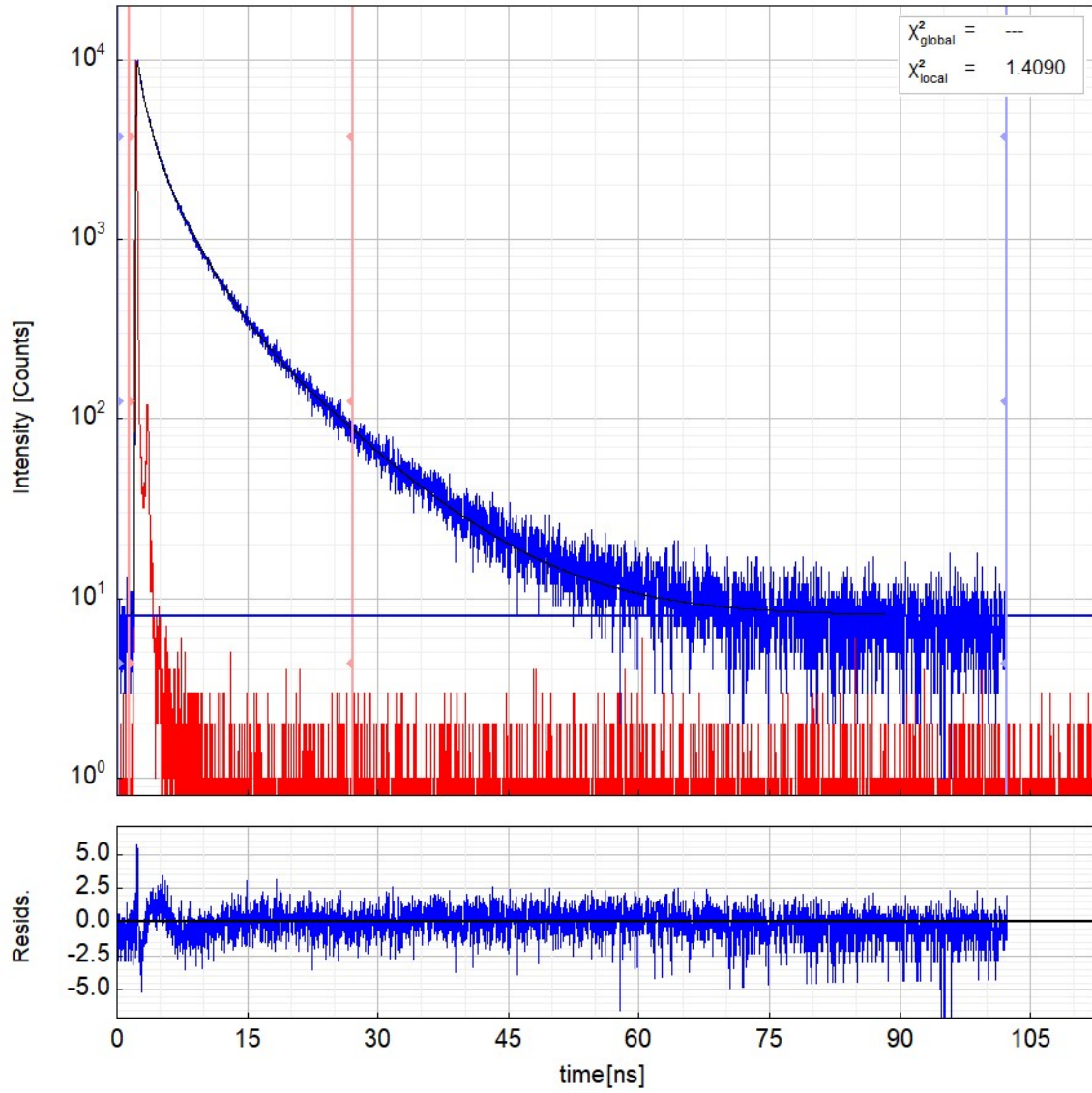




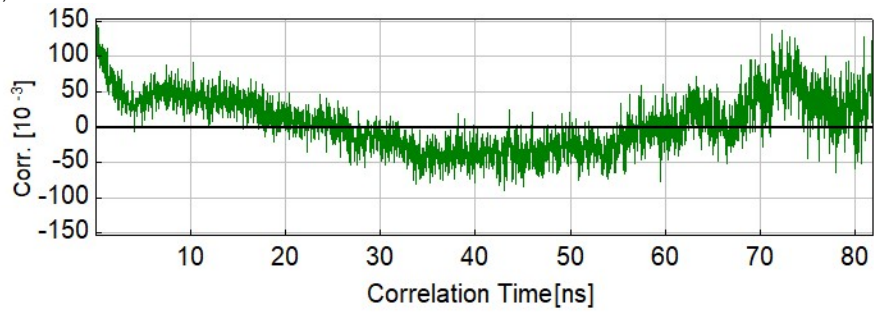
**Data Set: 3 / 16**

Decay: crv[3]; IRF: crv[0]

Fit



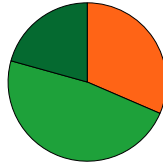
Autocorrelation (Residuals)



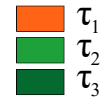
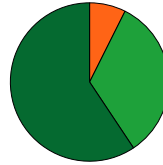
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.924	$\pm 0.020$	2.2%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	363.4	$\pm 5.7$	1.5%
$A_2$ [kCnts/Chnl]	4.153	$\pm 0.059$	1.4%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	552.3	$\pm 3.3$	0.6%
$A_3$ [kCnts/Chnl]	7.413	$\pm 0.099$	1.3%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	238.7	$\pm 6.0$	2.5%
$Bkgr_{Dec}$ [kCnts]	0.0081	$\pm 0.0001$	0.7%
$Bkgr_{IRF}$ [Cnts/Chnl]	0.28	$\pm 0.11$	38%
$Shift_{IRF}$ [ps]	-48.5	$\pm 1.4$	2.8%
$A_{Scat}$ [kCnts]	-13.75	$\pm 0.54$	3.9%
$\lambda_{Det}$ [nm]	480.0000	---	---

Relative Intensities



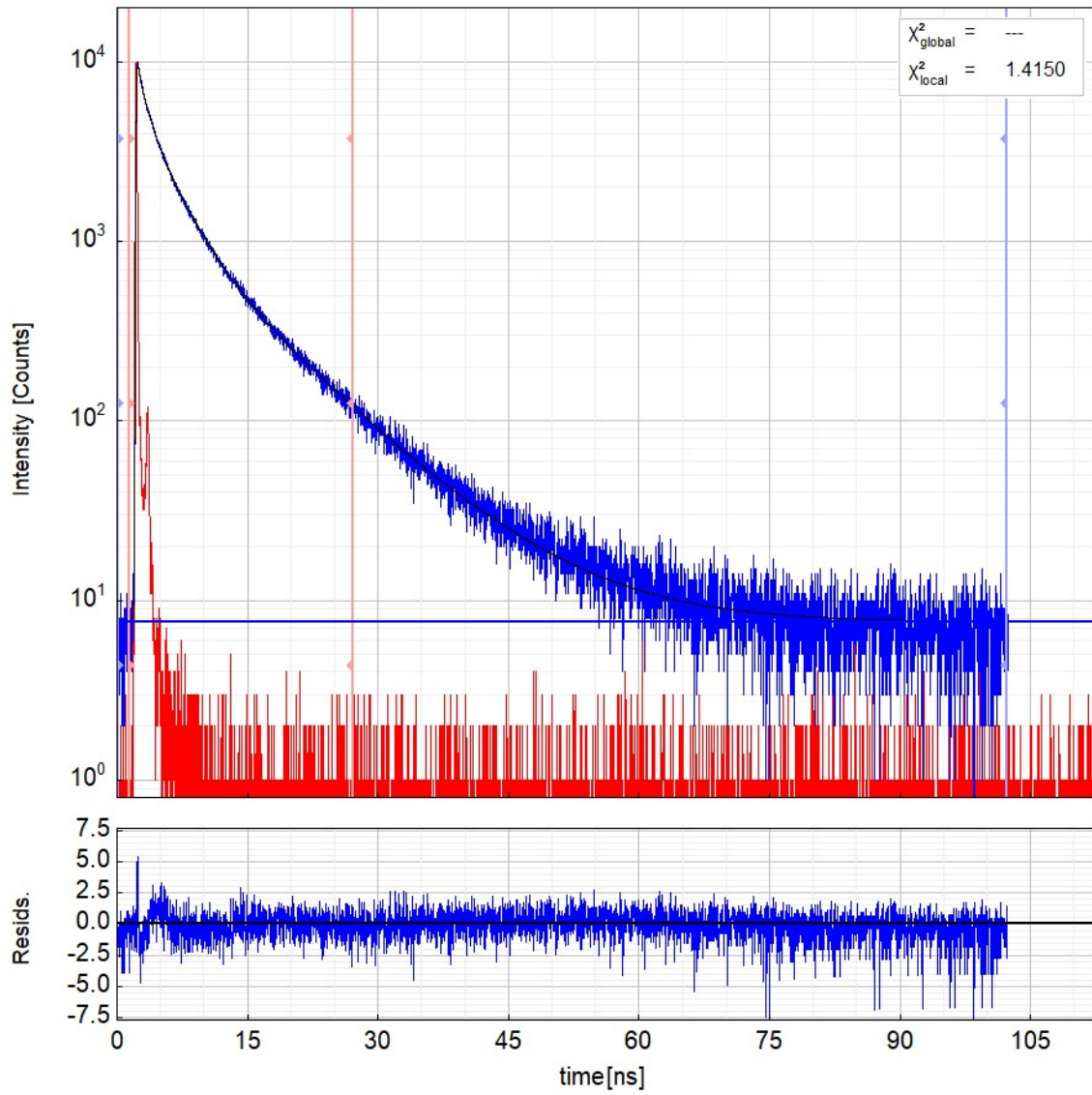
Relative Amplitudes



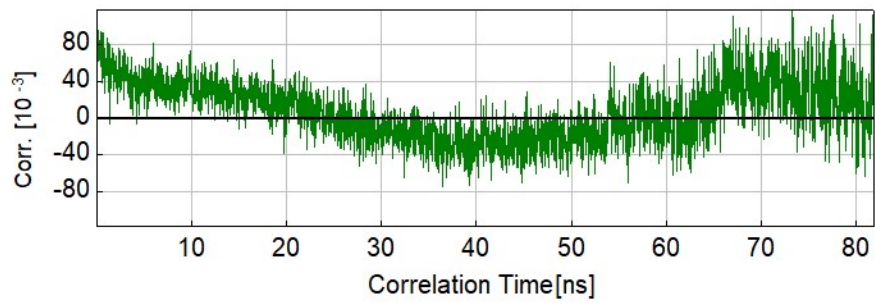
**Data Set: 4 / 16**

Decay: crv[4]; IRF: crv[0]

Fit



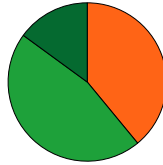
Autocorrelation (Residuals)



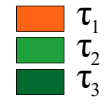
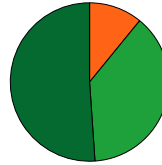
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.328	$\pm 0.024$	1.8%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	522.8	$\pm 7.6$	1.4%
$A_2$ [kCnts/Chnl]	4.633	$\pm 0.080$	1.7%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	616.2	$\pm 3.6$	0.6%
$A_3$ [kCnts/Chnl]	6.23	$\pm 0.13$	1.9%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	200.5	$\pm 6.4$	3.2%
$Bkgr_{Dec}$ [kCnts]	0.0077	$\pm 0.0002$	1.4%
$Bkgr_{IRF}$ [Cnts/Chnl]	0.193	$\pm 0.074$	38%
$Shift_{IRF}$ [ps]	-42.9	$\pm 1.6$	3.5%
$A_{Scat}$ [kCnts]	-12.21	$\pm 0.58$	4.7%
$\lambda_{Det}$ [nm]	500.0000	---	---

Relative Intensities



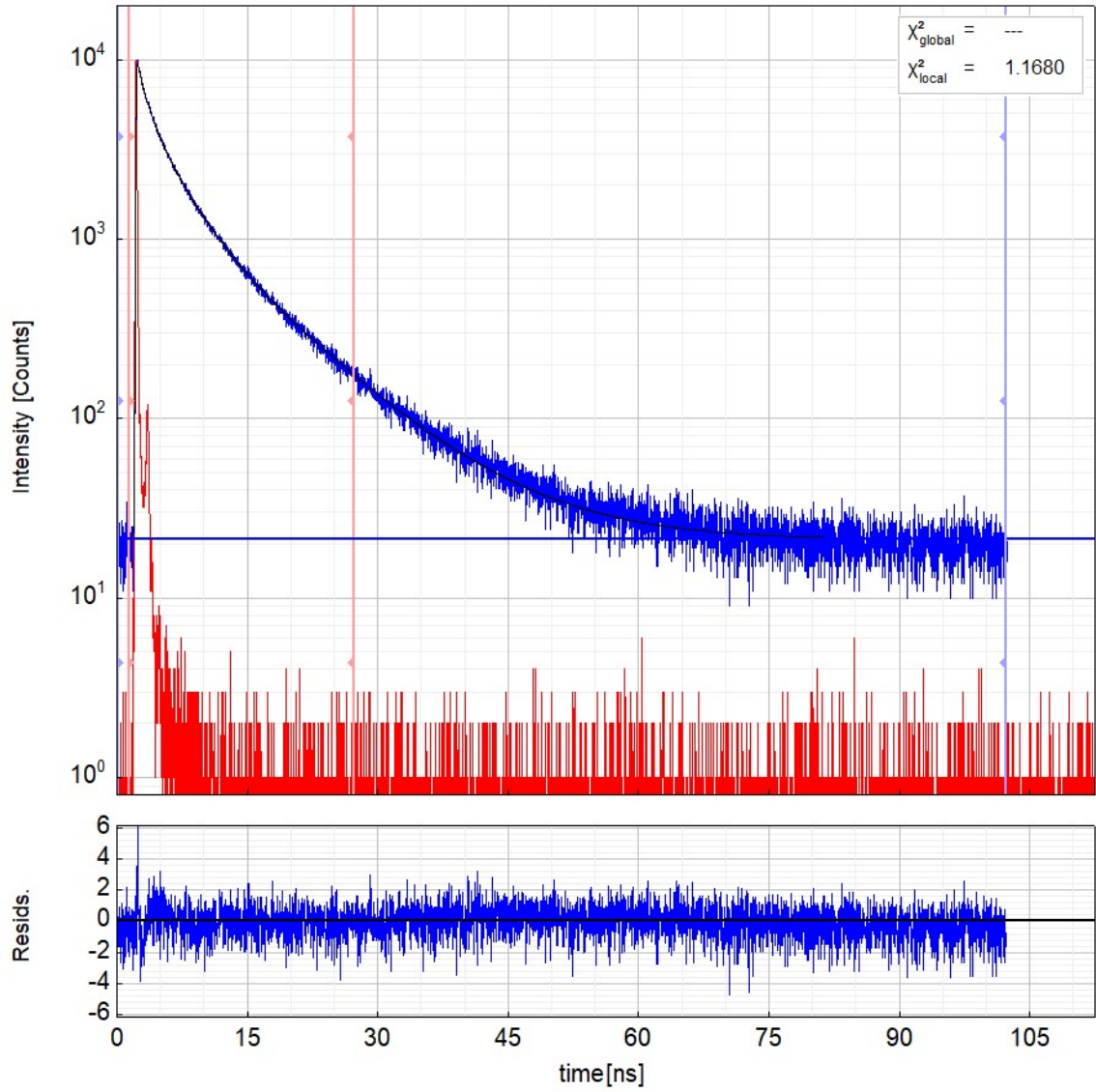
Relative Amplitudes



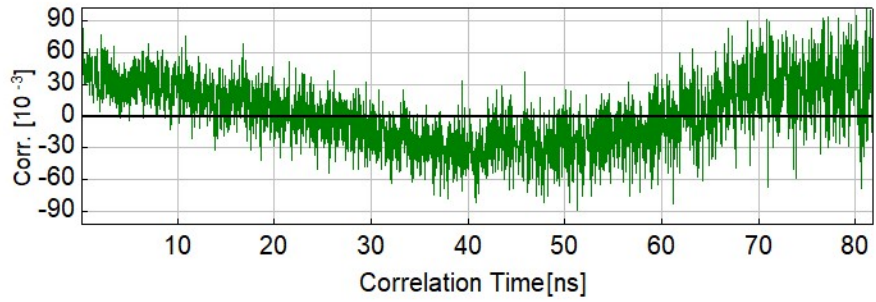
**Data Set: 5 / 16**

Decay: crv[5]; IRF: crv[0]

Fit



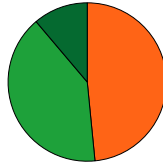
Autocorrelation (Residuals)



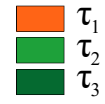
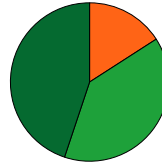
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.883	$\pm 0.027$	1.4%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	740.9	$\pm 8.6$	1.2%
$A_2$ [kCnts/Chnl]	4.643	$\pm 0.036$	0.8%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	617.5	$\pm 4.0$	0.6%
$A_3$ [kCnts/Chnl]	5.311	$\pm 0.063$	1.2%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	171.1	$\pm 4.6$	2.6%
$B_{\text{grDec}}$ [kCnts]	0.0212	$\pm 0.0002$	0.7%
$B_{\text{grIRF}}$ [Cnts/Chnl]	0.294	$\pm 0.084$	28%
$\text{Shift}_{\text{IRF}}$ [ps]	-37.2	$\pm 1.7$	4.6%
$A_{\text{Scat}}$ [kCnts]	-8.38	$\pm 0.72$	8.5%
$\lambda_{\text{Det}}$ [nm]	520.0000	---	---

Relative Intensities



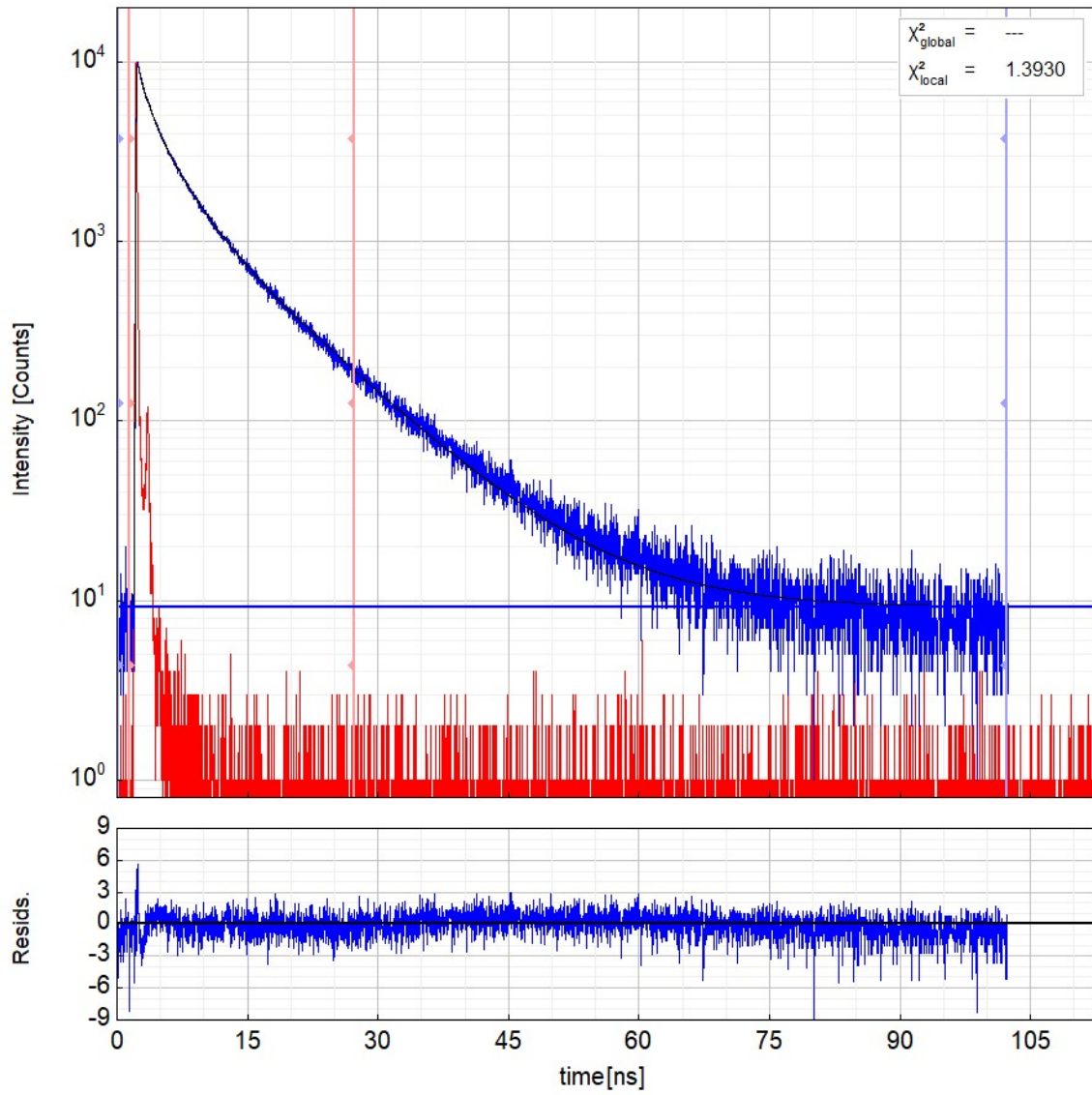
Relative Amplitudes



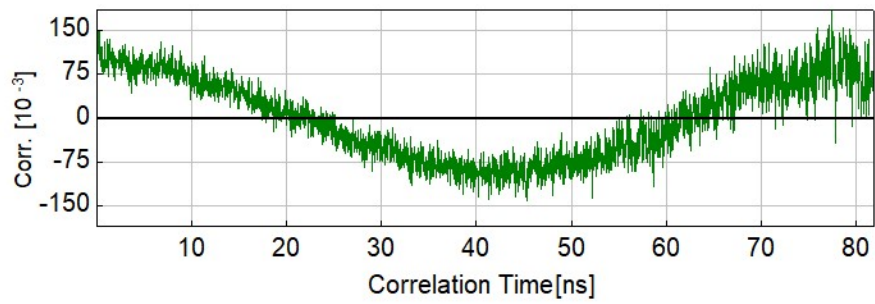
**Data Set: 6 / 16**

Decay: crv[6]; IRF: crv[0]

Fit



Autocorrelation (Residuals)



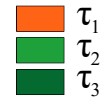
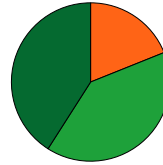
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	2.237	$\pm 0.035$	1.5%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	880.6	$\pm 9.2$	1.0%
$A_2$ [kCnts/Chnl]	4.741	$\pm 0.055$	1.2%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	630.5	$\pm 6.3$	1.0%
$A_3$ [kCnts/Chnl]	4.841	$\pm 0.088$	1.8%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	155.9	$\pm 5.5$	3.5%
$Bkgr_{Dec}$ [kCnts]	0.0092	$\pm 0.0001$	1.0%
$Bkgr_{IRF}$ [Cnts/Chnl]	0.34	$\pm 0.12$	35%
$Shift_{IRF}$ [ps]	-33.8	$\pm 3.9$	12%
$A_{Scat}$ [kCnts]	-6.4	$\pm 2.6$	40%
$\lambda_{Det}$ [nm]	540.0000	---	---

Relative Intensities



Relative Amplitudes

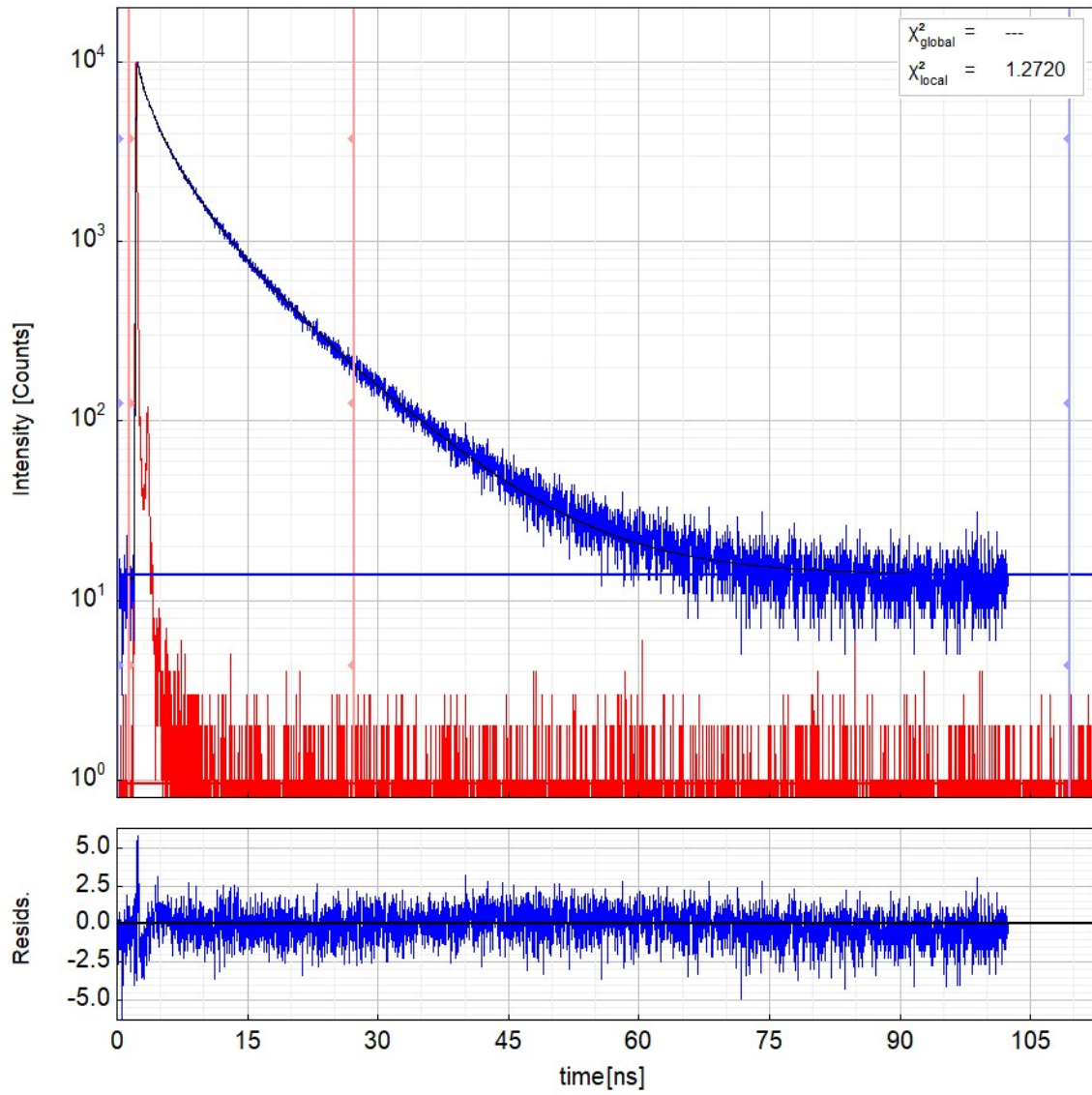




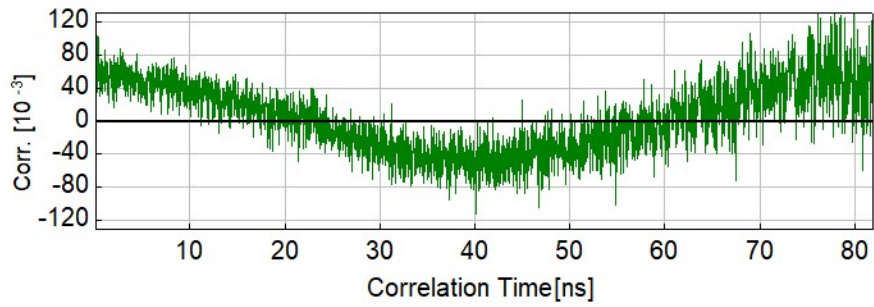
**Data Set: 7 / 16**

Decay: crv[7]; IRF: crv[0]

Fit

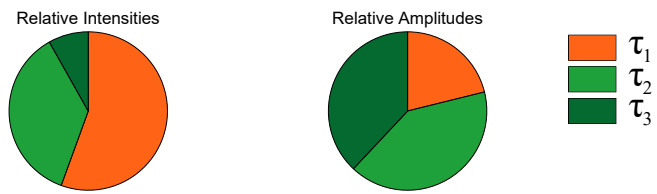


Autocorrelation (Residuals)



Fitted Parameters

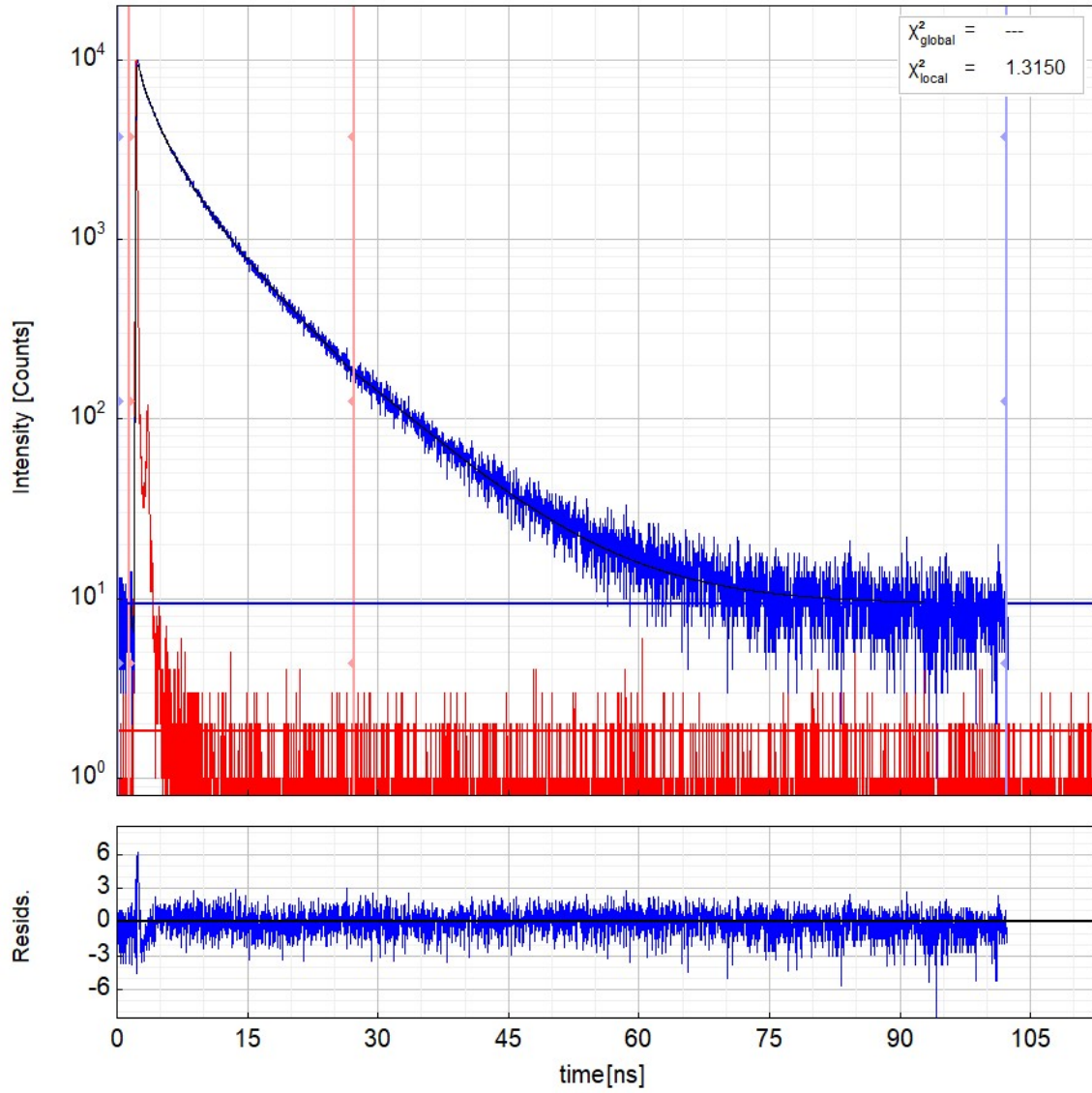
Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	2.476	$\pm 0.048$	1.9%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	975	$\pm 15$	1.5%
$A_2$ [kCnts/Chnl]	4.785	$\pm 0.045$	0.9%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	637	$\pm 12$	1.8%
$A_3$ [kCnts/Chnl]	4.46	$\pm 0.18$	3.8%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	143.4	$\pm 4.5$	3.1%
Bkgr <sub>Dec</sub> [kCnts]	0.0140	$\pm 0.0001$	0.5%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	0.96	$\pm 0.11$	11%
Shift <sub>IRF</sub> [ps]	-35.81	$\pm 0.53$	1.5%
$A_{Scat}$ [kCnts]	-6.53	$\pm 0.41$	6.3%
$\lambda_{Det}$ [nm]	560.0000	---	---



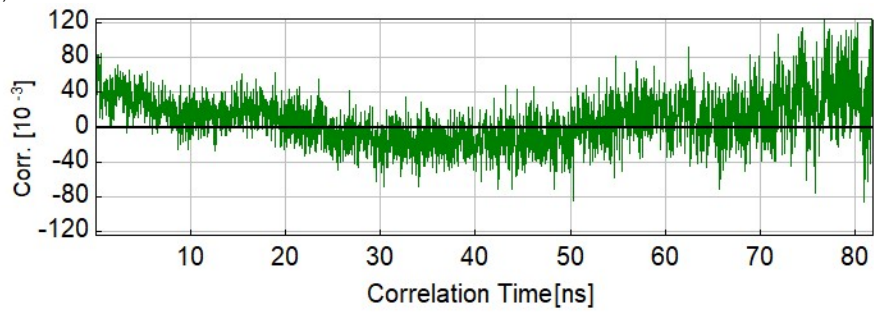
**Data Set: 8 / 16**

Decay: crv[8]; IRF: crv[0]

Fit



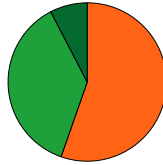
Autocorrelation (Residuals)



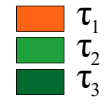
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	2.496	$\pm 0.045$	1.8%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	983	$\pm 12$	1.2%
$A_2$ [kCnts/Chnl]	4.936	$\pm 0.047$	0.9%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	656.4	$\pm 8.5$	1.3%
$A_3$ [kCnts/Chnl]	4.21	$\pm 0.12$	2.7%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	135.4	$\pm 4.7$	3.4%
$Bkgr_{Dec}$ [kCnts]	0.0094	$\pm 0.0002$	1.2%
$Bkgr_{IRF}$ [Cnts/Chnl]	1.839	$\pm 0.066$	3.6%
$Shift_{IRF}$ [ps]	-36.08	$\pm 0.73$	2.0%
$A_{Scat}$ [kCnts]	-6.88	$\pm 0.49$	7.1%
$\lambda_{Det}$ [nm]	580.0000	---	---

Relative Intensities



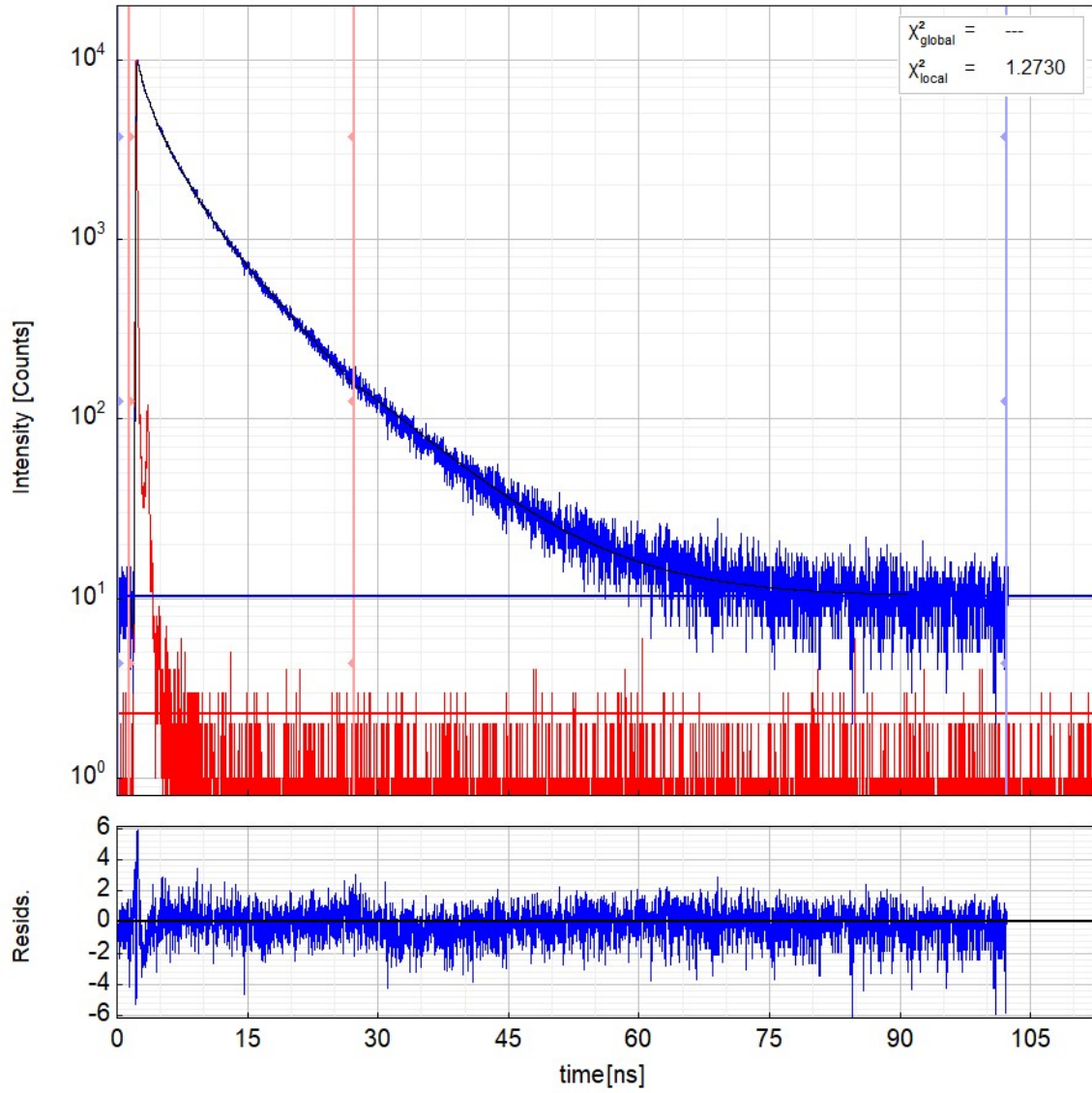
Relative Amplitudes



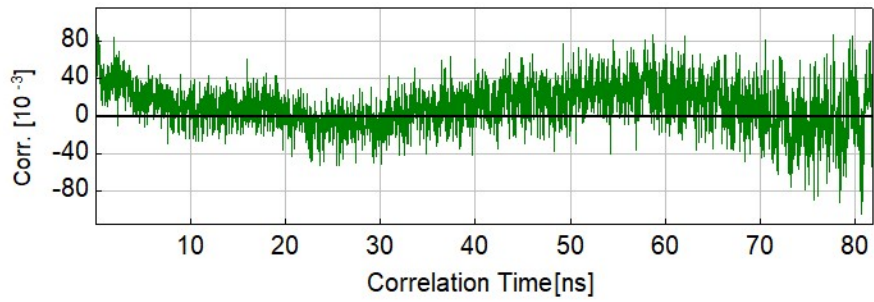
**Data Set: 9 / 16**

Decay: crv[9]; IRF: crv[0]

Fit



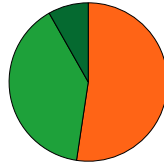
Autocorrelation (Residuals)



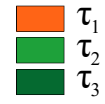
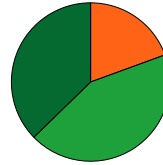
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	2.278	$\pm 0.044$	1.9%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	897	$\pm 13$	1.4%
$A_2$ [kCnts/Chnl]	5.075	$\pm 0.058$	1.1%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	674.9	$\pm 9.0$	1.3%
$A_3$ [kCnts/Chnl]	4.37	$\pm 0.14$	3.0%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	140.7	$\pm 6.9$	4.9%
$Bkgr_{Dec}$ [kCnts]	0.0103	$\pm 0.0001$	0.5%
$Bkgr_{IRF}$ [Cnts/Chnl]	2.30	$\pm 0.11$	4.4%
$Shift_{IRF}$ [ps]	-36.0	$\pm 3.5$	9.7%
$A_{Scat}$ [kCnts]	-6.69	$\pm 0.99$	15%
$\lambda_{Det}$ [nm]	600.0000	---	---

Relative Intensities



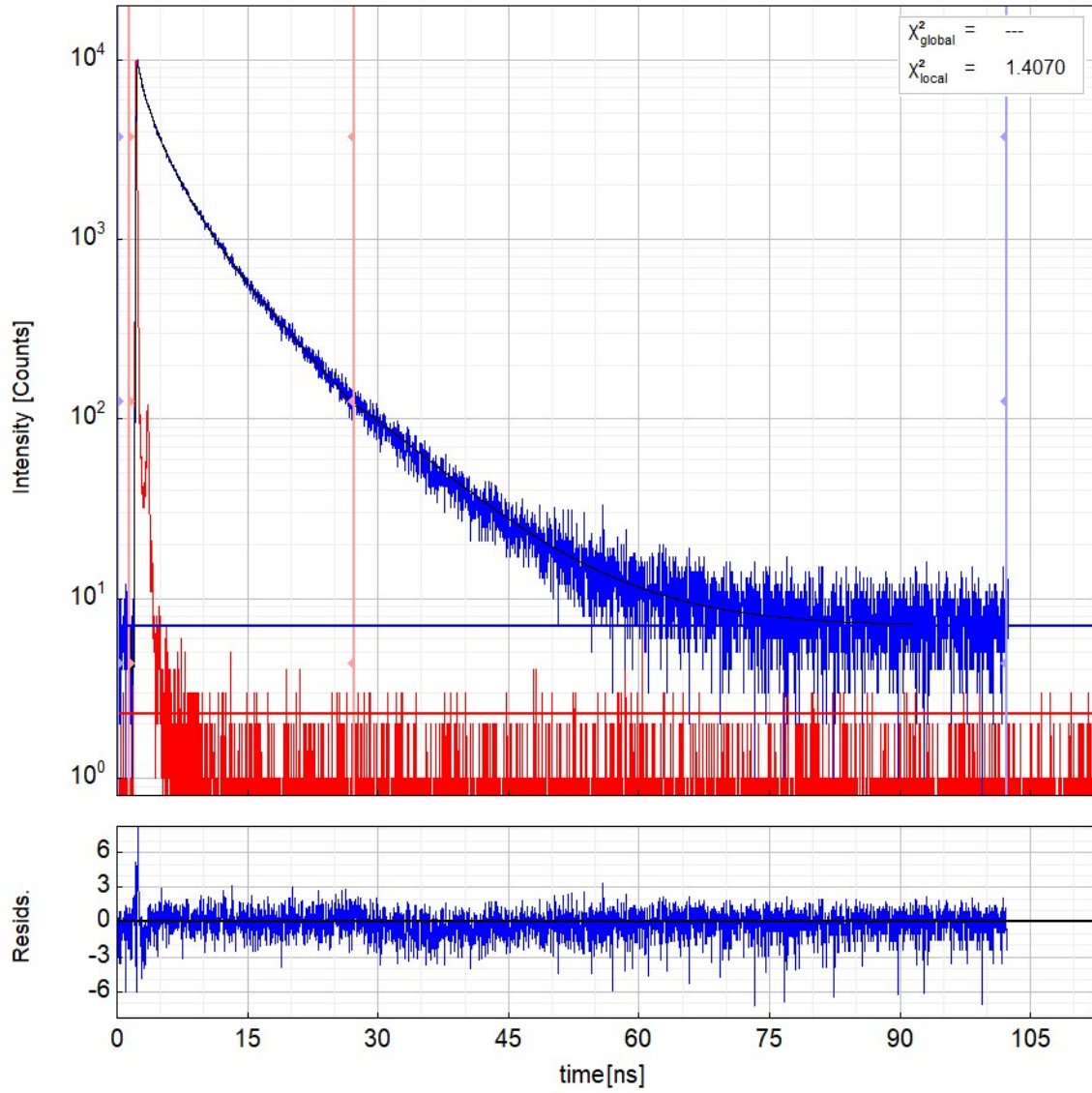
Relative Amplitudes



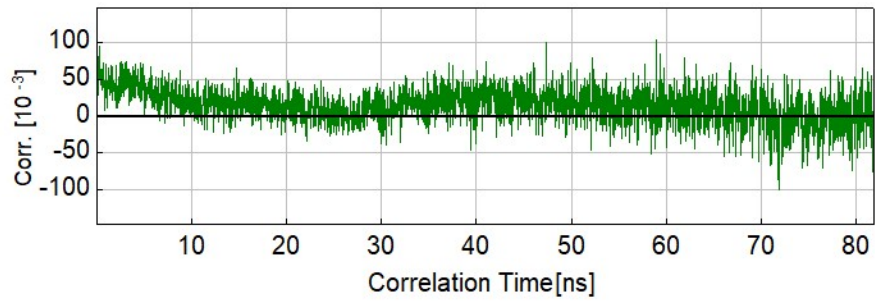
**Data Set: 10 / 16**

Decay: crv[10]; IRF: crv[0]

Fit



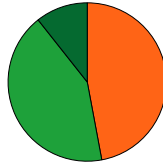
Autocorrelation (Residuals)



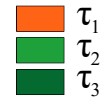
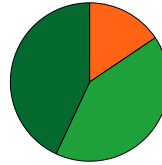
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.799	$\pm 0.042$	2.3%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	708	$\pm 13$	1.7%
$A_2$ [kCnts/Chnl]	4.785	$\pm 0.040$	0.8%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	636.3	$\pm 9.4$	1.5%
$A_3$ [kCnts/Chnl]	4.98	$\pm 0.15$	2.9%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	160.2	$\pm 6.0$	3.7%
Bkgr <sub>Dec</sub> [kCnts]	0.0070	$\pm 0.0001$	0.8%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	2.272	$\pm 0.079$	3.4%
Shift <sub>IRF</sub> [ps]	-36.1	$\pm 1.8$	4.9%
$A_{Scat}$ [kCnts]	-6.35	$\pm 0.67$	11%
$\lambda_{Det}$ [nm]	620.0000	---	---

Relative Intensities



Relative Amplitudes

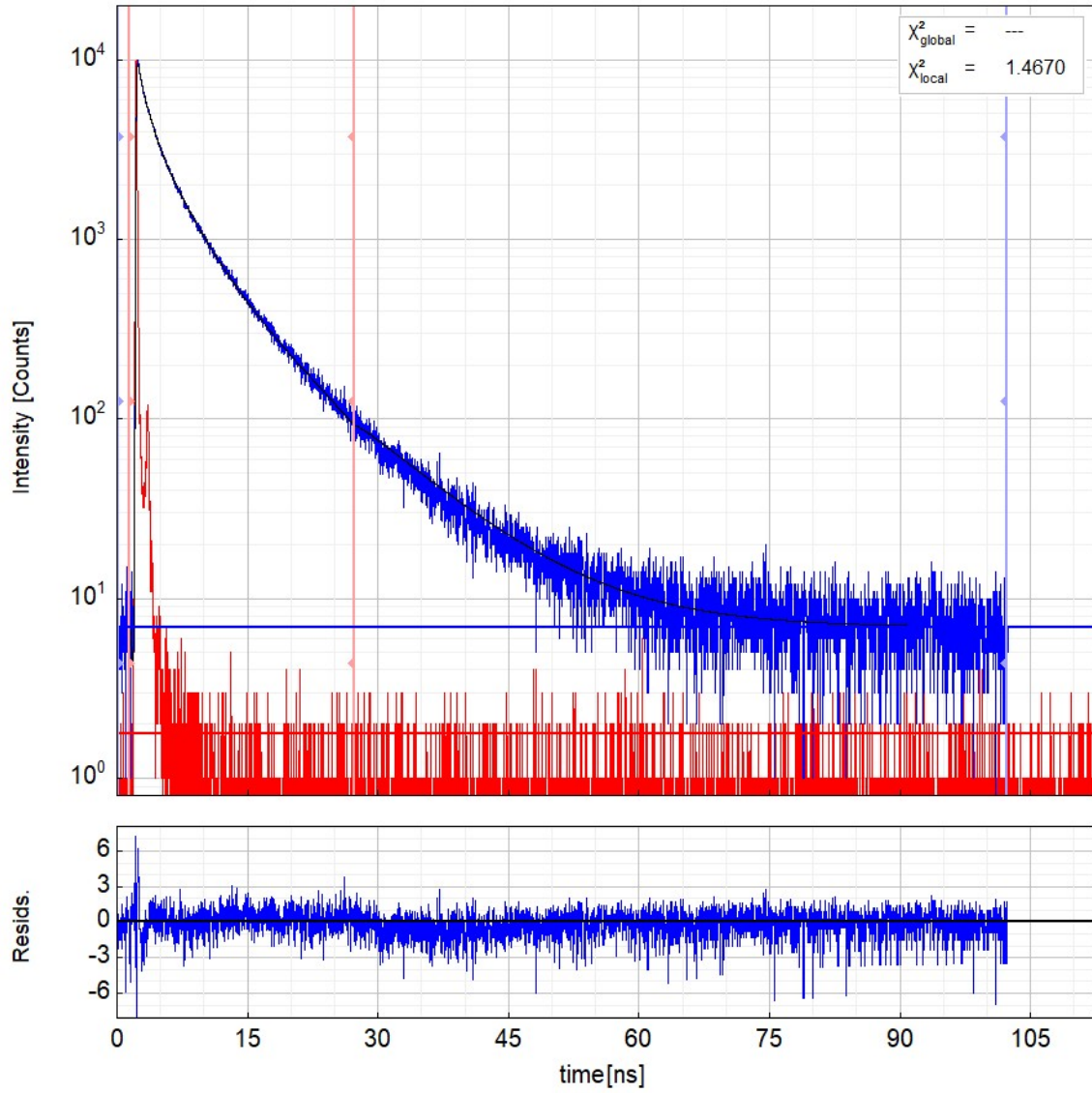




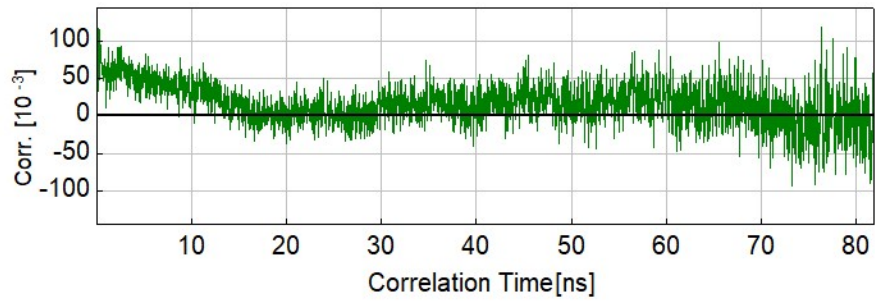
**Data Set: 11 / 16**

Decay: crv[11]; IRF: crv[0]

Fit



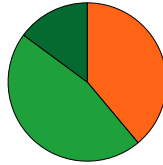
Autocorrelation (Residuals)



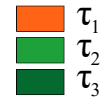
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.313	$\pm 0.038$	2.8%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	517	$\pm 12$	2.2%
$A_2$ [kCnts/Chnl]	4.612	$\pm 0.088$	1.9%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	613.3	$\pm 8.1$	1.3%
$A_3$ [kCnts/Chnl]	6.14	$\pm 0.21$	3.3%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	197.6	$\pm 7.5$	3.8%
$Bkgr_{Dec}$ [kCnts]	0.0070	$\pm 0.0001$	0.7%
$Bkgr_{IRF}$ [Cnts/Chnl]	1.77	$\pm 0.15$	8.3%
$Shift_{IRF}$ [ps]	-35.0	$\pm 2.2$	6.0%
$A_{Scat}$ [kCnts]	-7.6	$\pm 1.5$	20%
$\lambda_{Det}$ [nm]	640.0000	---	---

Relative Intensities



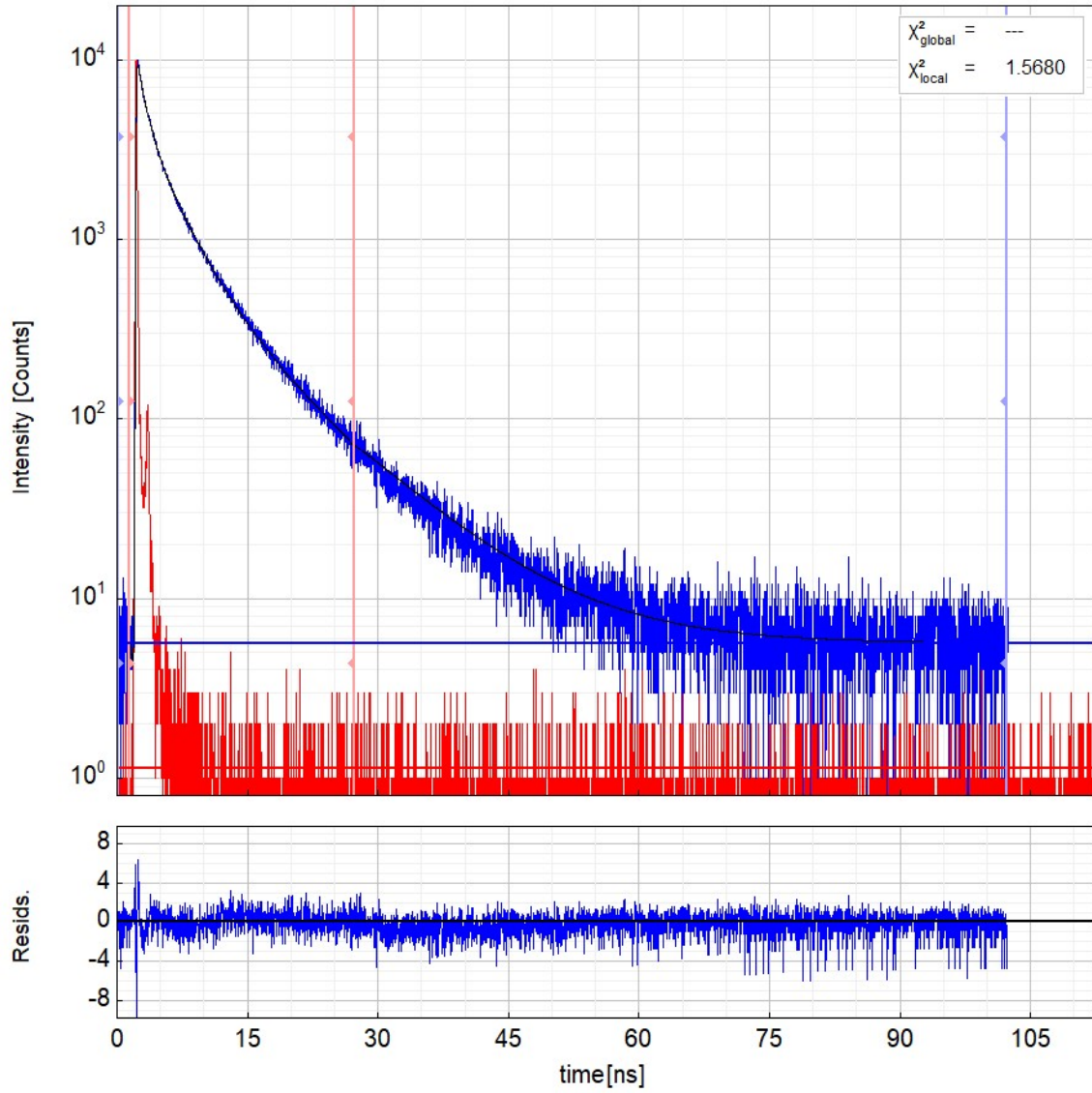
Relative Amplitudes



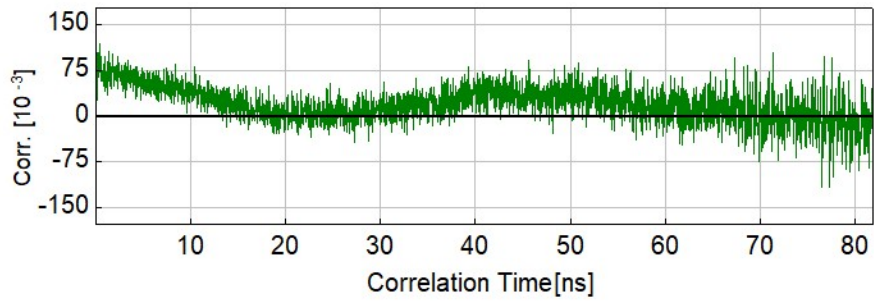
**Data Set: 12 / 16**

Decay: crv[12]; IRF: crv[0]

Fit



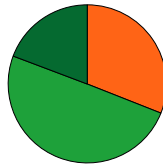
Autocorrelation (Residuals)



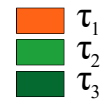
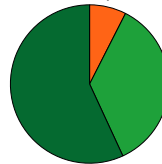
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.910	$\pm 0.031$	3.4%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	359	$\pm 11$	3.1%
$A_2$ [kCnts/Chnl]	4.326	$\pm 0.051$	1.2%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	575.2	$\pm 3.9$	0.7%
$A_3$ [kCnts/Chnl]	6.92	$\pm 0.18$	2.6%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	222.6	$\pm 6.8$	3.0%
$Bkgr_{Dec}$ [kCnts]	0.0057	$\pm 0.0001$	1.2%
$Bkgr_{IRF}$ [Cnts/Chnl]	1.13	$\pm 0.14$	12%
$Shift_{IRF}$ [ps]	-36.3	$\pm 4.1$	11%
$A_{Scat}$ [kCnts]	-8.2	$\pm 1.9$	22%
$\lambda_{Det}$ [nm]	660.0000	---	---

Relative Intensities



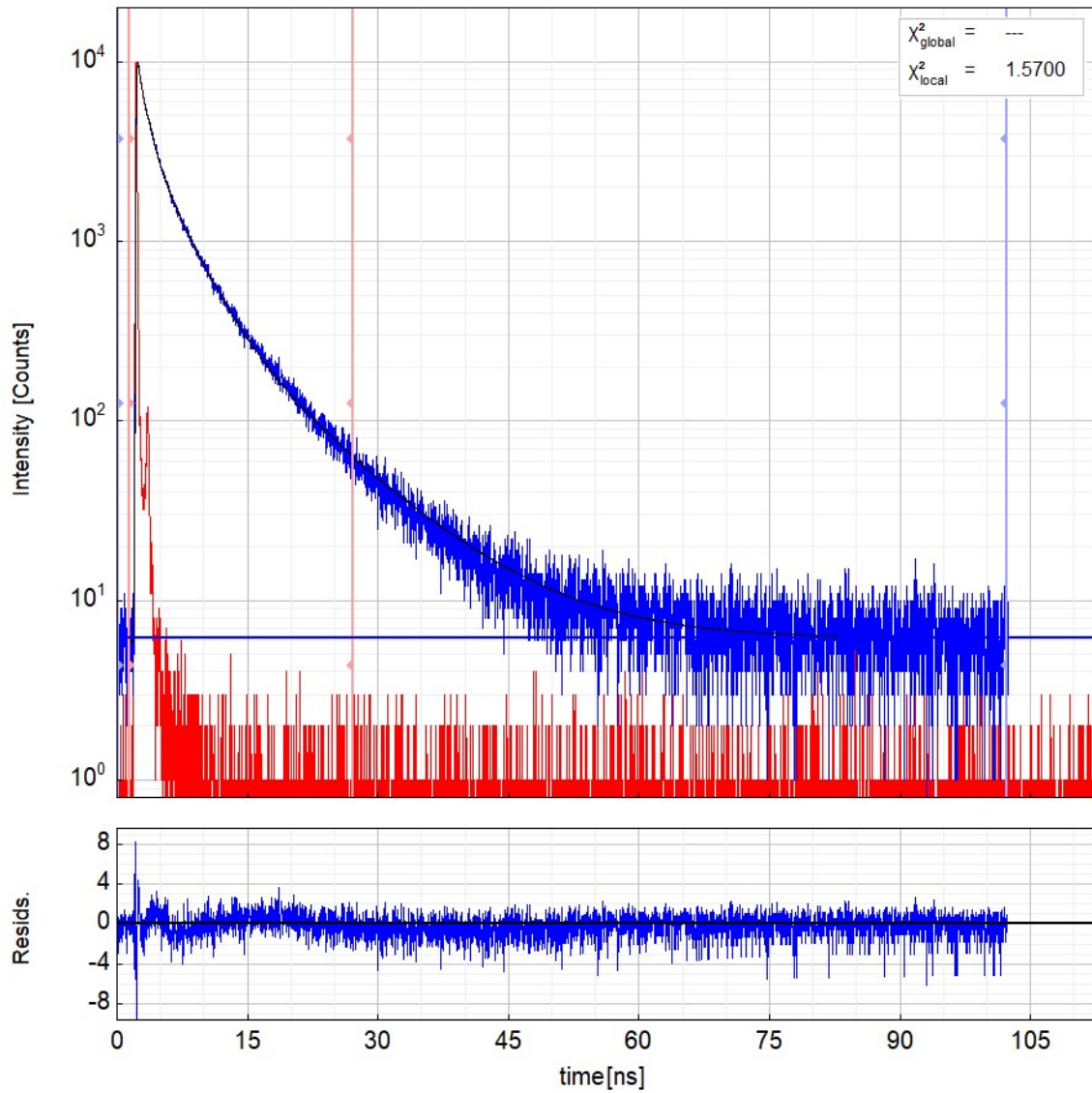
Relative Amplitudes



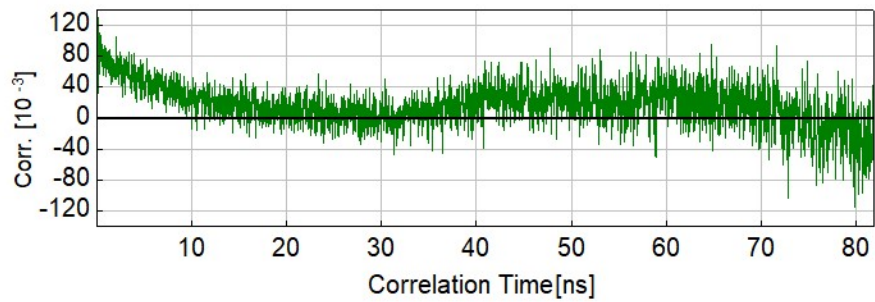
**Data Set: 13 / 16**

Decay: crv[13]; IRF: crv[0]

Fit



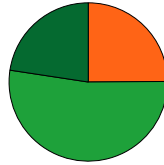
Autocorrelation (Residuals)



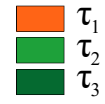
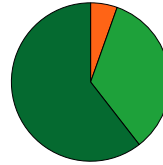
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.688	$\pm 0.019$	2.6%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	270.7	$\pm 5.5$	2.0%
$A_2$ [kCnts/Chnl]	4.295	$\pm 0.083$	1.9%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	571.1	$\pm 5.2$	0.9%
$A_3$ [kCnts/Chnl]	7.64	$\pm 0.15$	1.9%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	245.9	$\pm 1.6$	0.7%
$Bkgr_{Dec}$ [kCnts]	0.0062	$\pm 0.0001$	0.8%
$Bkgr_{IRF}$ [Cnts/Chnl]	0.556	$\pm 0.038$	6.7%
$Shift_{IRF}$ [ps]	-39	$\pm 19$	47%
$A_{Scat}$ [kCnts]	-10.6	$\pm 7.6$	72%
$\lambda_{Det}$ [nm]	680.0000	---	---

Relative Intensities



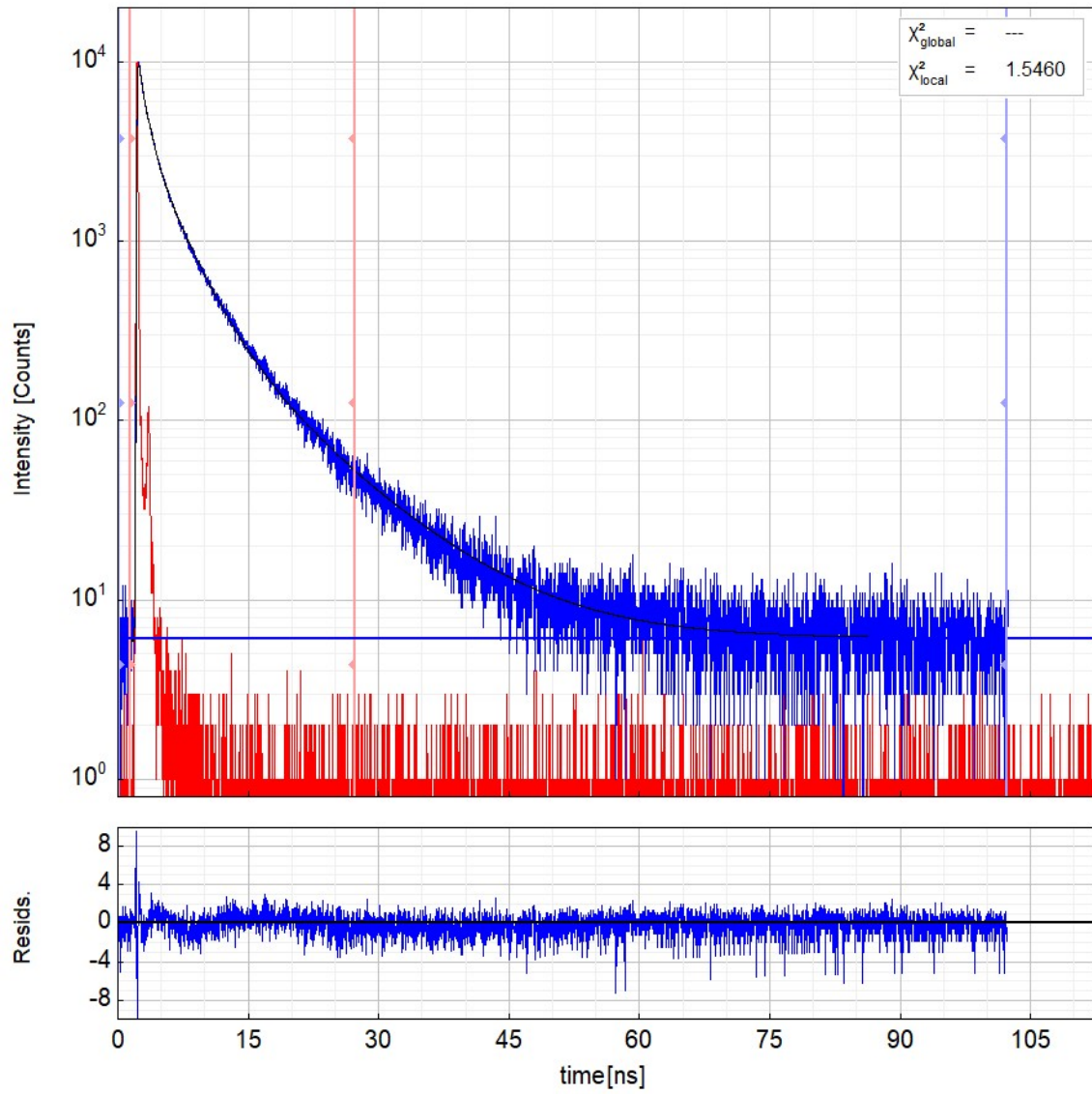
Relative Amplitudes



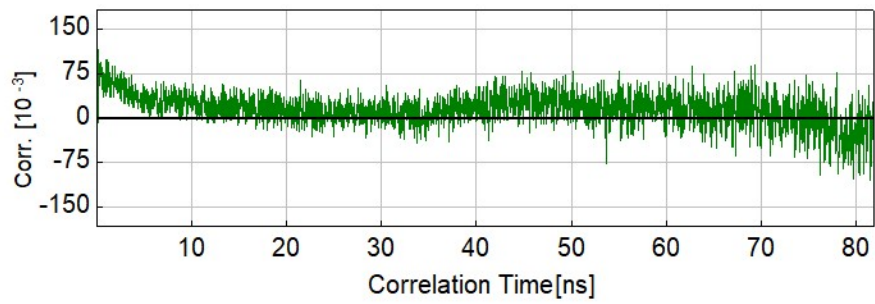
**Data Set: 14 / 16**

Decay: crv[14]; IRF: crv[0]

Fit



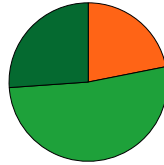
Autocorrelation (Residuals)



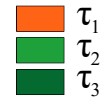
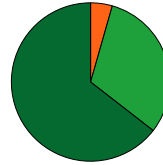
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.563	$\pm 0.019$	3.3%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	221.3	$\pm 6.7$	3.0%
$A_2$ [kCnts/Chnl]	3.951	$\pm 0.099$	2.5%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	525.4	$\pm 3.8$	0.7%
$A_3$ [kCnts/Chnl]	8.20	$\pm 0.14$	1.6%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	264.1	$\pm 4.1$	1.5%
$Bkgr_{Dec}$ [kCnts]	0.0062	$\pm 0.0001$	0.9%
$Bkgr_{IRF}$ [Cnts/Chnl]	0.53	$\pm 0.13$	24%
$Shift_{IRF}$ [ps]	-37	$\pm 14$	35%
$A_{Scat}$ [kCnts]	-11.4	$\pm 6.4$	56%
$\lambda_{Det}$ [nm]	700.0000	---	---

Relative Intensities



Relative Amplitudes

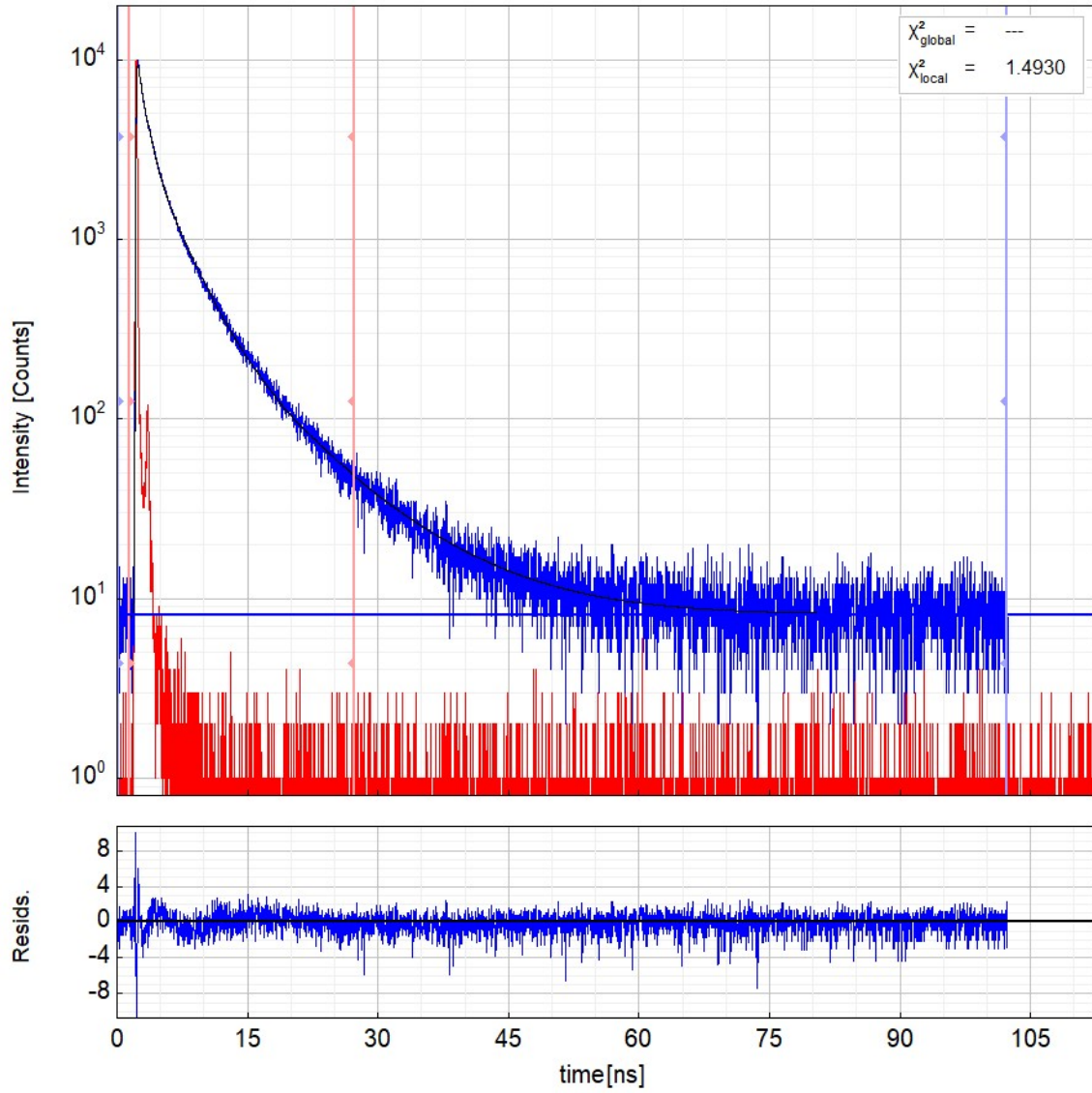




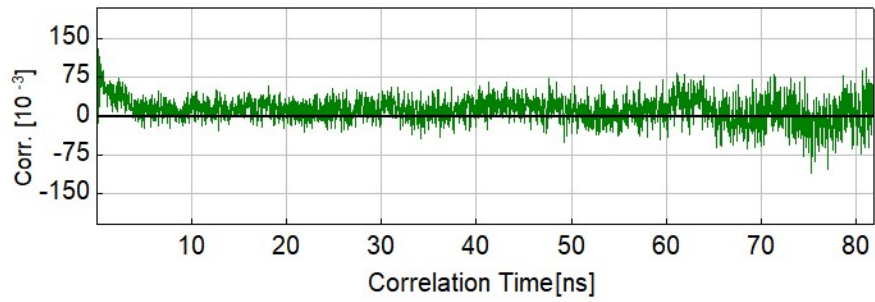
**Data Set: 15 / 16**

Decay: crv[15]; IRF: crv[0]

Fit



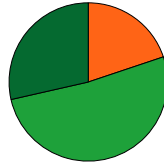
Autocorrelation (Residuals)



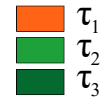
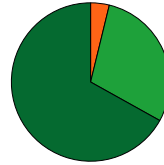
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.472	$\pm 0.012$	2.4%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	185.6	$\pm 4.3$	2.3%
$A_2$ [kCnts/Chnl]	3.626	$\pm 0.067$	1.8%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	482.2	$\pm 5.8$	1.2%
$A_3$ [kCnts/Chnl]	8.29	$\pm 0.21$	2.5%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	267	$\pm 11$	3.9%
$Bkgr_{Dec}$ [kCnts]	0.0082	$\pm 0.0001$	0.8%
$Bkgr_{IRF}$ [Cnts/Chnl]	0.43	$\pm 0.11$	25%
$Shift_{IRF}$ [ps]	-28.9	$\pm 9.4$	32%
$A_{Scat}$ [kCnts]	-5.6	$\pm 4.4$	77%
$\lambda_{Det}$ [nm]	720.0000	---	---

Relative Intensities



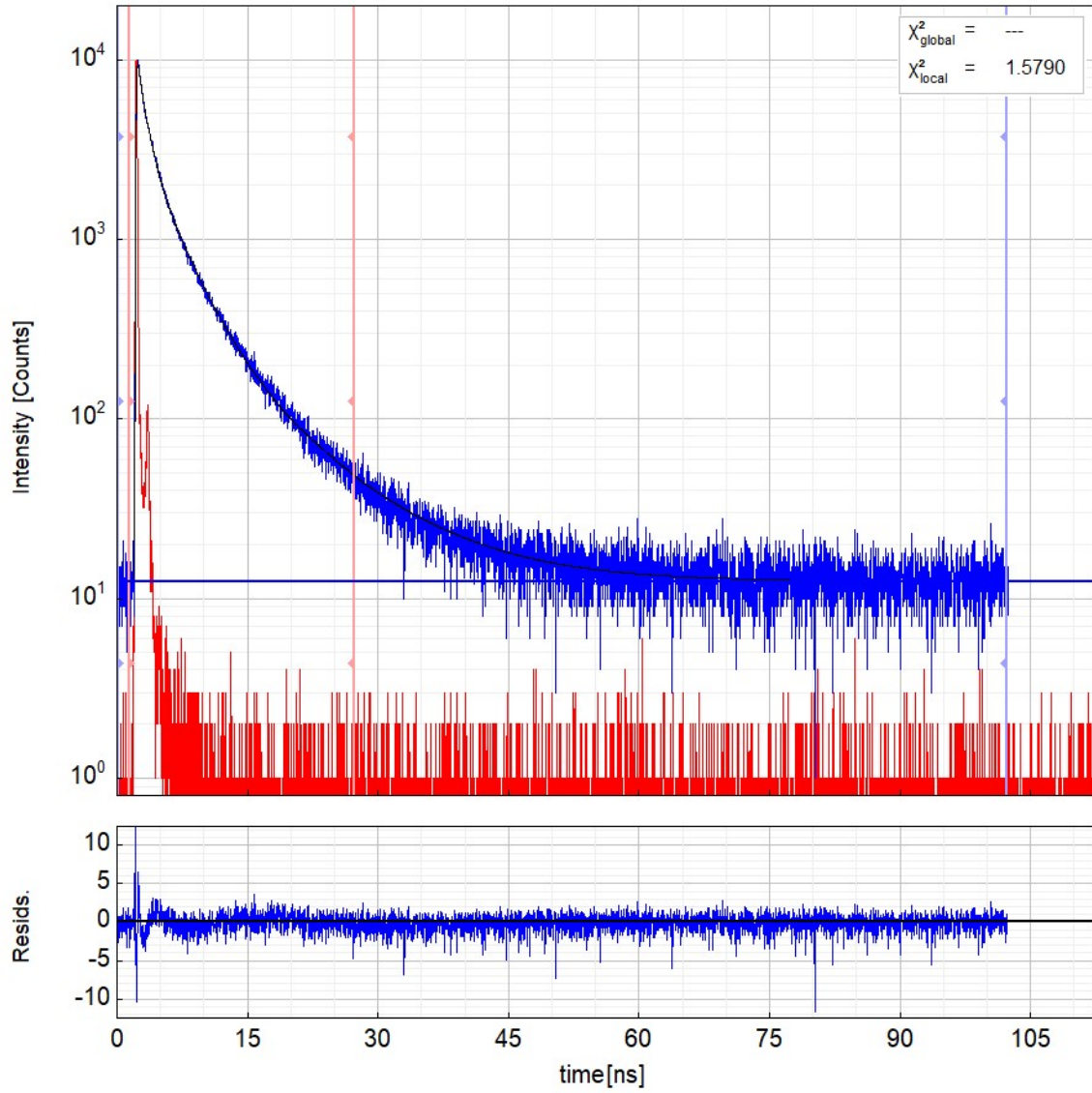
Relative Amplitudes



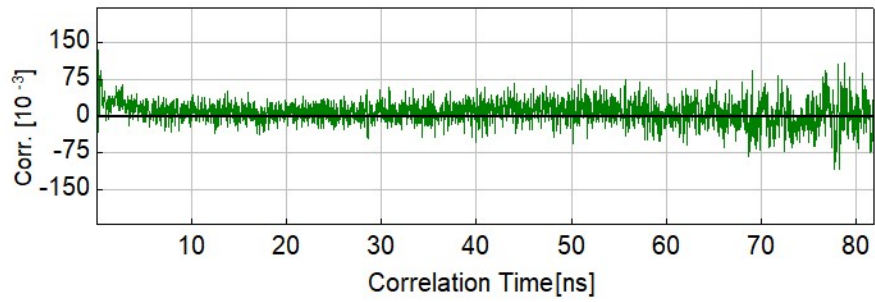
**Data Set: 16 / 16**

Decay: crv[16]; IRF: crv[0]

Fit



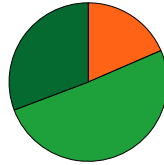
Autocorrelation (Residuals)



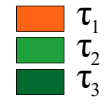
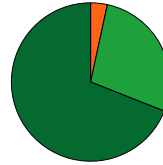
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.423	$\pm 0.017$	3.9%
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$I_1$ [kCnts]	166.5	$\pm 6.4$	3.8%
$A_2$ [kCnts/Chnl]	3.433	$\pm 0.034$	1.0%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$I_2$ [kCnts]	456.5	$\pm 3.8$	0.8%
$A_3$ [kCnts/Chnl]	8.588	$\pm 0.098$	1.1%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%
$I_3$ [kCnts]	276.6	$\pm 6.9$	2.5%
Bkgr <sub>Dec</sub> [kCnts]	0.0126	$\pm 0.0002$	1.0%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	0.45	$\pm 0.15$	32%
Shift <sub>IRF</sub> [ps]	-28	$\pm 19$	66%
$A_{Scat}$ [kCnts]	-4.1	$\pm 7.9$	195%
$\lambda_{Det}$ [nm]	740.0000	---	---

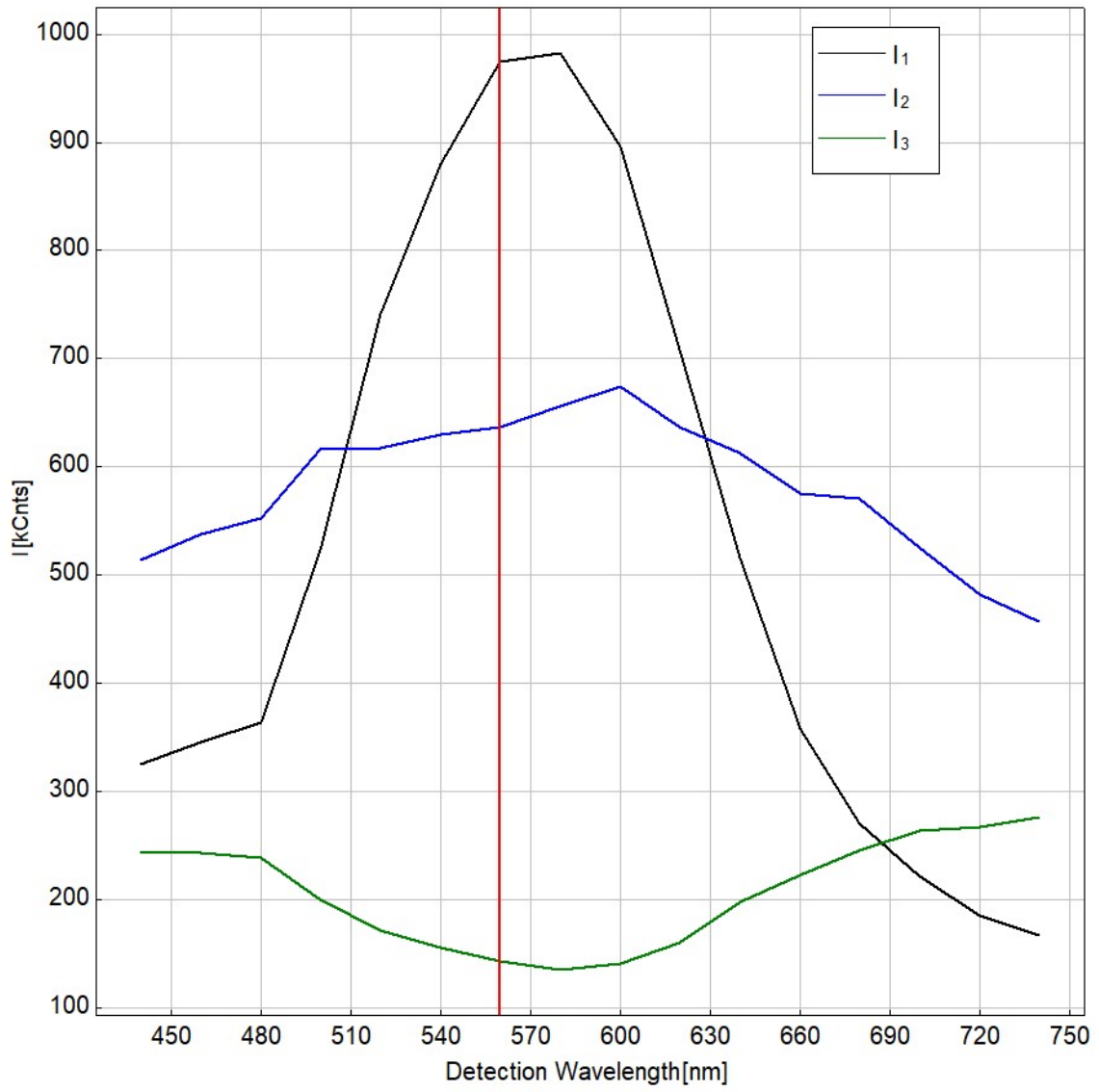
Relative Intensities



Relative Amplitudes



### Parameter Plot



### Global Parameters

Parameter	Value	$\Delta$	$\delta$
$\tau_1$ [ns]	9.842	$\pm 0.057$	0.6%
$\tau_2$ [ns]	3.325	$\pm 0.048$	1.4%
$\tau_3$ [ns]	0.806	$\pm 0.015$	1.8%

# EasyTau Report

9/4/2020 7:36:28 PM



## Container Curves

TRES+IRF\_20200618\_1611.etc: crv[0 - 15]

## Container Properties

Measurement Context: Time Resolved Emission Scan

Detection Wavelength: 400.0 - 700.0 (Step: 20.0) nm

Summary:

Sample: CD4  
Solvent: Dimethyl sulfoxide  
Excitation: V pol 376±1nm with LDH-P-C-375  
Detection: M pol 400...700nm 20nm steps  
10000 peak counts  
grating 1200/500+  
detector UV-red [PMT]

## Comment

[\[Edit Comment\]](#)

## Model: Exponential [Reconv.]

$$\text{Dec}(t) = \left[ \int_{-\infty}^t dt' [\text{IRF}(t - \text{Shift}_{\text{IRF}}) - \text{Bkg}_{\text{IRF}}] \left[ \sum_{i=1}^{n_{\text{Exp}}} A_i e^{-\frac{t-t'}{\tau_i}} + A_{\text{Scatt}} \delta(t-t') \right] \right] + \text{Bkg}_{\text{Dec}}$$

$$I_m = A_m \tau_m$$

$$A_{\text{Rel } m} = A_m / \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i$$

$$I_{\text{Rel } m} = I_m / \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i$$

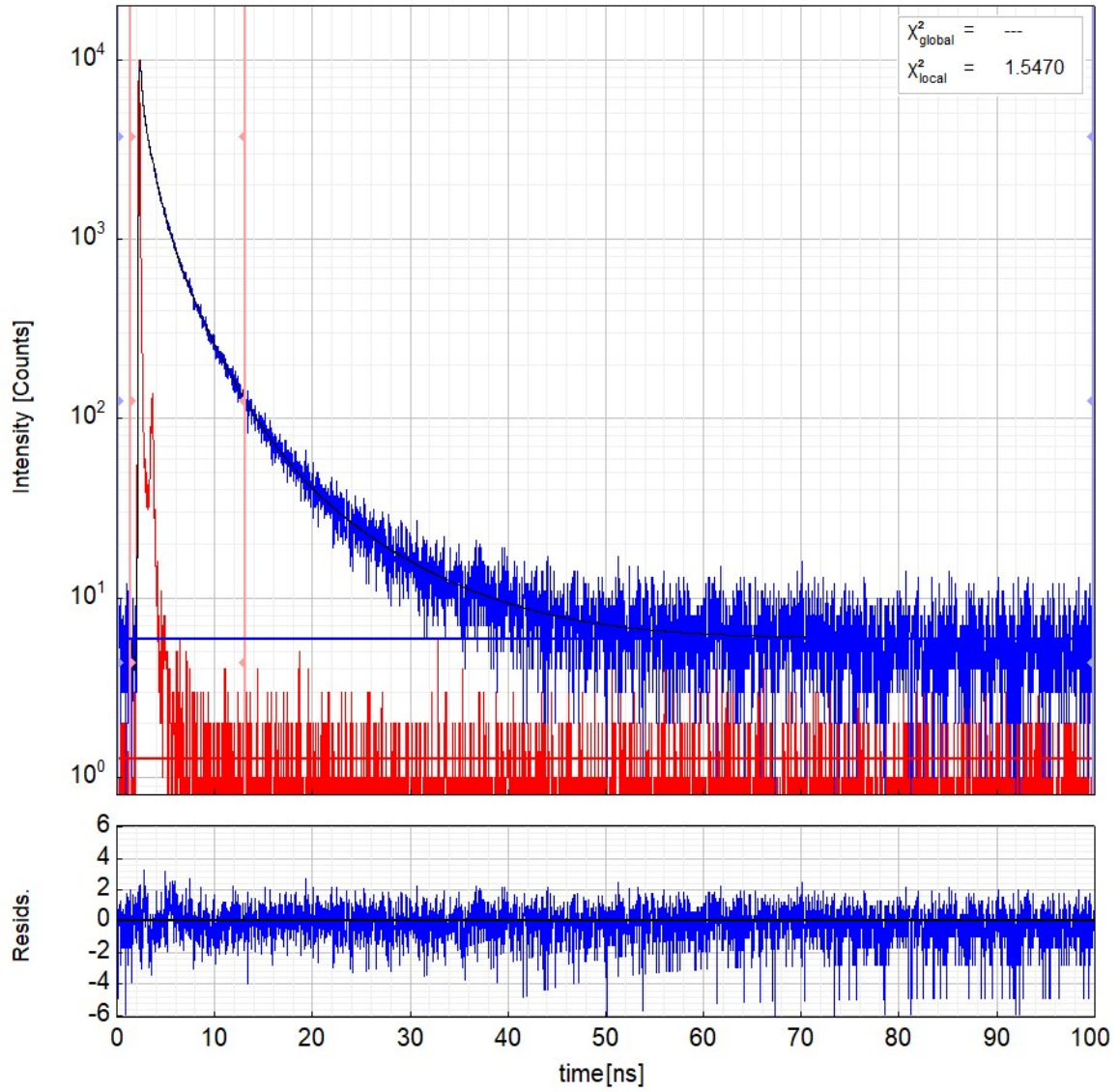
$$\tau_{\text{Av Amp}} = \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i \tau_i / \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i$$

$$\tau_{\text{Av Int}} = \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i \tau_i / \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i$$

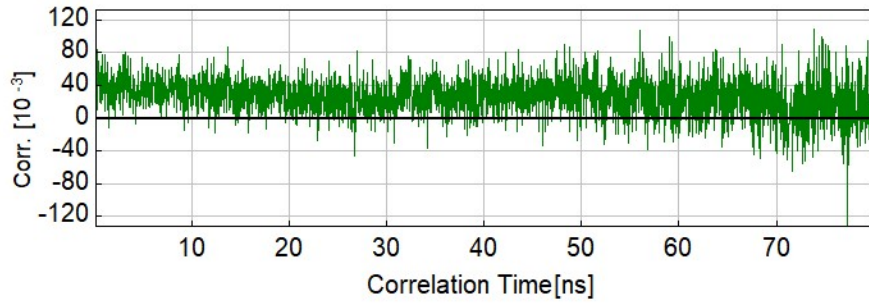
Data Set: 1 / 14

Decay: crv[1]; IRF: crv[0]

Fit



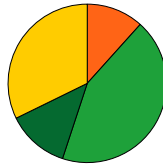
Autocorrelation (Residuals)



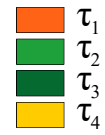
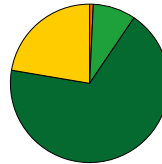
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.186	$\pm 0.015$	7.6%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	70.3	$\pm 4.2$	6.0%
$A_2$ [kCnts/Chnl]	2.13	$\pm 0.11$	5.1%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	261.5	$\pm 6.9$	2.6%
$A_3$ [kCnts/Chnl]	16.6	$\pm 1.1$	6.3%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	76.5	$\pm 3.1$	4.0%
$A_4$ [kCnts/Chnl]	5.44	$\pm 0.13$	2.3%
$\tau_4$ [ns]	0.893	$\pm 0.055$	6.1%
$I_4$ [kCnts]	194.3	$\pm 8.1$	4.1%
$Bkg_{Dec}$ [kCnts]	0.0059	$\pm 0.0001$	1.0%
$Bkg_{IRF}$ [Cnts/Chnl]	1.27	$\pm 0.19$	14%
$Shift_{IRF}$ [ps]	-15.7	$\pm 4.8$	30%
$A_{Scat}$ [kCnts]	-25.3	$\pm 1.4$	5.2%
$\lambda_{Det}$ [nm]	400.0000	---	---

Relative Intensities



Relative Amplitudes

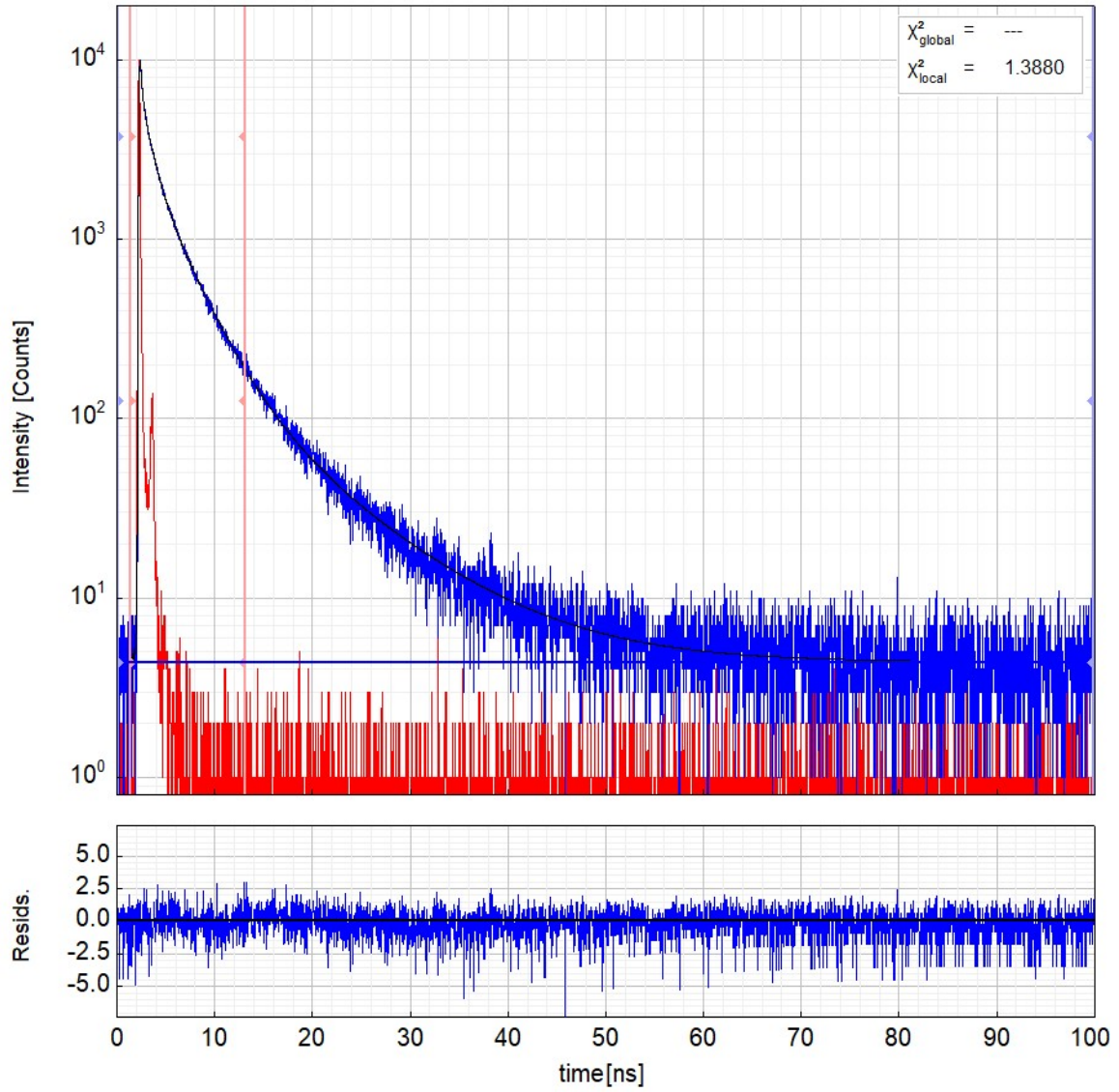




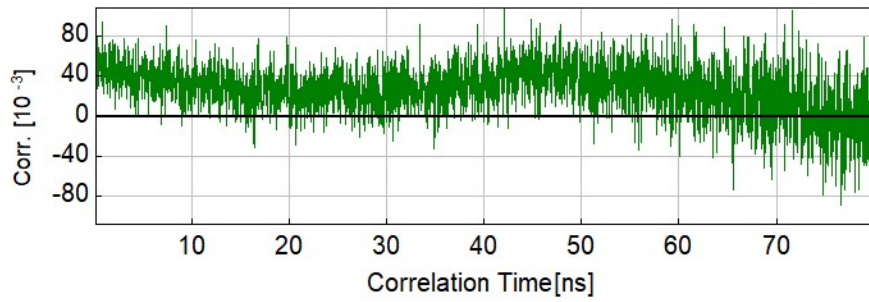
**Data Set: 2 / 14**

Decay: crv[2]; IRF: crv[0]

Fit



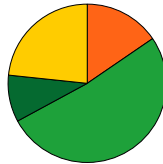
Autocorrelation (Residuals)



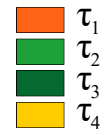
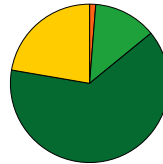
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.288	$\pm 0.017$	5.6%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	109.1	$\pm 4.4$	4.0%
$A_2$ [kCnts/Chnl]	2.97	$\pm 0.14$	4.4%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	364.6	$\pm 5.0$	1.4%
$A_3$ [kCnts/Chnl]	14.7	$\pm 1.2$	7.8%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	67.5	$\pm 2.2$	3.2%
$A_4$ [kCnts/Chnl]	5.14	$\pm 0.14$	2.7%
$\tau_4$ [ns]	0.802	$\pm 0.054$	6.6%
$I_4$ [kCnts]	164.8	$\pm 8.9$	5.3%
$Bkg_{Dec}$ [kCnts]	0.0044	$\pm 0.0001$	0.8%
$Bkg_{RF}$ [Cnts/Chnl]	0.13	$\pm 0.39$	310%
$Shift_{RF}$ [ps]	-23.2	$\pm 2.1$	9.0%
$A_{Scat}$ [kCnts]	-22.75	$\pm 0.90$	3.9%
$\lambda_{Det}$ [nm]	420.0000	---	---

Relative Intensities



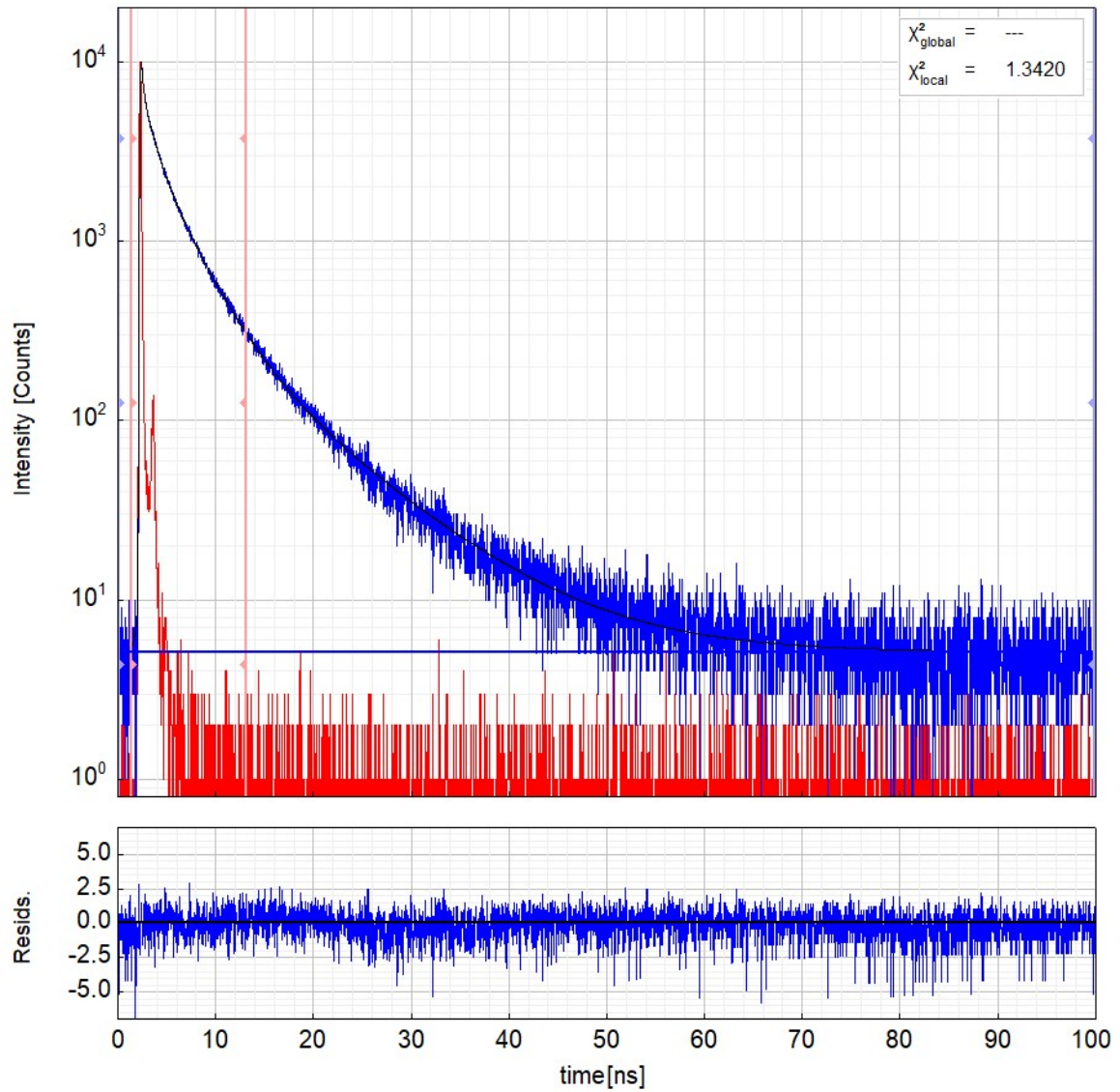
Relative Amplitudes



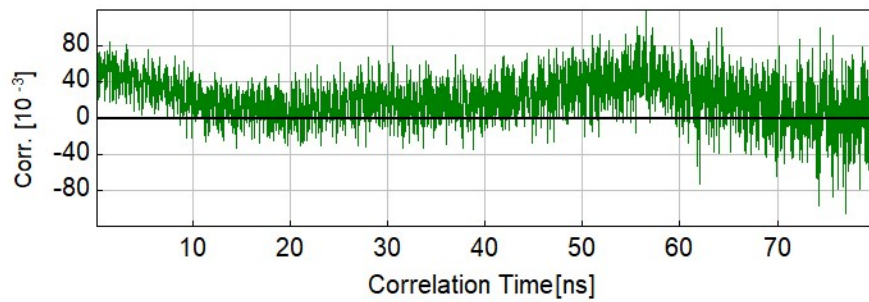
**Data Set: 3 / 14**

Decay: crv[3]; IRF: crv[0]

Fit

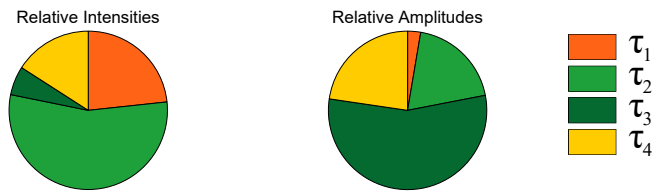


Autocorrelation (Residuals)



Fitted Parameters

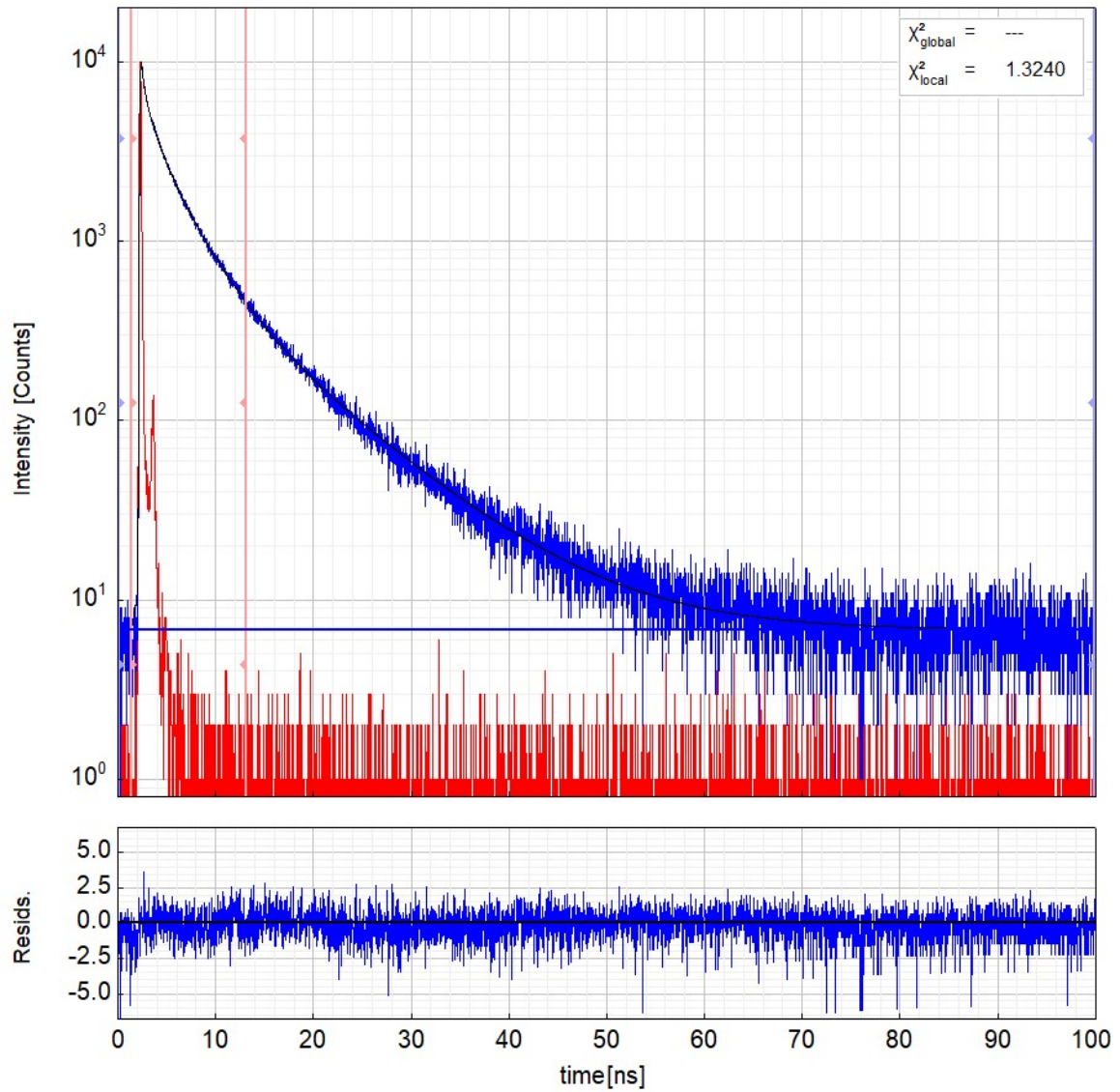
Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.547	$\pm 0.032$	5.8%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	207.1	$\pm 8.5$	4.1%
$A_2$ [kCnts/Chnl]	3.97	$\pm 0.16$	3.8%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	487.8	$\pm 2.8$	0.6%
$A_3$ [kCnts/Chnl]	11.37	$\pm 0.67$	5.8%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	52.4	$\pm 2.9$	5.4%
$A_4$ [kCnts/Chnl]	4.66	$\pm 0.14$	3.0%
$\tau_4$ [ns]	0.760	$\pm 0.065$	8.5%
$I_4$ [kCnts]	141.5	$\pm 9.7$	6.8%
$Bkg_{Dec}$ [kCnts]	0.0052	$\pm 0.0001$	1.2%
$Bkg_{RF}$ [Cnts/Chnl]	-0.35	$\pm 0.44$	127%
$Shift_{RF}$ [ps]	-9.18	$\pm 0.97$	11%
$A_{Scat}$ [kCnts]	-12.92	$\pm 0.99$	7.6%
$\lambda_{Det}$ [nm]	440.0000	---	---



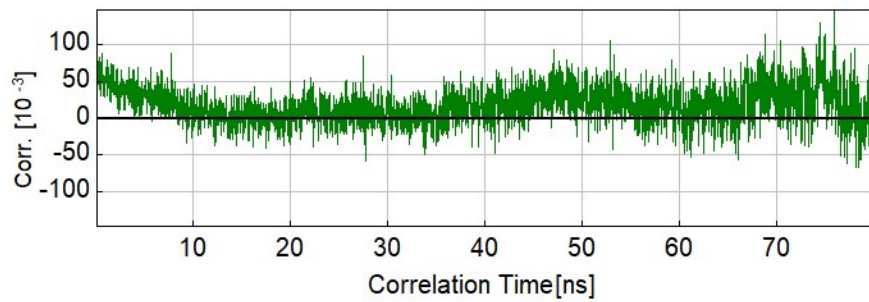
**Data Set: 4 / 14**

Decay: crv[4]; IRF: crv[0]

Fit

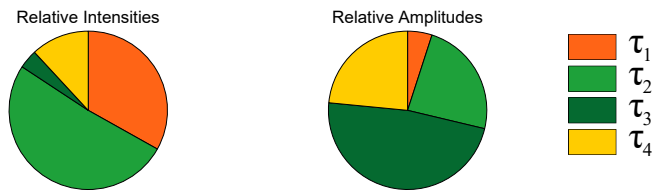


Autocorrelation (Residuals)



Fitted Parameters

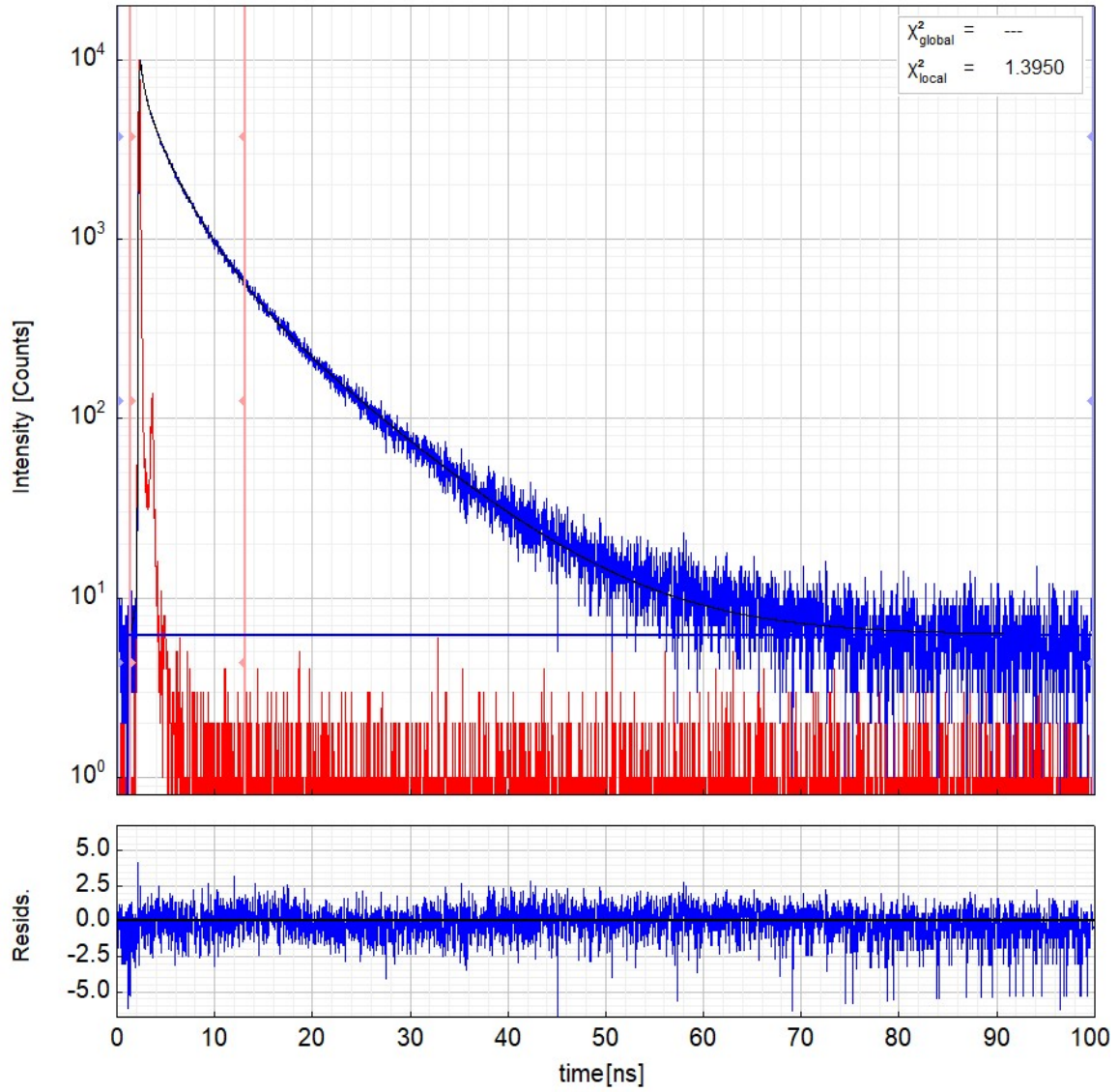
Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.942	$\pm 0.053$	5.6%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	357	$\pm 14$	3.7%
$A_2$ [kCnts/Chnl]	4.48	$\pm 0.12$	2.6%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	551.1	$\pm 5.0$	0.9%
$A_3$ [kCnts/Chnl]	9.02	$\pm 0.86$	9.5%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	41.6	$\pm 3.8$	9.1%
$A_4$ [kCnts/Chnl]	4.43	$\pm 0.13$	2.7%
$\tau_4$ [ns]	0.724	$\pm 0.067$	9.3%
$I_4$ [kCnts]	128.1	$\pm 8.9$	6.9%
$Bkg_{Dec}$ [kCnts]	0.0068	$\pm 0.0001$	1.1%
$Bkg_{RF}$ [Cnts/Chnl]	-0.65	$\pm 0.29$	44%
$Shift_{RF}$ [ps]	-10.1	$\pm 1.2$	11%
$A_{Scat}$ [kCnts]	-10.85	$\pm 0.45$	4.1%
$\lambda_{Det}$ [nm]	460.0000	---	---



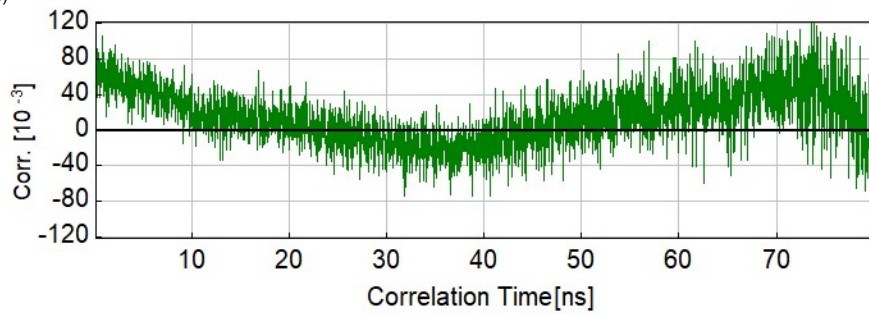
**Data Set: 5 / 14**

Decay: crv[5]; IRF: crv[0]

Fit



Autocorrelation (Residuals)



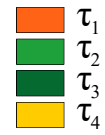
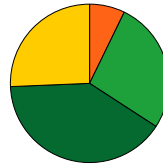
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.257	$\pm 0.061$	4.9%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	477	$\pm 16$	3.3%
$A_2$ [kCnts/Chnl]	4.69	$\pm 0.13$	2.7%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	577.1	$\pm 6.3$	1.1%
$A_3$ [kCnts/Chnl]	7.00	$\pm 0.42$	5.9%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	32.2	$\pm 4.6$	14%
$A_4$ [kCnts/Chnl]	4.47	$\pm 0.12$	2.5%
$\tau_4$ [ns]	0.665	$\pm 0.071$	11%
$I_4$ [kCnts]	118.7	$\pm 8.4$	7.1%
$Bkg_{Dec}$ [kCnts]	0.0063	$\pm 0.0002$	2.3%
$Bkg_{RF}$ [Cnts/Chnl]	-0.53	$\pm 0.34$	64%
$Shift_{RF}$ [ps]	-10.66	$\pm 0.43$	4.0%
$A_{Scat}$ [kCnts]	-9.49	$\pm 0.60$	6.3%
$\lambda_{Det}$ [nm]	480.0000	---	---

Relative Intensities



Relative Amplitudes

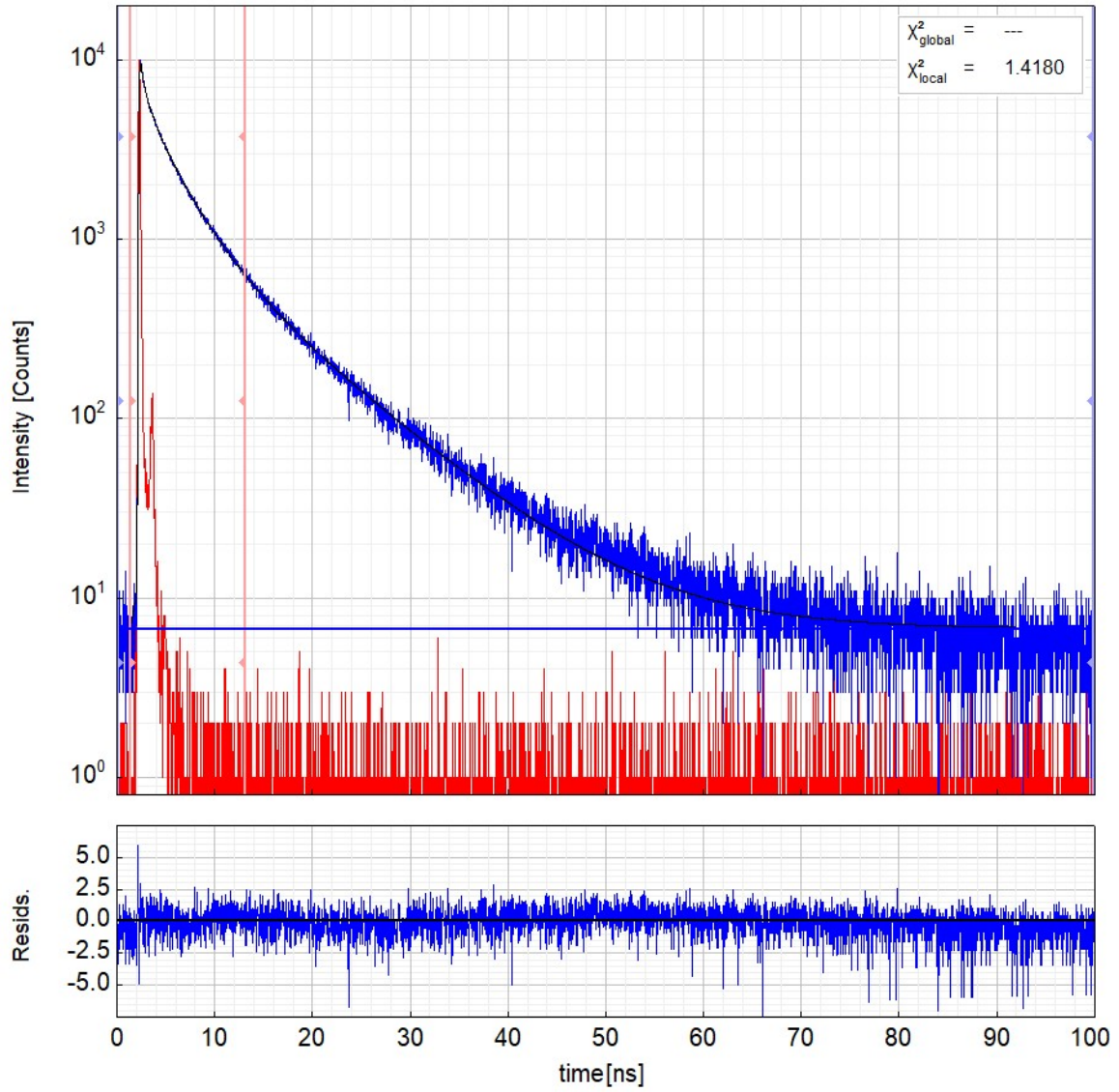




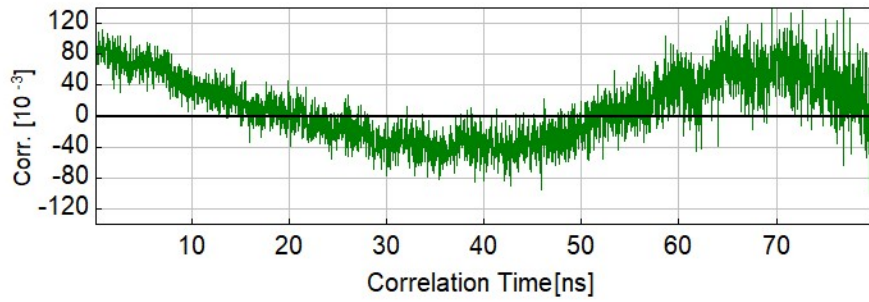
**Data Set: 6 / 14**

Decay: crv[6]; IRF: crv[0]

Fit



Autocorrelation (Residuals)



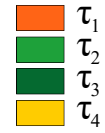
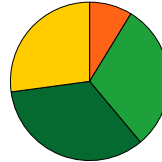
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.437	$\pm 0.076$	5.3%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	545	$\pm 20$	3.6%
$A_2$ [kCnts/Chnl]	4.97	$\pm 0.11$	2.1%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	612	$\pm 12$	1.8%
$A_3$ [kCnts/Chnl]	5.59	$\pm 0.33$	5.8%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	25.8	$\pm 3.9$	15%
$A_4$ [kCnts/Chnl]	4.47	$\pm 0.22$	4.7%
$\tau_4$ [ns]	0.605	$\pm 0.070$	11%
$I_4$ [kCnts]	108.0	$\pm 7.7$	7.1%
$Bkg_{rDec}$ [kCnts]	0.0068	$\pm 0.0002$	1.6%
$Bkg_{rRF}$ [Cnts/Chnl]	-0.68	$\pm 0.24$	35%
$Shift_{rRF}$ [ps]	-11.0	$\pm 1.2$	10%
$A_{Scat}$ [kCnts]	-8.76	$\pm 0.61$	6.9%
$\lambda_{Det}$ [nm]	500.0000	---	---

Relative Intensities



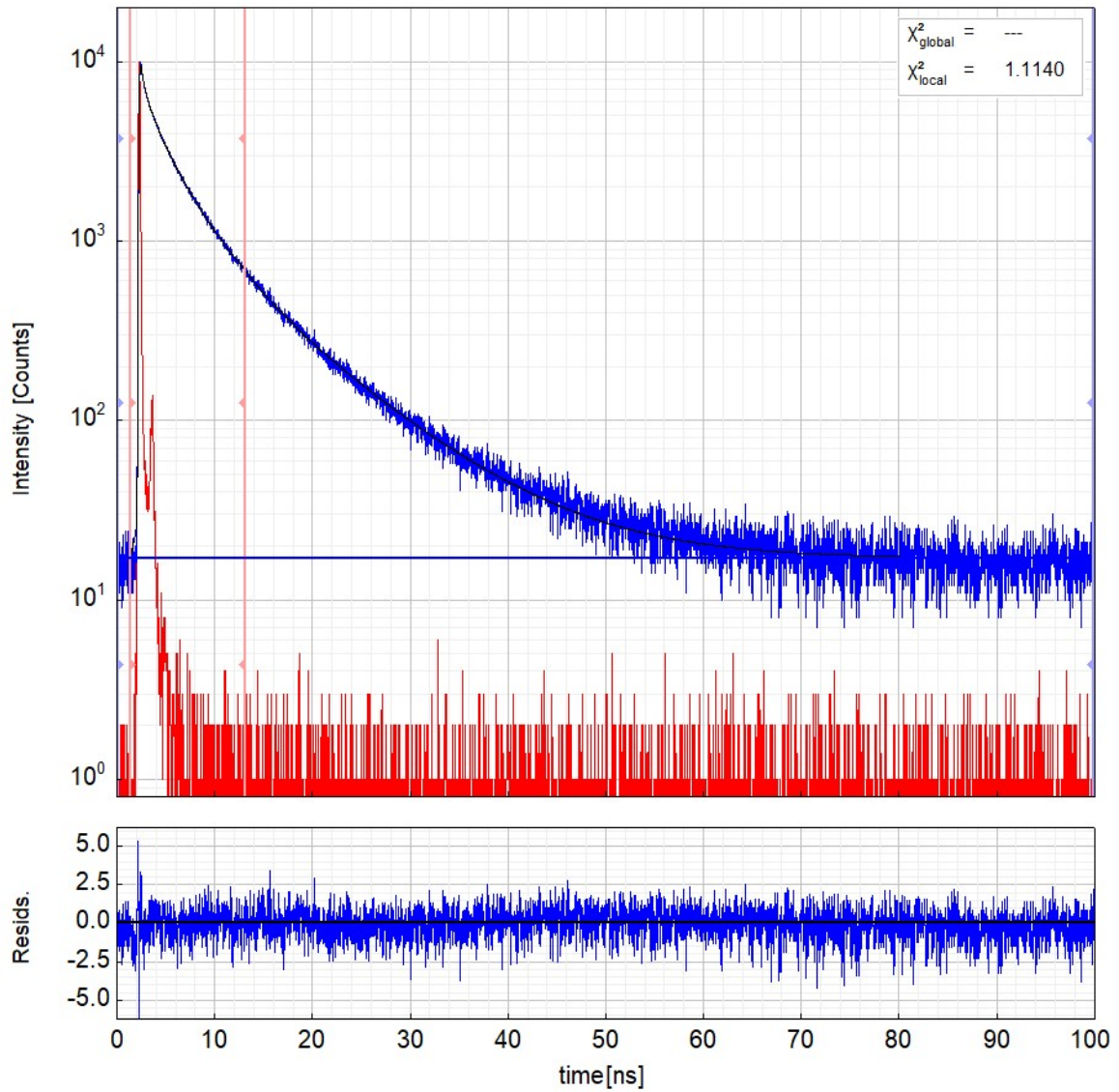
Relative Amplitudes



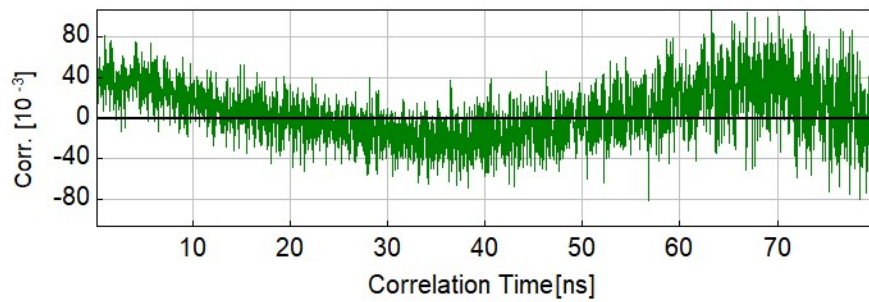
**Data Set: 7 / 14**

Decay: crv[7]; IRF: crv[0]

Fit



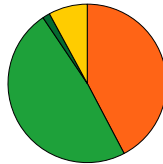
Autocorrelation (Residuals)



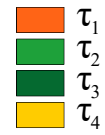
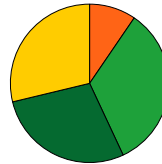
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.481	$\pm 0.087$	5.9%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	562	$\pm 25$	4.3%
$A_2$ [kCnts/Chnl]	5.206	$\pm 0.097$	1.8%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	641	$\pm 14$	2.1%
$A_3$ [kCnts/Chnl]	4.4	$\pm 1.2$	25%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	20.2	$\pm 5.8$	29%
$A_4$ [kCnts/Chnl]	4.47	$\pm 0.27$	5.9%
$\tau_4$ [ns]	0.589	$\pm 0.048$	8.0%
$I_4$ [kCnts]	105.2	$\pm 7.5$	7.1%
$Bkg_{Dec}$ [kCnts]	0.0171	$\pm 0.0002$	0.8%
$Bkg_{IRF}$ [Cnts/Chnl]	-1.96	$\pm 0.49$	25%
$Shift_{IRF}$ [ps]	-12.26	$\pm 0.96$	7.8%
$A_{Scat}$ [kCnts]	-7.7	$\pm 1.7$	21%
$\lambda_{Det}$ [nm]	520.0000	---	---

Relative Intensities



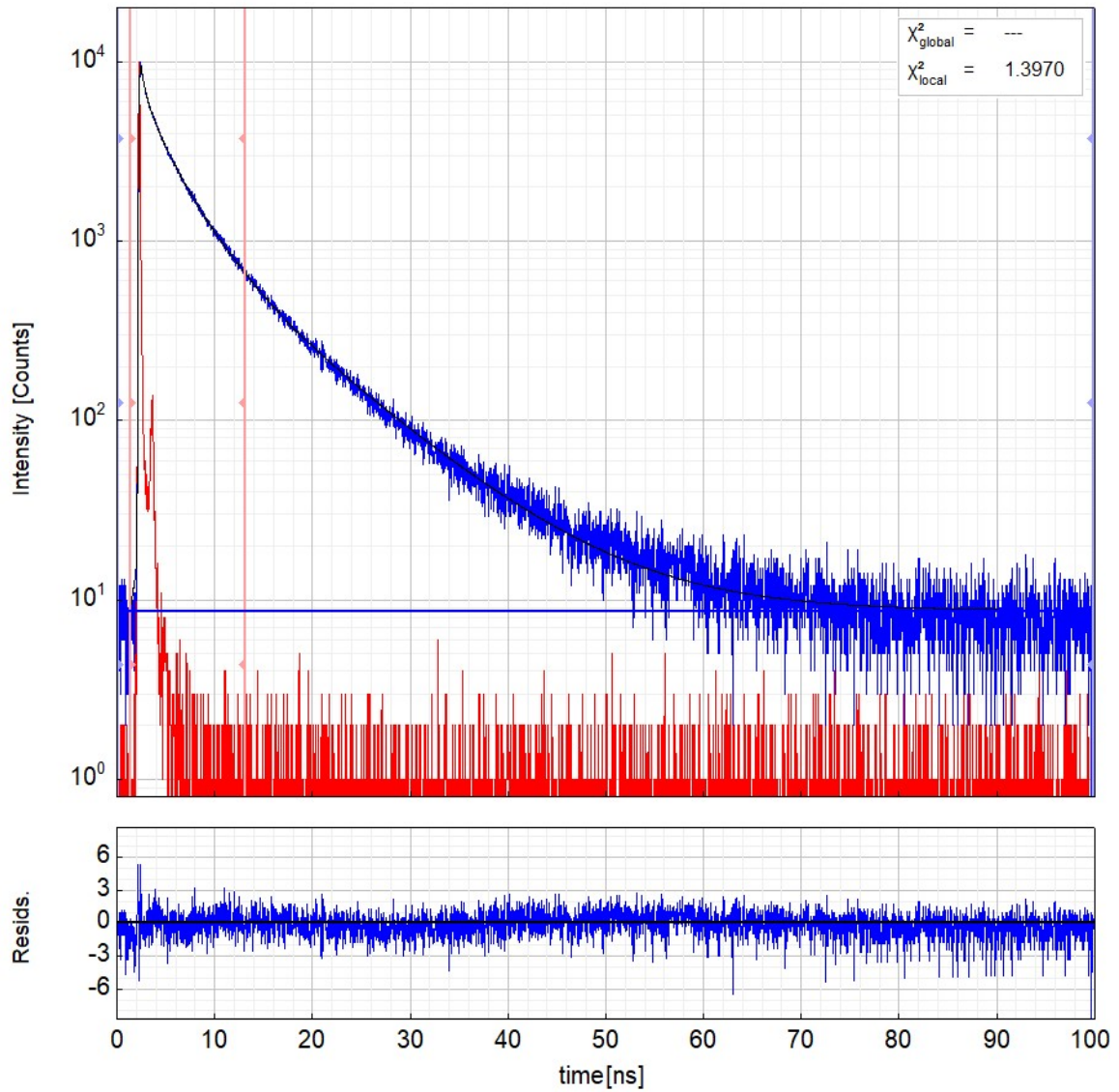
Relative Amplitudes



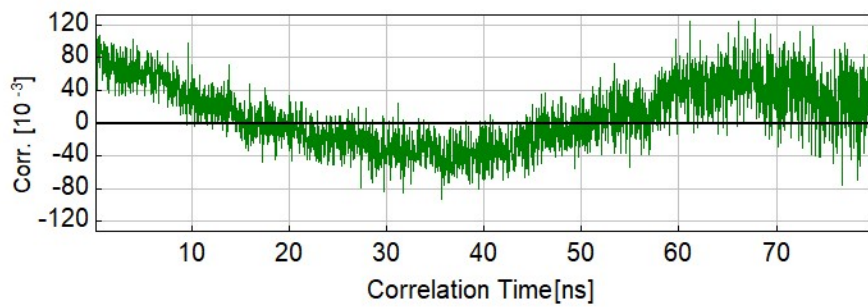
**Data Set: 8 / 14**

Decay: crv[8]; IRF: crv[0]

Fit



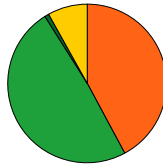
Autocorrelation (Residuals)



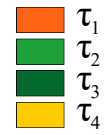
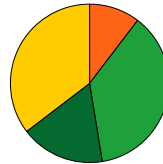
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.469	$\pm 0.094$	6.4%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	557	$\pm 24$	4.2%
$A_2$ [kCnts/Chnl]	5.244	$\pm 0.089$	1.7%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	646	$\pm 11$	1.7%
$A_3$ [kCnts/Chnl]	2.5	$\pm 1.5$	60%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	11.2	$\pm 7.7$	68%
$A_4$ [kCnts/Chnl]	5.01	$\pm 0.43$	8.6%
$\tau_4$ [ns]	0.536	$\pm 0.058$	11%
$I_4$ [kCnts]	107.2	$\pm 6.3$	5.8%
$Bkg_{Dec}$ [kCnts]	0.0087	$\pm 0.0003$	2.4%
$Bkg_{IRF}$ [Cnts/Chnl]	-1.45	$\pm 0.47$	32%
$Shift_{IRF}$ [ps]	-14.5	$\pm 3.3$	23%
$A_{Scat}$ [kCnts]	-6.6	$\pm 1.3$	19%
$\lambda_{Det}$ [nm]	540.0000	---	---

Relative Intensities



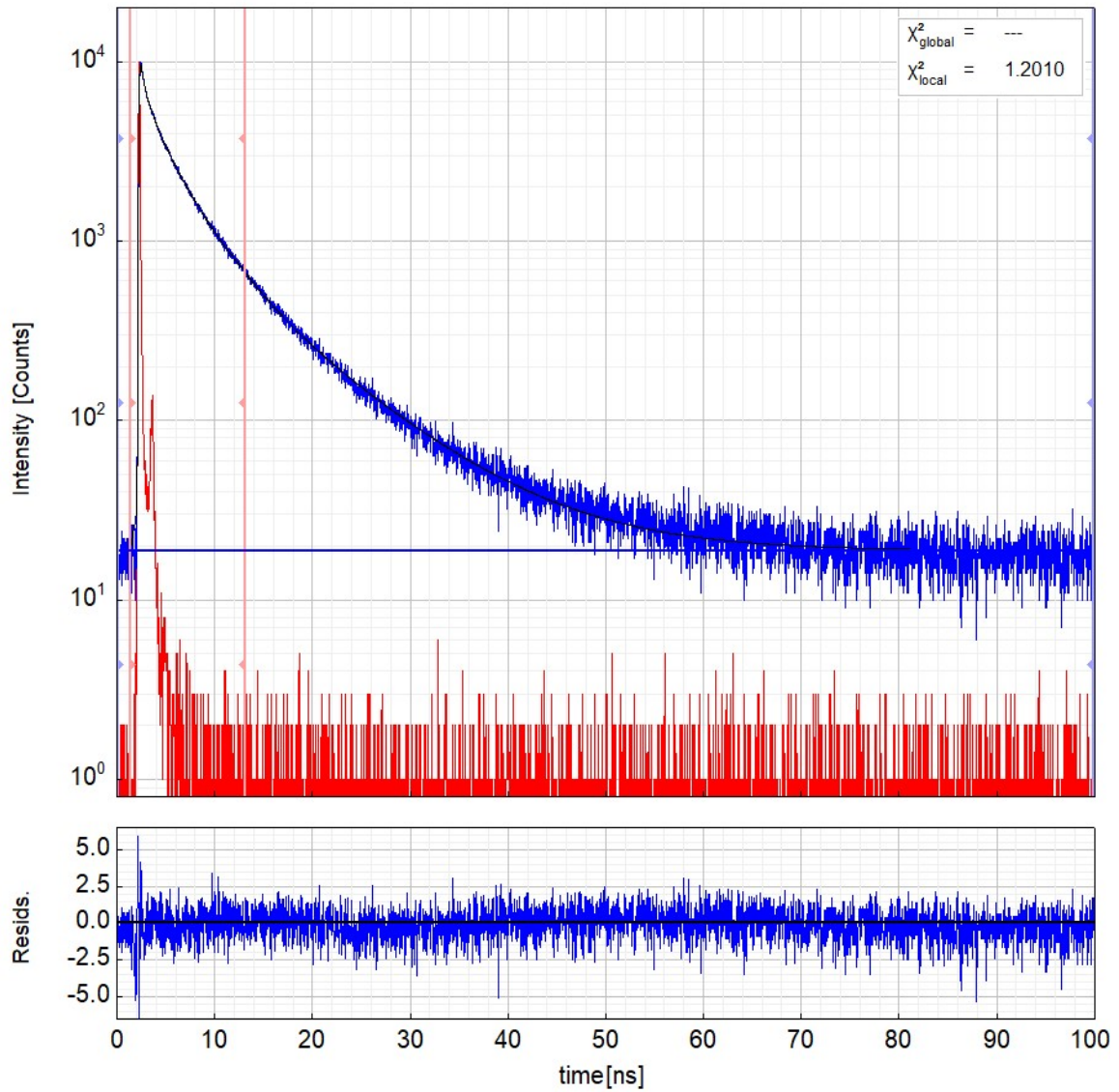
Relative Amplitudes



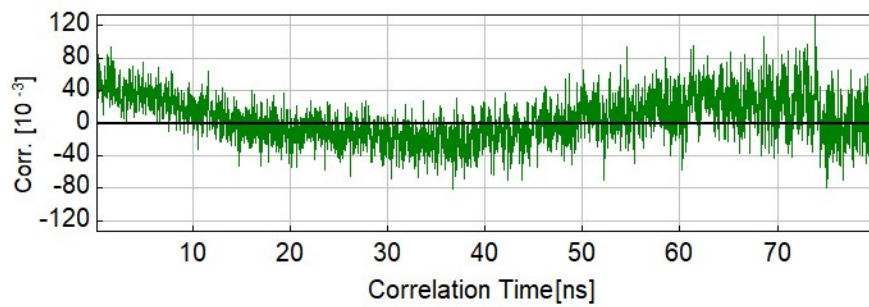
**Data Set: 9 / 14**

Decay: crv[9]; IRF: crv[0]

Fit



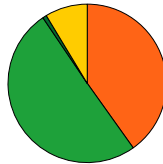
Autocorrelation (Residuals)



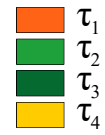
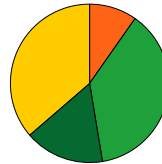
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.384	$\pm 0.069$	5.0%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	525	$\pm 18$	3.3%
$A_2$ [kCnts/Chnl]	5.349	$\pm 0.084$	1.6%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	659	$\pm 13$	1.9%
$A_3$ [kCnts/Chnl]	2.4	$\pm 1.5$	64%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	10.7	$\pm 8.3$	77%
$A_4$ [kCnts/Chnl]	5.17	$\pm 0.48$	9.2%
$\tau_4$ [ns]	0.548	$\pm 0.055$	9.9%
$I_4$ [kCnts]	113.0	$\pm 6.6$	5.8%
$Bkg_{Dec}$ [kCnts]	0.0189	$\pm 0.0002$	0.8%
$Bkg_{IRF}$ [Cnts/Chnl]	-2.85	$\pm 0.63$	22%
$Shift_{IRF}$ [ps]	-14.8	$\pm 4.7$	32%
$A_{Scat}$ [kCnts]	-5.6	$\pm 2.8$	50%
$\lambda_{Det}$ [nm]	560.0000	---	---

Relative Intensities



Relative Amplitudes

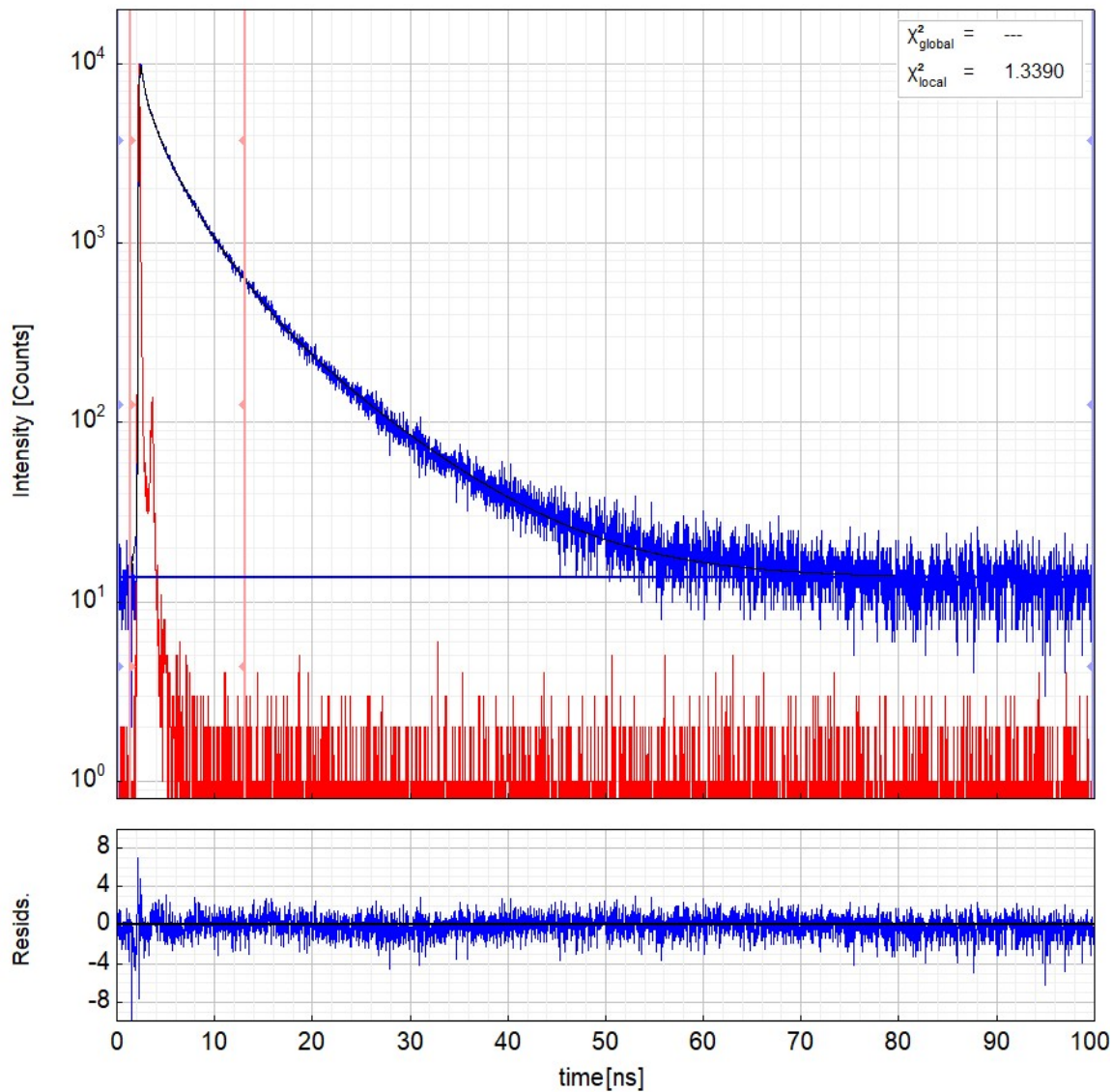




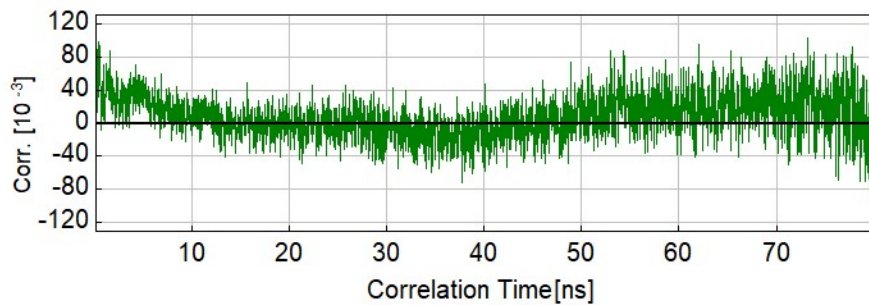
Data Set: 10 / 14

Decay: crv[10]; IRF: crv[0]

Fit



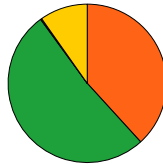
Autocorrelation (Residuals)



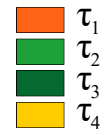
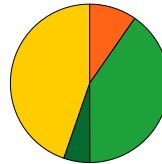
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.276	$\pm 0.062$	4.8%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	484	$\pm 18$	3.7%
$A_2$ [kCnts/Chnl]	5.318	$\pm 0.077$	1.4%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	655	$\pm 11$	1.6%
$A_3$ [kCnts/Chnl]	0.8	$\pm 2.1$	293%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	4	$\pm 11$	330%
$A_4$ [kCnts/Chnl]	5.90	$\pm 0.49$	8.3%
$\tau_4$ [ns]	0.525	$\pm 0.068$	13%
$I_4$ [kCnts]	123.6	$\pm 7.8$	6.2%
$Bkg_{rDec}$ [kCnts]	0.0136	$\pm 0.0002$	1.0%
$Bkg_{rRF}$ [Cnts/Chnl]	-2.64	$\pm 0.45$	17%
$Shift_{rRF}$ [ps]	-18	$\pm 12$	60%
$A_{Scat}$ [kCnts]	-5.3	$\pm 4.4$	83%
$\lambda_{Det}$ [nm]	580.0000	---	---

Relative Intensities



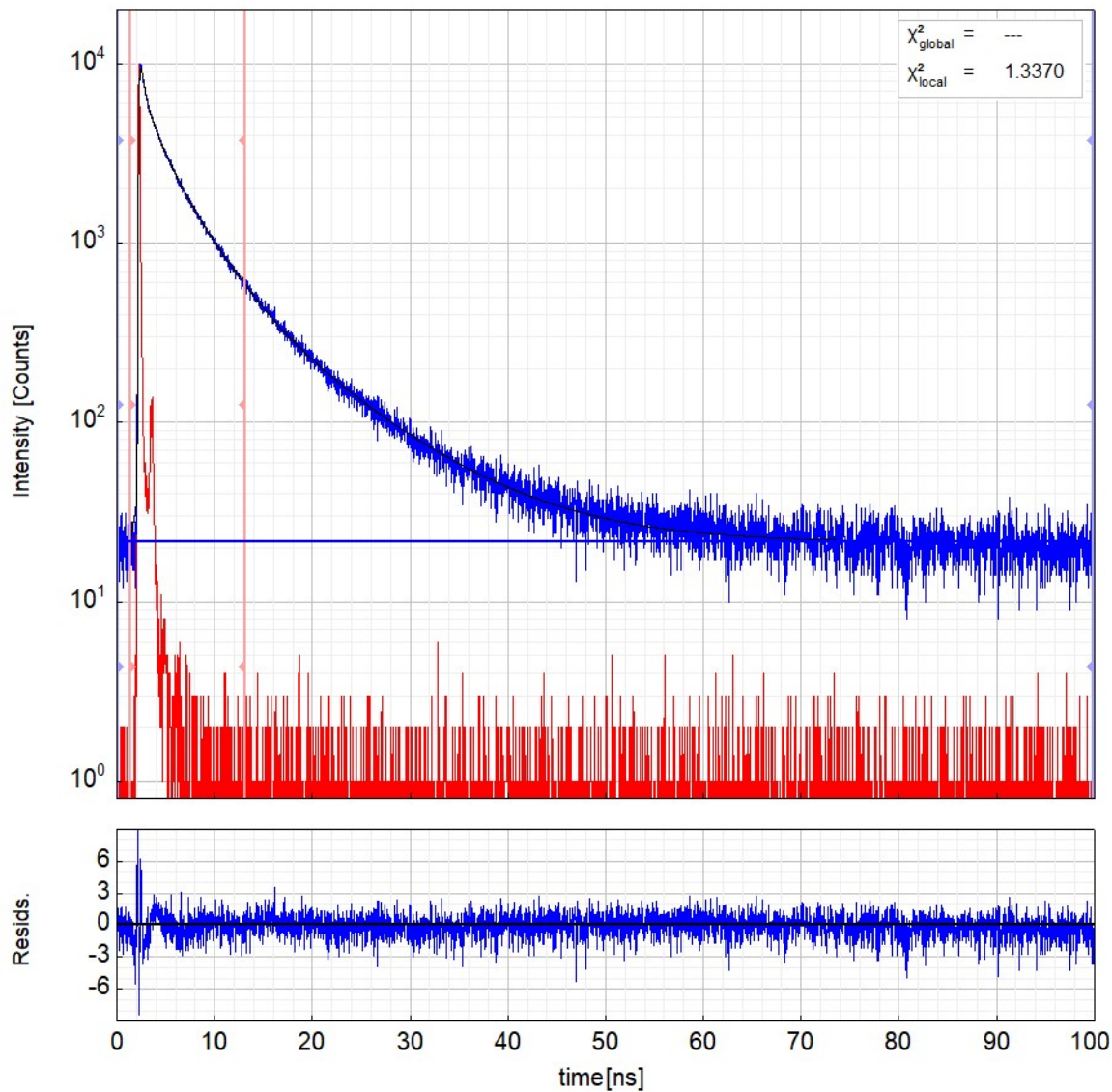
Relative Amplitudes



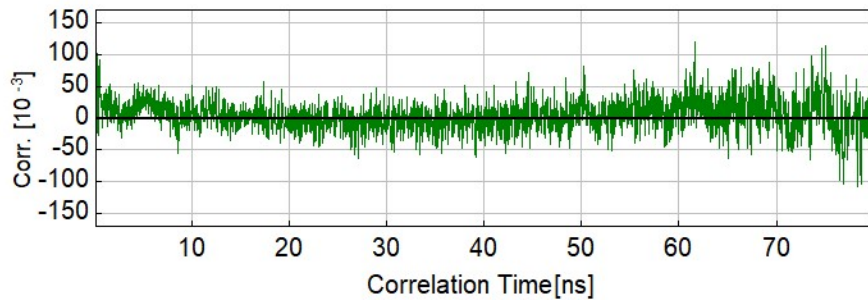
Data Set: 11 / 14

Decay: crv[11]; IRF: crv[0]

Fit



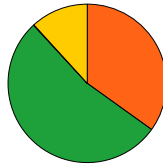
Autocorrelation (Residuals)



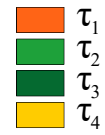
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.131	$\pm 0.058$	5.1%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	429	$\pm 13$	2.8%
$A_2$ [kCnts/Chnl]	5.31	$\pm 0.11$	2.0%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	653.5	$\pm 8.0$	1.2%
$A_3$ [kCnts/Chnl]	-3.8	$\pm 3.0$	79%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	-17	$\pm 15$	85%
$A_4$ [kCnts/Chnl]	7.47	$\pm 0.70$	9.4%
$\tau_4$ [ns]	0.485	$\pm 0.043$	8.7%
$I_4$ [kCnts]	144.5	$\pm 7.1$	4.9%
$Bkg_{Dec}$ [kCnts]	0.0215	$\pm 0.0002$	0.9%
$Bkg_{IRF}$ [Cnts/Chnl]	-3.29	$\pm 0.73$	22%
$Shift_{IRF}$ [ps]	-31.0	$\pm 6.6$	21%
$A_{Scat}$ [kCnts]	-3.6	$\pm 3.5$	95%
$\lambda_{Det}$ [nm]	600.0000	---	---

Relative Intensities



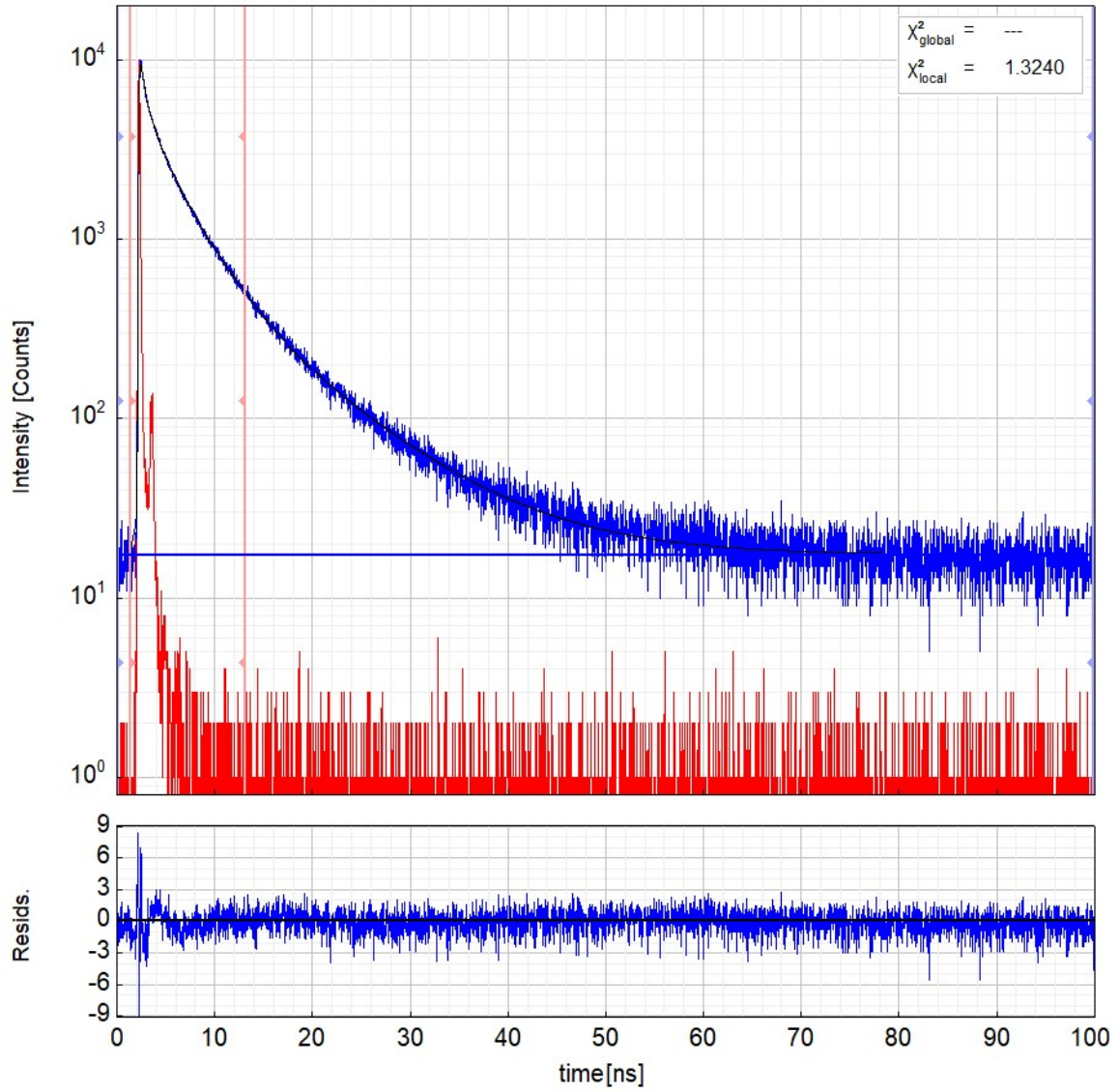
Relative Amplitudes



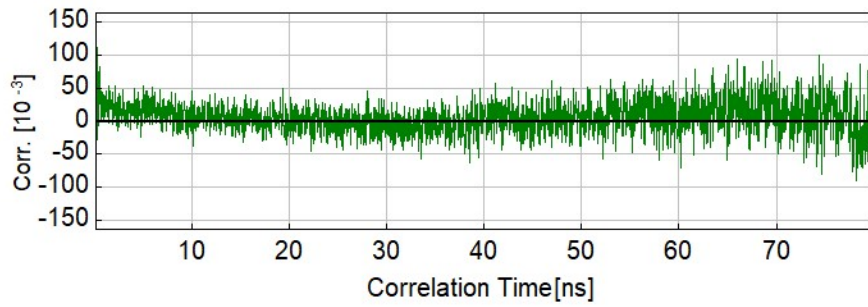
**Data Set: 12 / 14**

Decay: crv[12]; IRF: crv[0]

Fit



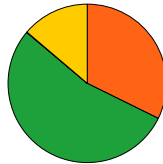
Autocorrelation (Residuals)



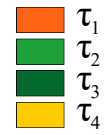
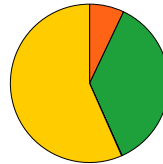
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.955	$\pm 0.058$	6.1%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	362	$\pm 15$	4.1%
$A_2$ [kCnts/Chnl]	4.90	$\pm 0.15$	3.0%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	603.0	$\pm 7.1$	1.2%
$A_3$ [kCnts/Chnl]	-2.5	$\pm 3.6$	144%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	-11	$\pm 17$	147%
$A_4$ [kCnts/Chnl]	7.66	$\pm 0.97$	13%
$\tau_4$ [ns]	0.504	$\pm 0.061$	12%
$I_4$ [kCnts]	154.4	$\pm 5.7$	3.6%
$Bkg_{Dec}$ [kCnts]	0.0175	$\pm 0.0002$	0.8%
$Bkg_{IRF}$ [Cnts/Chnl]	-2.64	$\pm 0.54$	20%
$Shift_{IRF}$ [ps]	-29	$\pm 17$	55%
$A_{Scat}$ [kCnts]	-5.0	$\pm 3.9$	79%
$\lambda_{Det}$ [nm]	620.0000	---	---

Relative Intensities



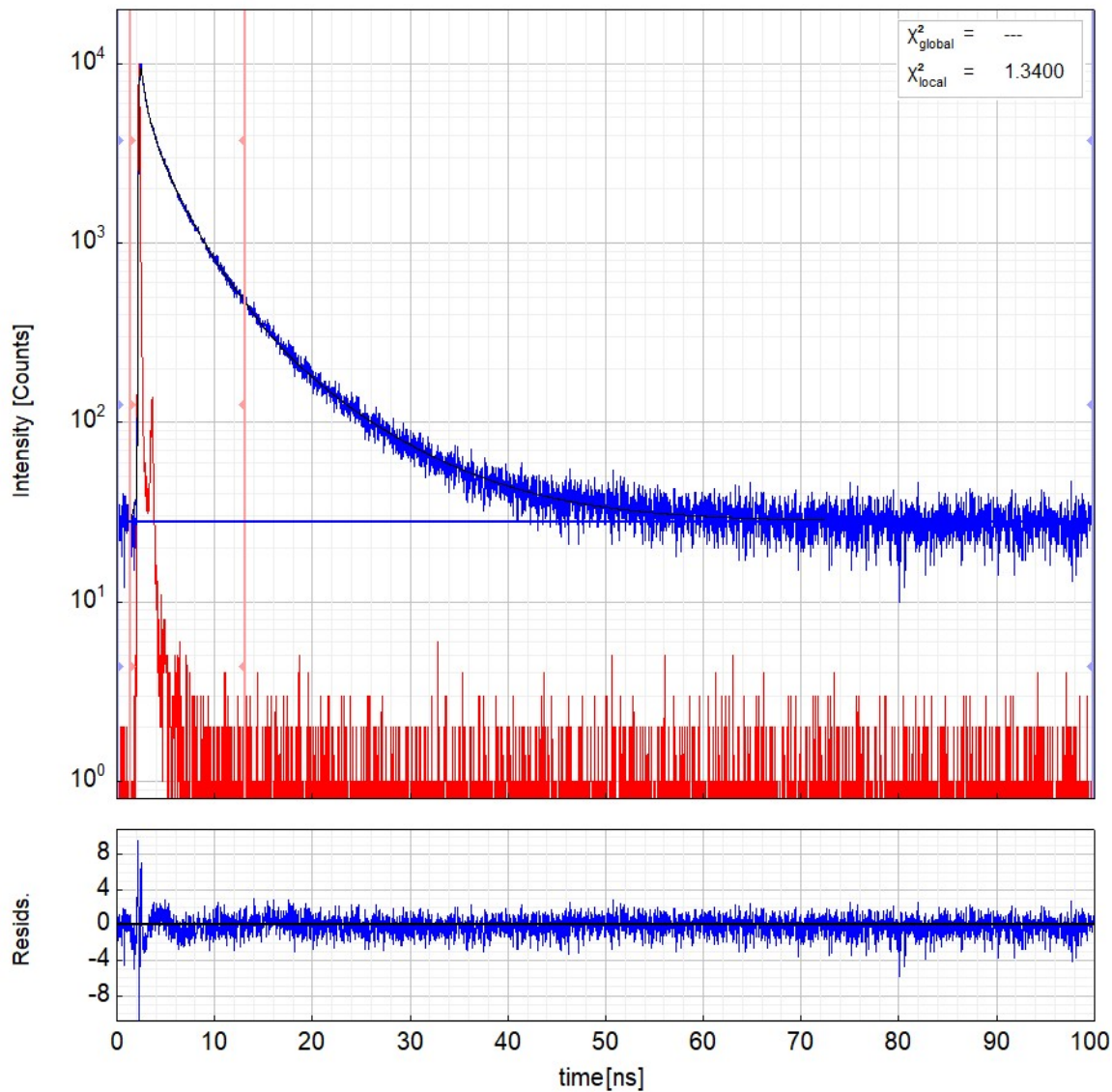
Relative Amplitudes



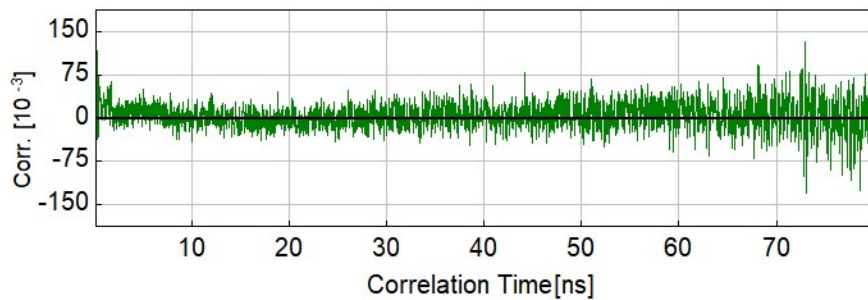
**Data Set: 13 / 14**

Decay: crv[13]; IRF: crv[0]

Fit



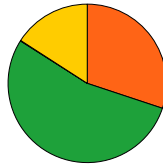
Autocorrelation (Residuals)



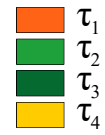
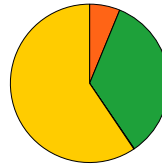
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.838	$\pm 0.034$	4.0%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	317.5	$\pm 8.3$	2.6%
$A_2$ [kCnts/Chnl]	4.63	$\pm 0.15$	3.2%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	568.8	$\pm 8.2$	1.4%
$A_3$ [kCnts/Chnl]	-2.1	$\pm 3.2$	152%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	-9	$\pm 15$	158%
$A_4$ [kCnts/Chnl]	8.02	$\pm 0.70$	8.7%
$\tau_4$ [ns]	0.523	$\pm 0.051$	9.7%
$I_4$ [kCnts]	168	$\pm 11$	6.4%
$Bkg_{Dec}$ [kCnts]	0.0280	$\pm 0.0001$	0.3%
$Bkg_{IRF}$ [Cnts/Chnl]	-2.36	$\pm 0.96$	41%
$Shift_{IRF}$ [ps]	-26	$\pm 12$	43%
$A_{Scat}$ [kCnts]	-3.3	$\pm 4.6$	140%
$\lambda_{Det}$ [nm]	640.0000	---	---

Relative Intensities



Relative Amplitudes

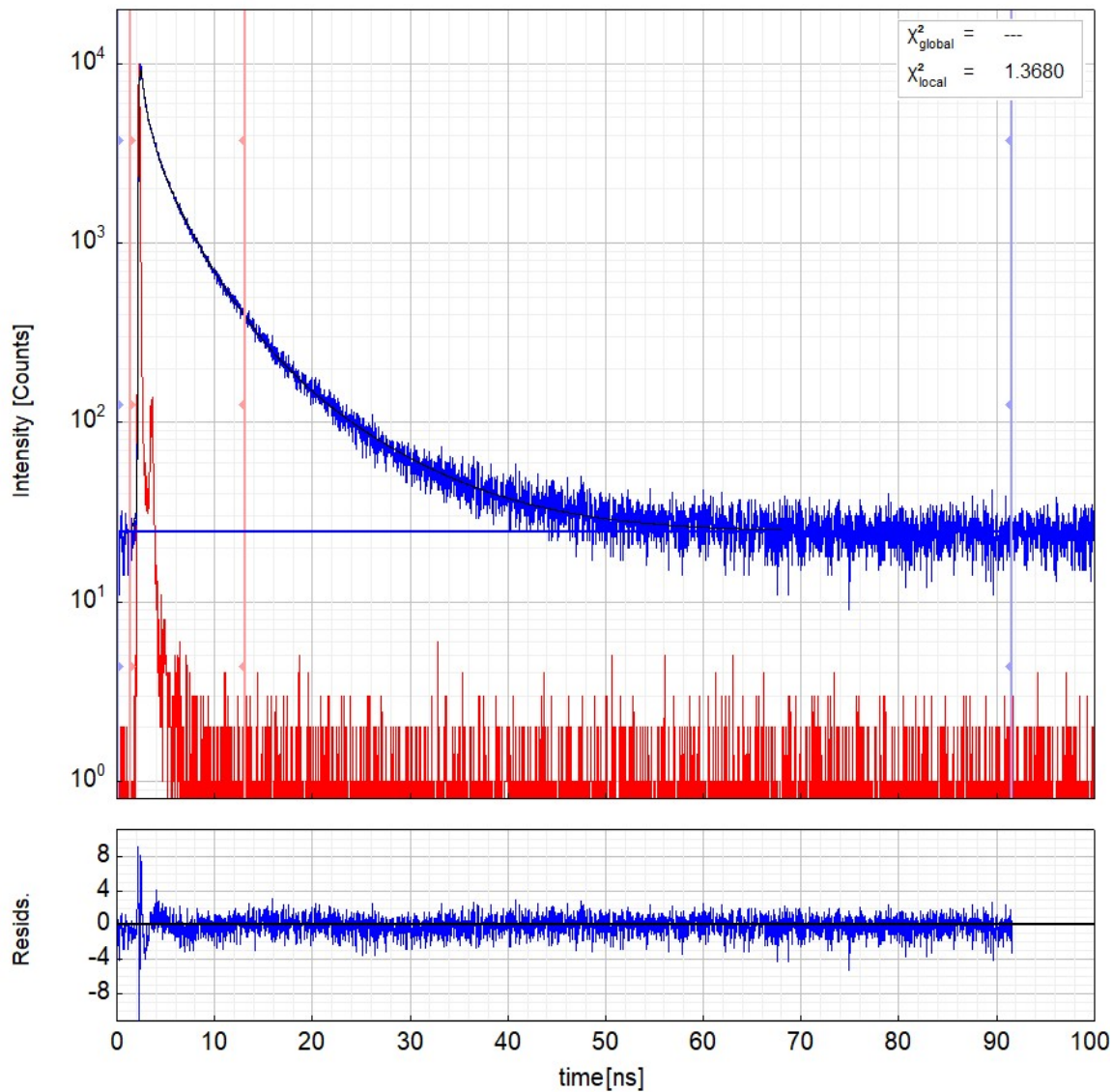




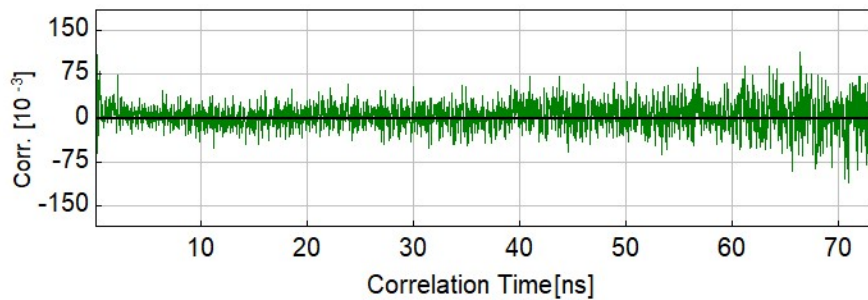
Data Set: 14 / 14

Decay: crv[14]; IRF: crv[0]

Fit



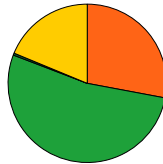
Autocorrelation (Residuals)



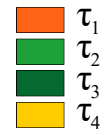
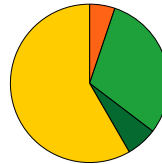
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.699	$\pm 0.050$	7.1%
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$I_1$ [kCnts]	265	$\pm 14$	5.3%
$A_2$ [kCnts/Chnl]	4.07	$\pm 0.17$	4.0%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$I_2$ [kCnts]	500.8	$\pm 3.2$	0.6%
$A_3$ [kCnts/Chnl]	0.9	$\pm 1.8$	204%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%
$I_3$ [kCnts]	4	$\pm 11$	271%
$A_4$ [kCnts/Chnl]	7.88	$\pm 1.00$	13%
$\tau_4$ [ns]	0.565	$\pm 0.062$	11%
$I_4$ [kCnts]	177.8	$\pm 5.8$	3.3%
$Bkg_{Dec}$ [kCnts]	0.0245	$\pm 0.0002$	0.6%
$Bkg_{RF}$ [Cnts/Chnl]	-1.57	$\pm 0.58$	37%
$Shift_{RF}$ [ps]	-36	$\pm 26$	70%
$A_{Scat}$ [kCnts]	-12	$\pm 11$	86%
$\lambda_{Det}$ [nm]	660.0000	---	---

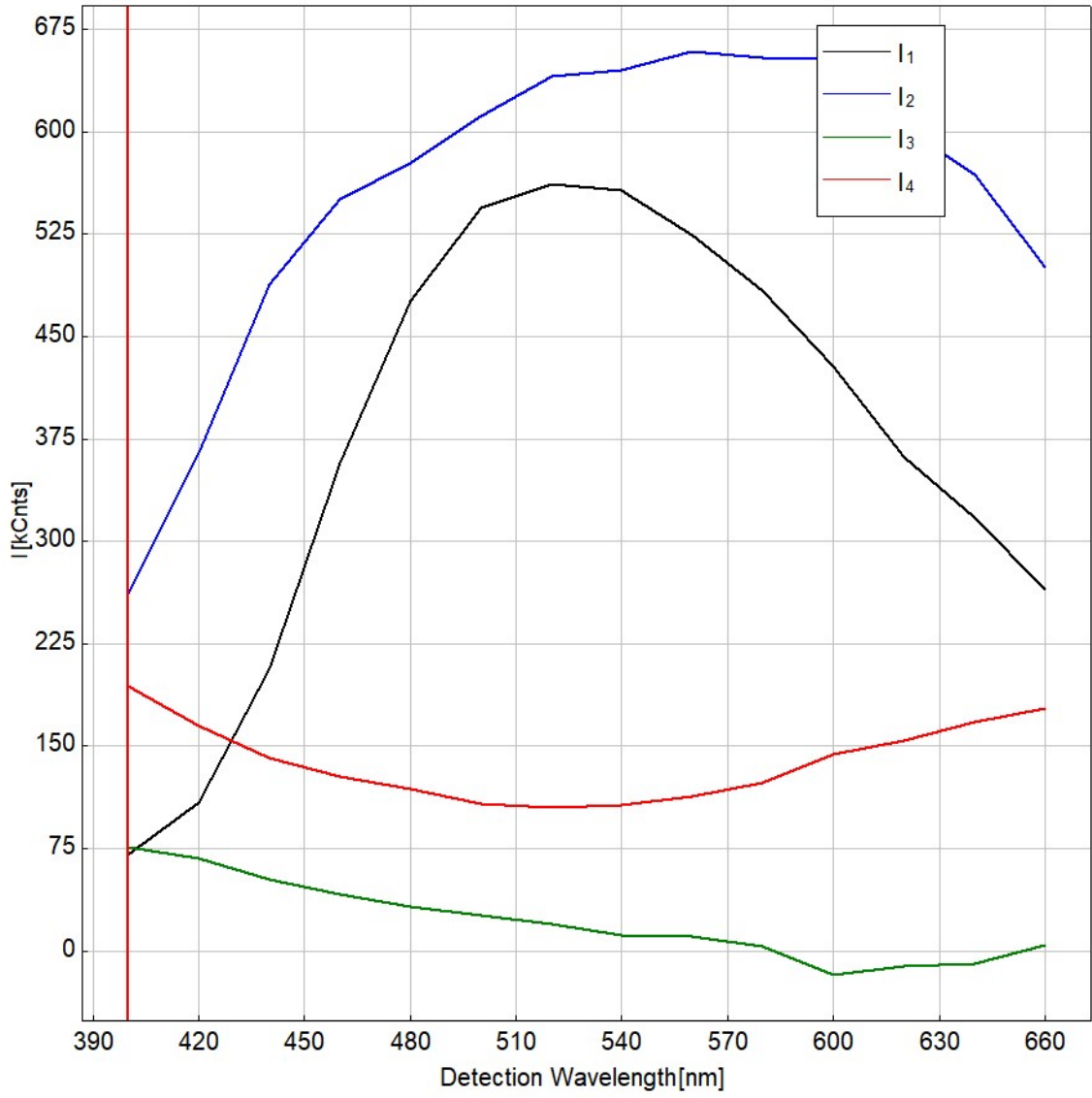
Relative Intensities



Relative Amplitudes



### Parameter Plot



### Global Parameters

Parameter	Value	$\Delta$	$\delta$
$\tau_1$ [ns]	9.48	$\pm 0.17$	1.8%
$\tau_2$ [ns]	3.078	$\pm 0.088$	2.8%
$\tau_3$ [ns]	0.116	$\pm 0.012$	9.6%

# EasyTau Report

9/4/2020 7:38:15 PM



## Container Curves

TRES+IRF\_20200618\_1644.etc: crv[0 - 11]

## Container Properties

Measurement Context: Time Resolved Emission Scan

Detection Wavelength: 410.0 - 610.0 (Step: 20.0) nm

Summary:

Sample: Sample\_1  
Solvent: <unspecified>  
Excitation: V pol 376±1nm with LDH-P-C-375  
Detection: M pol 410..610nm 20nm steps  
10000 peak counts  
grating 1200/500+  
detector UV-red [PMT]

## Comment

[\[Edit Comment\]](#)

## Model: Exponential [Reconv.]

$$\text{Dec}(t) = \left[ \int_{-\infty}^t dt' [\text{IRF}(t - \text{Shift}_{\text{IRF}}) - \text{Bkg}_{\text{IRF}}] \left[ \sum_{i=1}^{n_{\text{Exp}}} A_i e^{-\frac{t-t'}{\tau_i}} + A_{\text{Scatt}} \delta(t-t') \right] \right] + \text{Bkg}_{\text{Dec}}$$

$$I_m = A_m \tau_m$$

$$A_{\text{Rel } m} = A_m / \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i$$

$$I_{\text{Rel } m} = I_m / \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i$$

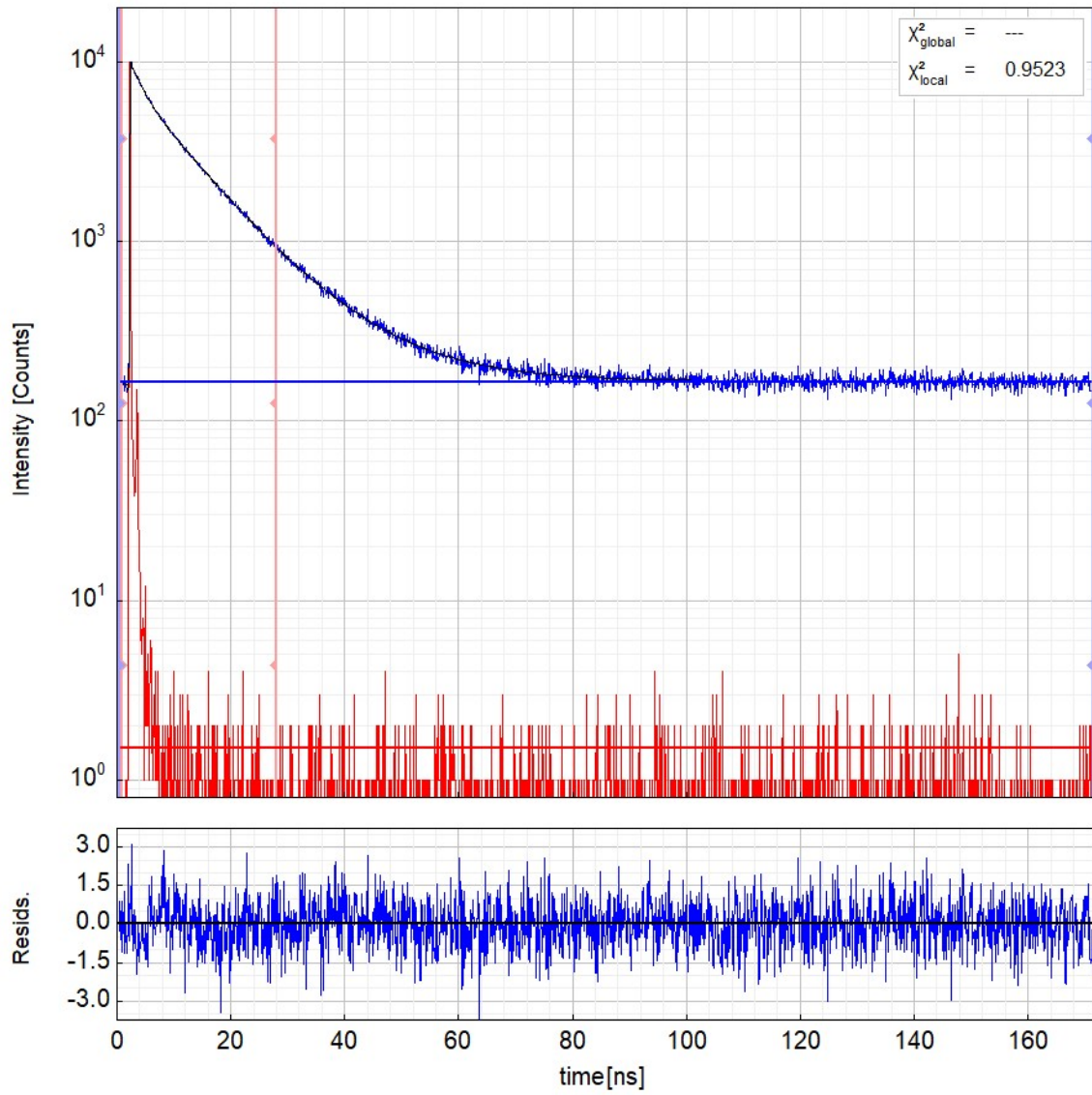
$$\tau_{\text{Av Amp}} = \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i \tau_i / \sum_{\substack{i=1 \\ A_i > 0}}^{n_{\text{Exp}}} A_i$$

$$\tau_{\text{Av Int}} = \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i \tau_i / \sum_{\substack{i=1 \\ I_i > 0}}^{n_{\text{Exp}}} I_i$$

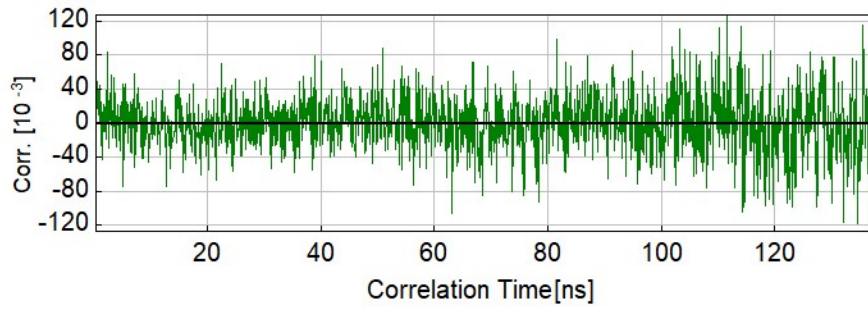
**Data Set: 1 / 11**

Decay: crv[1]; IRF: crv[0]

Fit



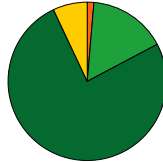
Autocorrelation (Residuals)



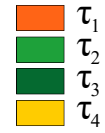
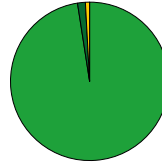
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0401	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	14.7459	---	---
$A_2$ [kCnts/Chnl]	434.4581	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	174.4210	---	---
$A_3$ [kCnts/Chnl]	7.1278	---	---
$\tau_3$ [ns]	11.6451	---	---
$I_3$ [kCnts]	830.0420	---	---
$A_4$ [kCnts/Chnl]	3.7847	---	---
$\tau_4$ [ns]	2.0294	---	---
$I_4$ [kCnts]	76.8074	---	---
$Bkg_{Dec}$ [kCnts]	0.1641	---	---
$Bkg_{RF}$ [Cnts/Chnl]	1.5106	---	---
$Shift_{RF}$ [ps]	-27.6718	---	---
$A_{Scat}$ [kCnts]	-47.4477	---	---
$\lambda_{Det}$ [nm]	410.0000	---	---

Relative Intensities



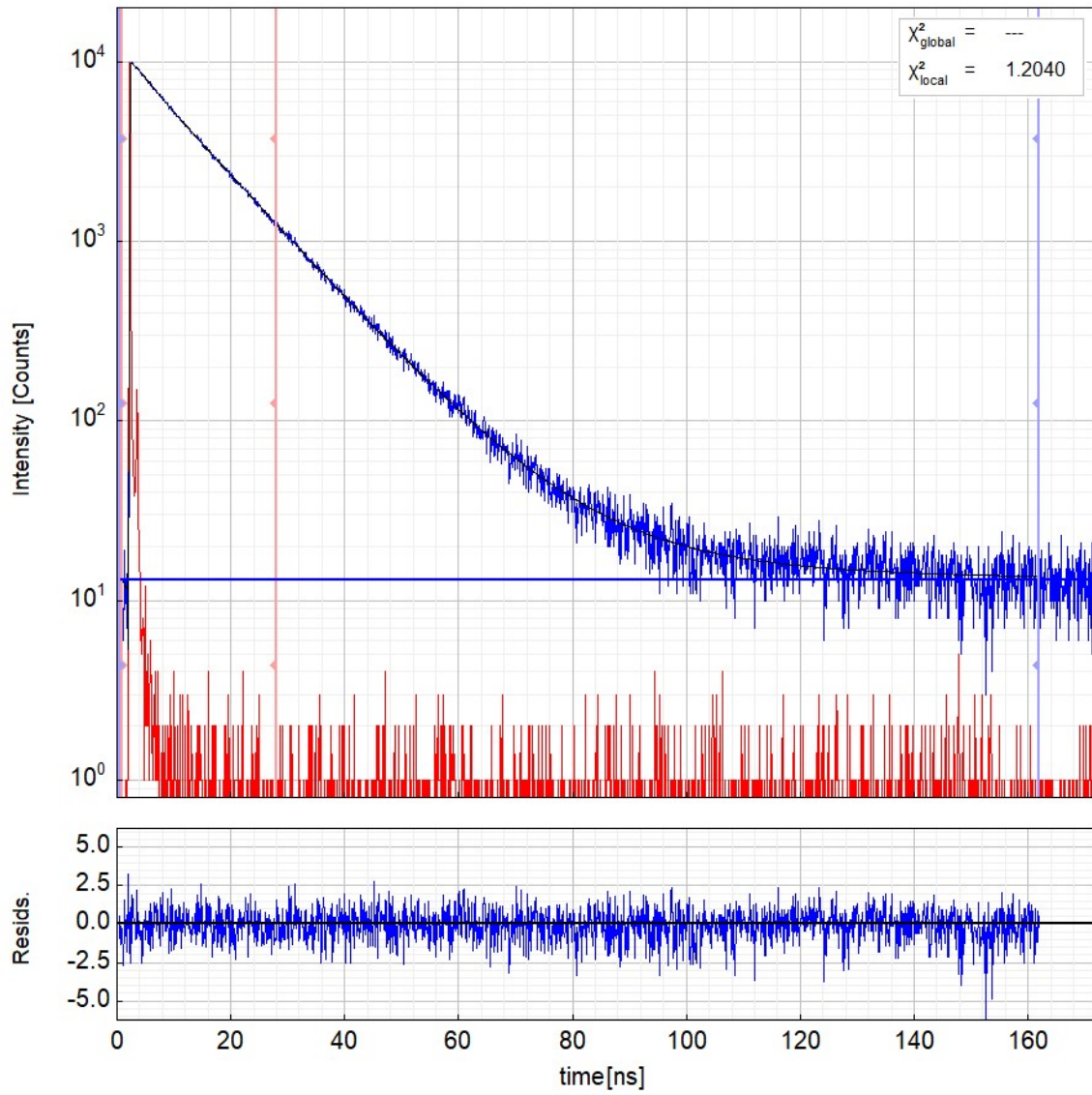
Relative Amplitudes



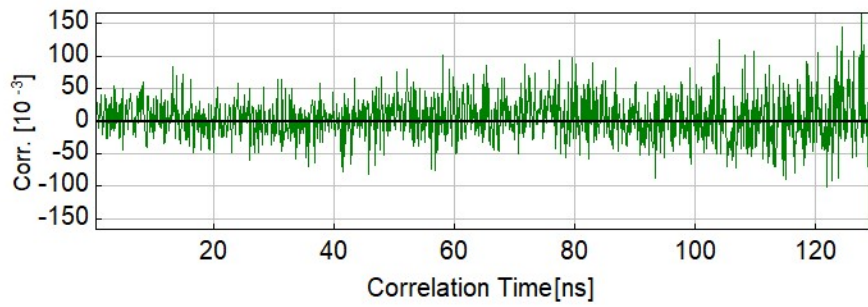
**Data Set: 2 / 11**

Decay: crv[2]; IRF: crv[0]

Fit



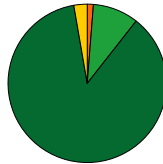
Autocorrelation (Residuals)



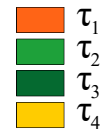
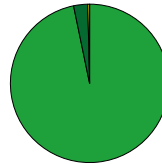
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0471	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	17.3064	---	---
$A_2$ [kCnts/Chnl]	321.9463	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	129.2511	---	---
$A_3$ [kCnts/Chnl]	9.6103	---	---
$\tau_3$ [ns]	12.4727	---	---
$I_3$ [kCnts]	1198.6631	---	---
$A_4$ [kCnts/Chnl]	1.2134	---	---
$\tau_4$ [ns]	3.1033	---	---
$I_4$ [kCnts]	37.6539	---	---
$Bkg_{Dec}$ [kCnts]	0.0130	---	---
$Bkg_{RF}$ [Cnts/Chnl]	0.5197	---	---
$Shift_{RF}$ [ps]	-32.0478	---	---
$A_{Scat}$ [kCnts]	-37.9649	---	---
$\lambda_{Det}$ [nm]	430.0000	---	---

Relative Intensities



Relative Amplitudes

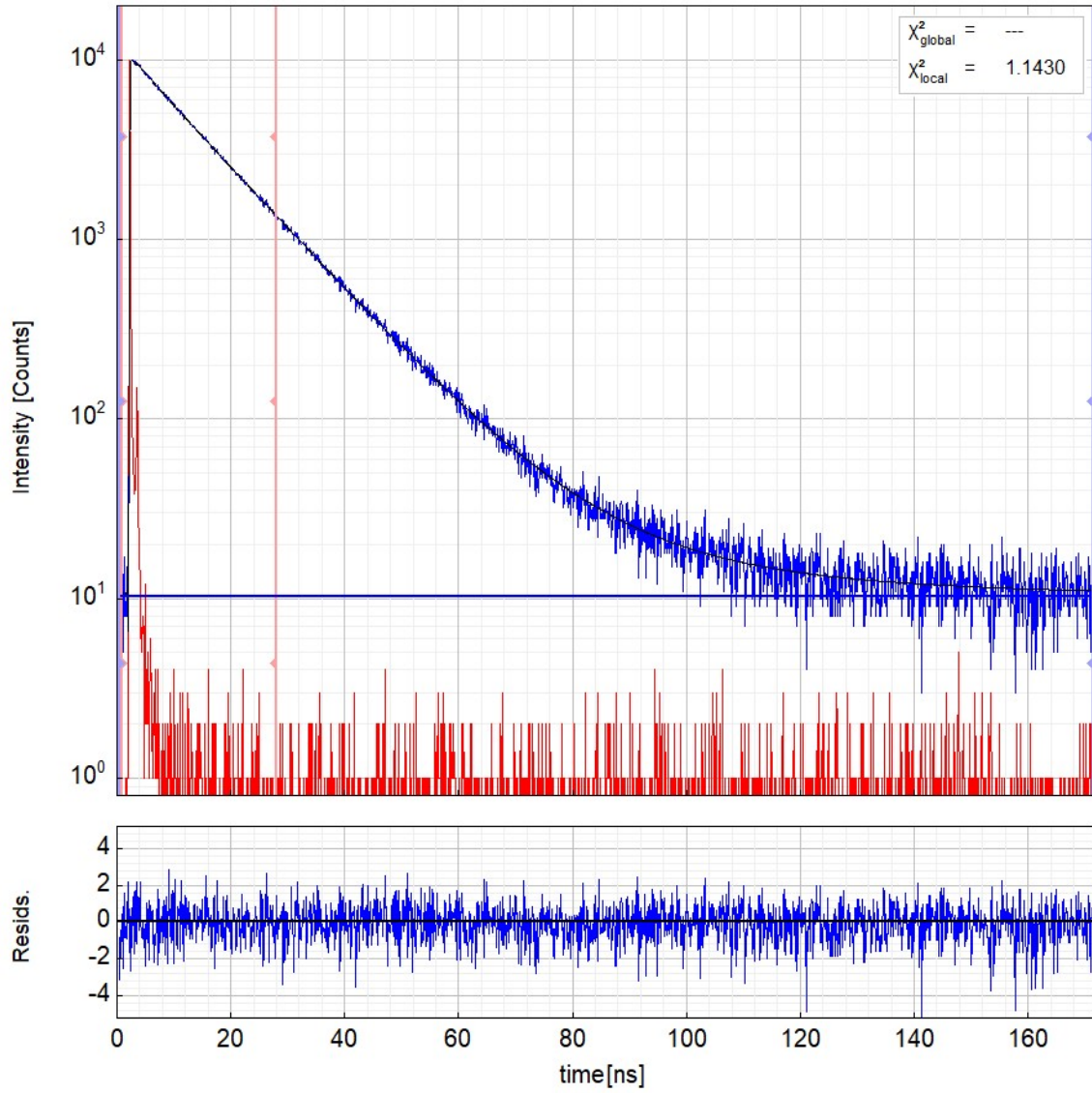




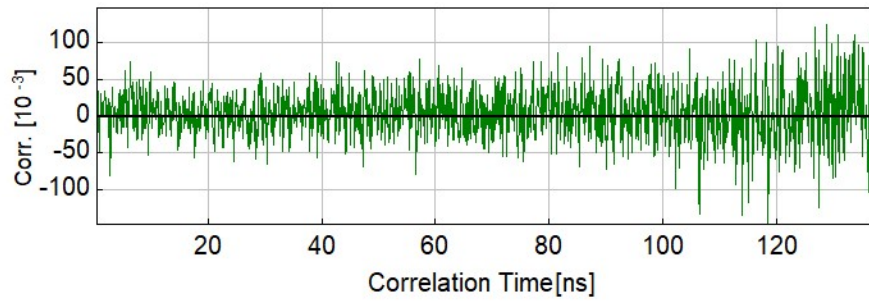
**Data Set: 3 / 11**

Decay: crv[3]; IRF: crv[0]

Fit



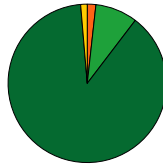
Autocorrelation (Residuals)



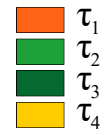
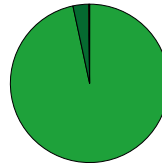
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0692	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	25.4384	---	---
$A_2$ [kCnts/Chnl]	311.3265	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	124.9876	---	---
$A_3$ [kCnts/Chnl]	10.2699	---	---
$\tau_3$ [ns]	12.4768	---	---
$I_3$ [kCnts]	1281.3505	---	---
$A_4$ [kCnts/Chnl]	0.6296	---	---
$\tau_4$ [ns]	3.0814	---	---
$I_4$ [kCnts]	19.4012	---	---
$Bkg_{Dec}$ [kCnts]	0.0103	---	---
$Bkg_{RF}$ [Cnts/Chnl]	0.1509	---	---
$Shift_{RF}$ [ps]	-32.1298	---	---
$A_{Scat}$ [kCnts]	-37.0872	---	---
$\lambda_{Det}$ [nm]	450.0000	---	---

Relative Intensities



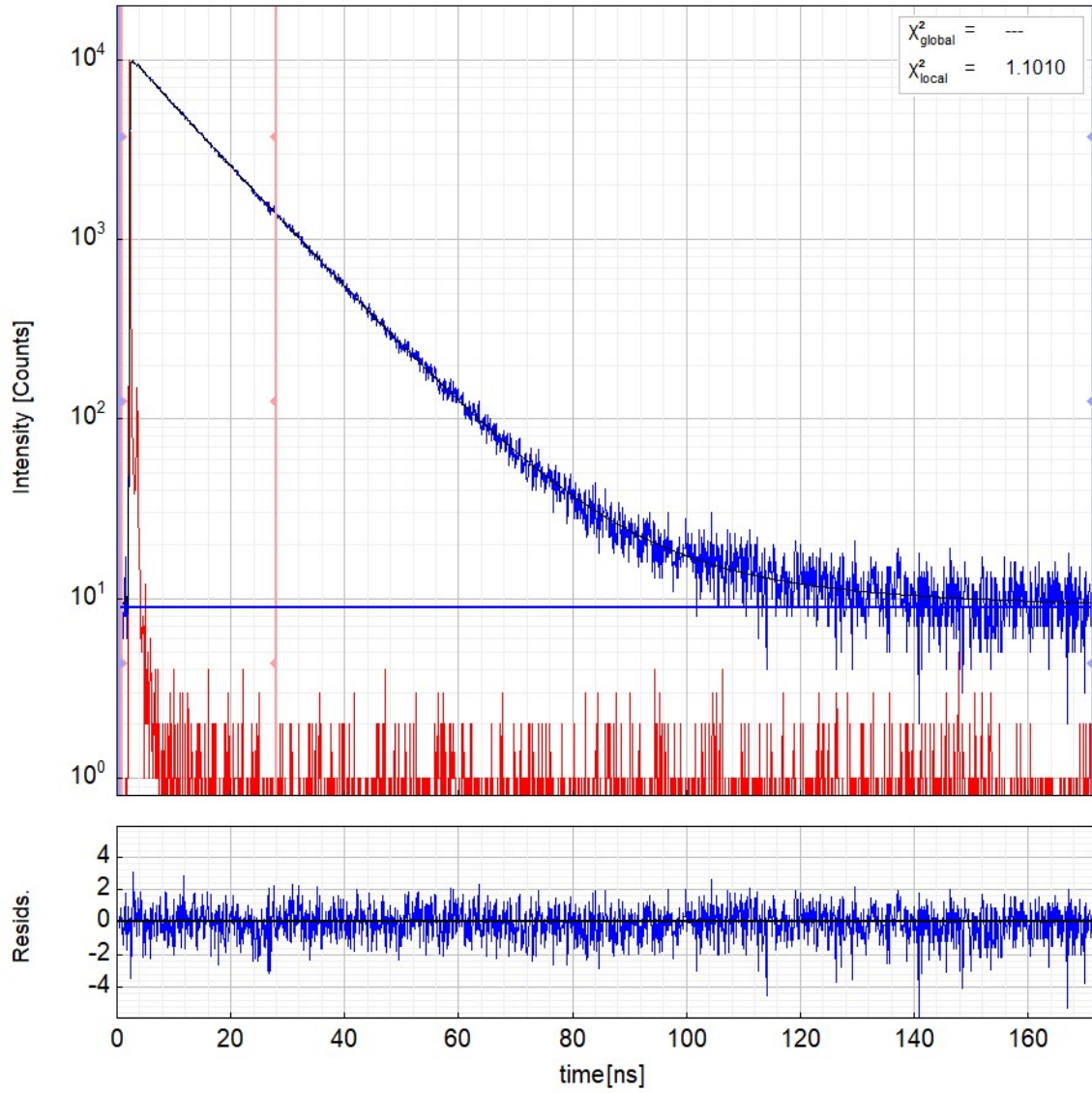
Relative Amplitudes



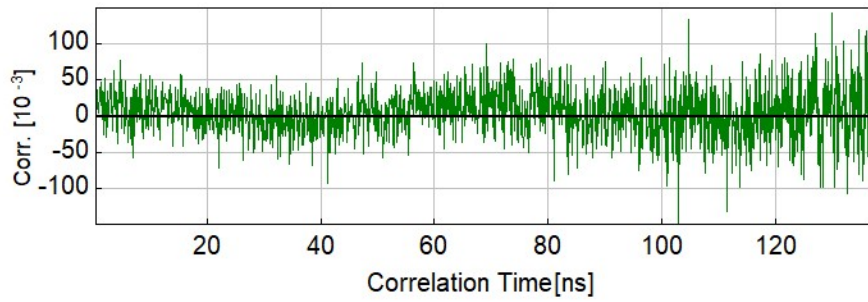
**Data Set: 4 / 11**

Decay: crv[4]; IRF: crv[0]

Fit



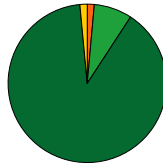
Autocorrelation (Residuals)



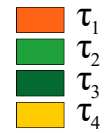
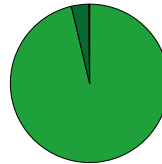
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0561	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	20.6131	---	---
$A_2$ [kCnts/Chnl]	279.8602	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	112.3549	---	---
$A_3$ [kCnts/Chnl]	10.2148	---	---
$\tau_3$ [ns]	12.6149	---	---
$I_3$ [kCnts]	1288.5924	---	---
$A_4$ [kCnts/Chnl]	0.5475	---	---
$\tau_4$ [ns]	3.9255	---	---
$I_4$ [kCnts]	21.4903	---	---
$Bkg_{Dec}$ [kCnts]	0.0089	---	---
$Bkg_{RF}$ [Cnts/Chnl]	-0.0609	---	---
$Shift_{RF}$ [ps]	-33.1172	---	---
$A_{Scat}$ [kCnts]	-34.1985	---	---
$\lambda_{Det}$ [nm]	470.0000	---	---

Relative Intensities



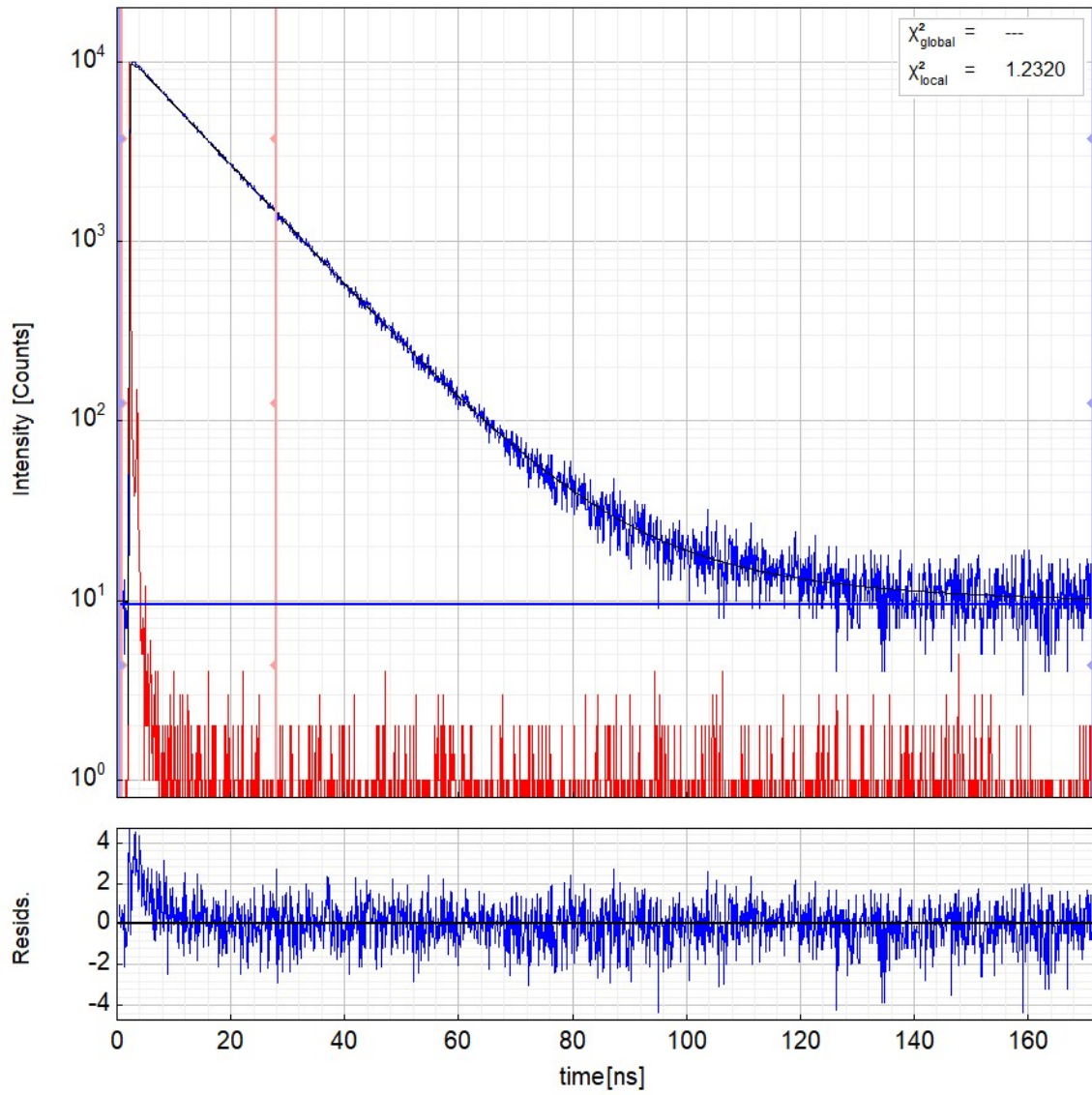
Relative Amplitudes



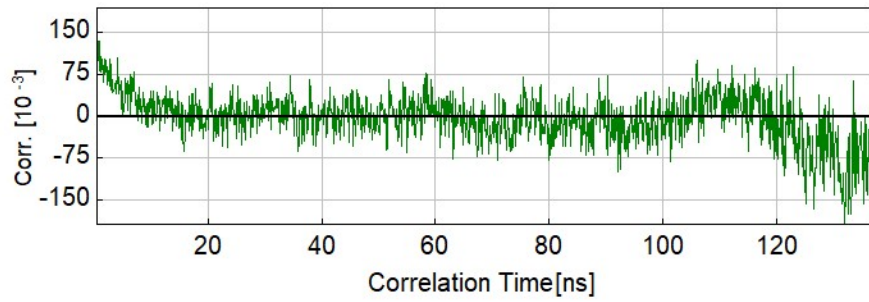
**Data Set: 5 / 11**

Decay: crv[5]; IRF: crv[0]

Fit



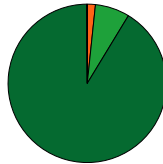
Autocorrelation (Residuals)



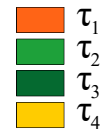
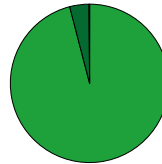
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0666	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	24.4931	---	---
$A_2$ [kCnts/Chnl]	258.7378	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	103.8749	---	---
$A_3$ [kCnts/Chnl]	10.5959	---	---
$\tau_3$ [ns]	12.7032	---	---
$I_3$ [kCnts]	1346.0131	---	---
$A_4$ [kCnts/Chnl]	0.3193	---	---
$\tau_4$ [ns]	0.0000	---	---
$I_4$ [kCnts]	0.0000	---	---
$Bkg_{Dec}$ [kCnts]	0.0095	---	---
$Bkg_{RF}$ [Cnts/Chnl]	0.1558	---	---
$Shift_{RF}$ [ps]	-35.4543	---	---
$A_{Scat}$ [kCnts]	-32.5982	---	---
$\lambda_{Det}$ [nm]	490.0000	---	---

Relative Intensities



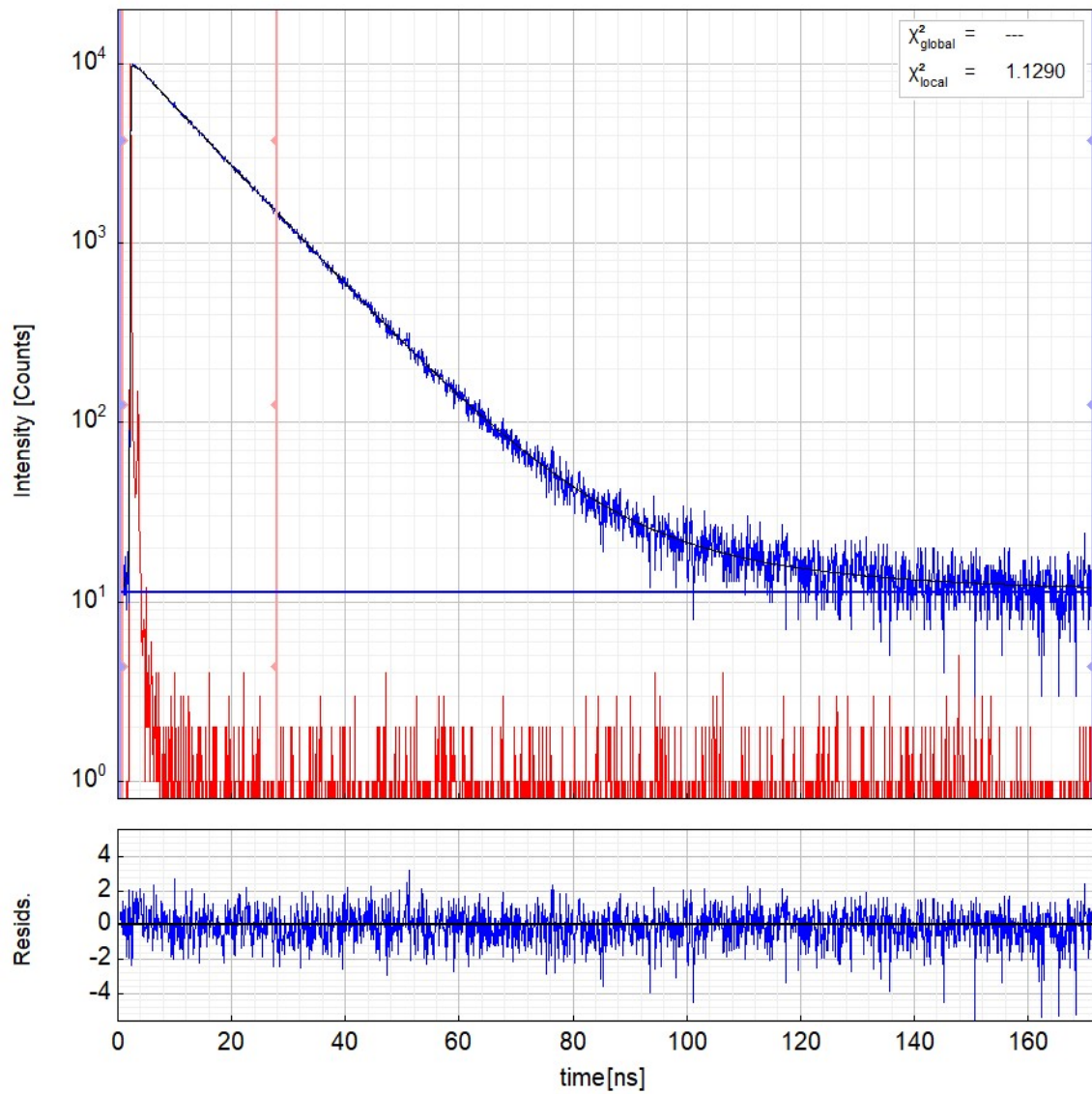
Relative Amplitudes



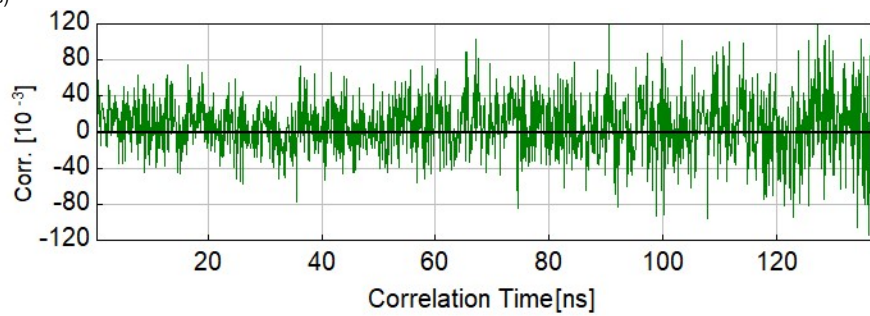
**Data Set: 6 / 11**

Decay: crv[6]; IRF: crv[0]

Fit



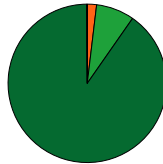
Autocorrelation (Residuals)



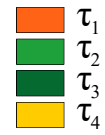
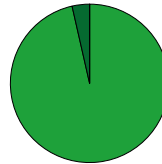
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0768	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	28.2345	---	---
$A_2$ [kCnts/Chnl]	289.5708	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	116.2534	---	---
$A_3$ [kCnts/Chnl]	10.6410	---	---
$\tau_3$ [ns]	12.6246	---	---
$I_3$ [kCnts]	1343.3798	---	---
$A_4$ [kCnts/Chnl]	0.0396	---	---
$\tau_4$ [ns]	0.0000	---	---
$I_4$ [kCnts]	0.0000	---	---
$Bkg_{Dec}$ [kCnts]	0.0113	---	---
$Bkg_{RF}$ [Cnts/Chnl]	-0.6721	---	---
$Shift_{RF}$ [ps]	-33.2388	---	---
$A_{Scat}$ [kCnts]	-34.6012	---	---
$\lambda_{Det}$ [nm]	510.0000	---	---

Relative Intensities



Relative Amplitudes

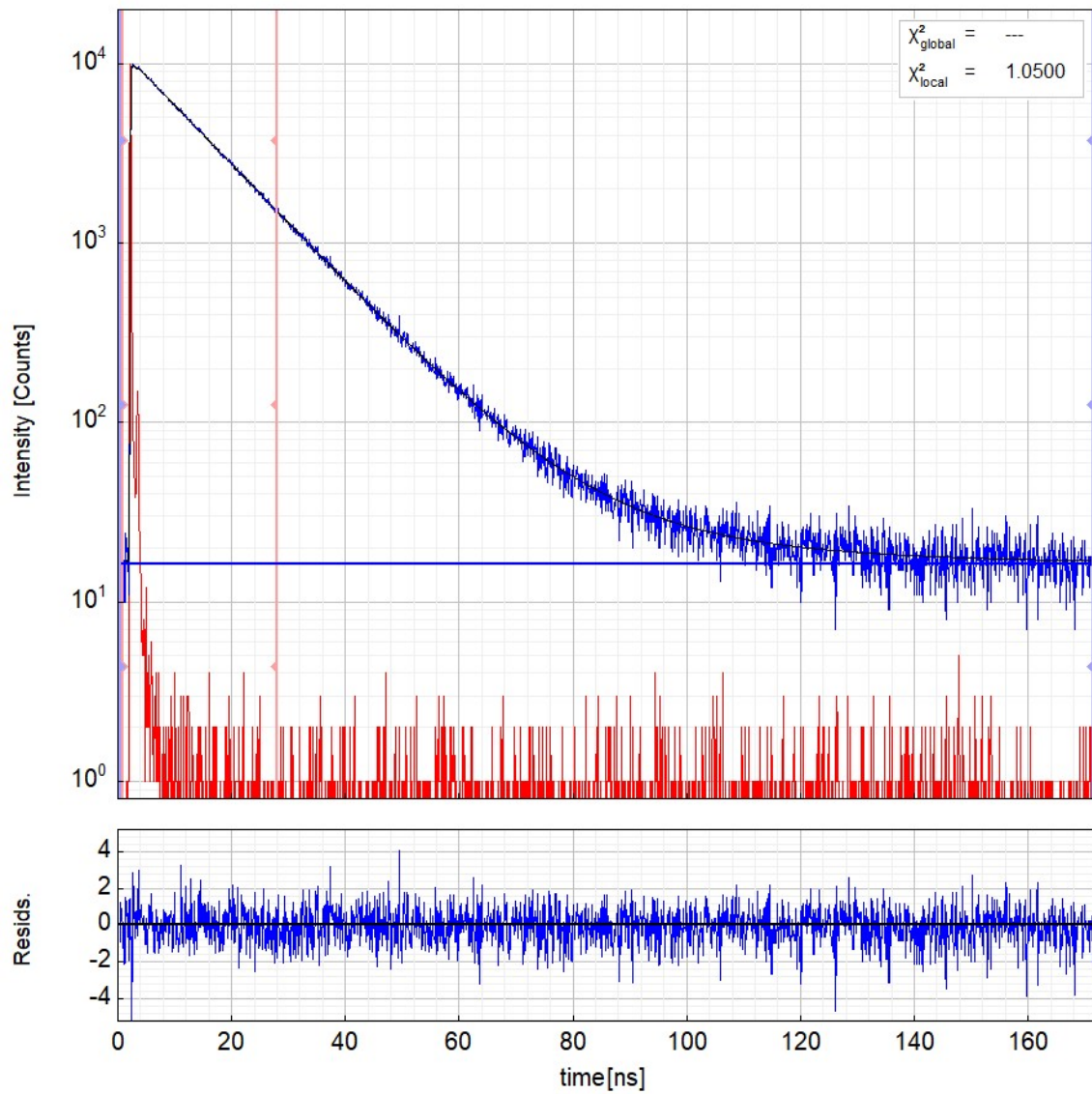




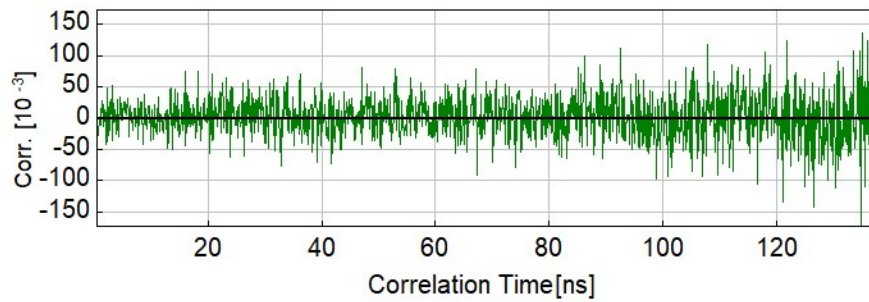
**Data Set: 7 / 11**

Decay: crv[7]; IRF: crv[0]

Fit



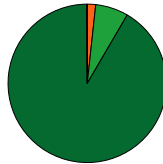
Autocorrelation (Residuals)



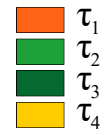
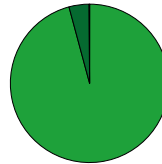
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0706	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	25.9537	---	---
$A_2$ [kCnts/Chnl]	252.8147	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	101.4970	---	---
$A_3$ [kCnts/Chnl]	10.8020	---	---
$\tau_3$ [ns]	12.8110	---	---
$I_3$ [kCnts]	1383.8433	---	---
$A_4$ [kCnts/Chnl]	-0.2278	---	---
$\tau_4$ [ns]	5.8352	---	---
$I_4$ [kCnts]	-13.2926	---	---
$Bkg_{Dec}$ [kCnts]	0.0162	---	---
$Bkg_{IRF}$ [Cnts/Chnl]	0.0541	---	---
$Shift_{IRF}$ [ps]	-38.0975	---	---
$A_{Scat}$ [kCnts]	-31.6938	---	---
$\lambda_{Det}$ [nm]	530.0000	---	---

Relative Intensities



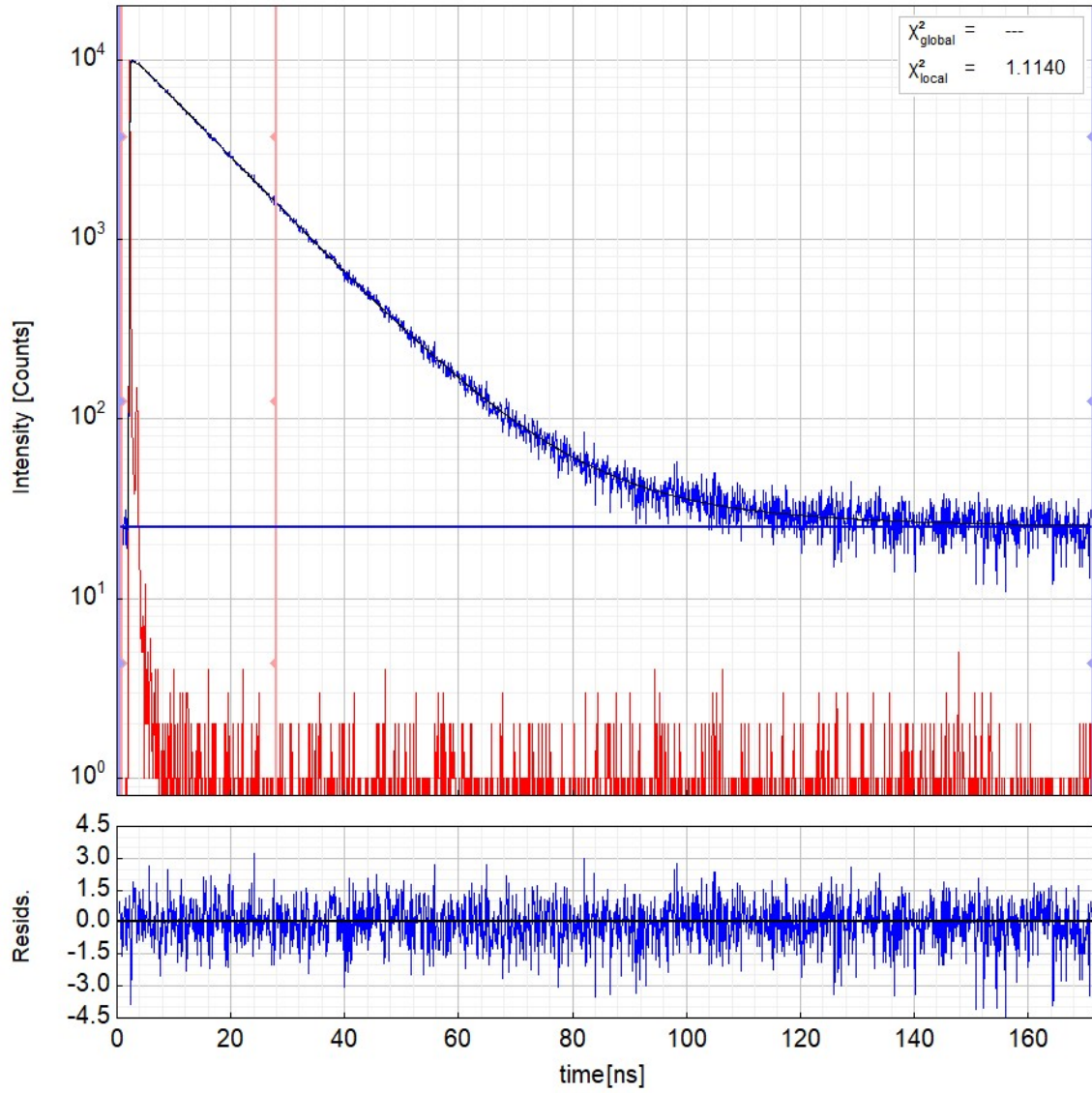
Relative Amplitudes



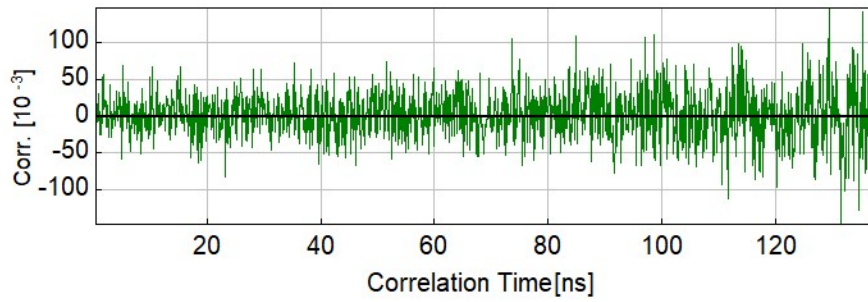
**Data Set: 8 / 11**

Decay: crv[8]; IRF: crv[0]

Fit



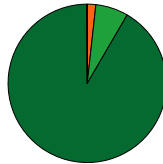
Autocorrelation (Residuals)



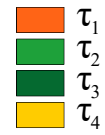
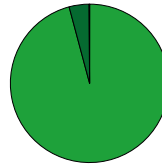
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0750	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	27.5572	---	---
$A_2$ [kCnts/Chnl]	262.5443	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	105.4031	---	---
$A_3$ [kCnts/Chnl]	11.1515	---	---
$\tau_3$ [ns]	12.9602	---	---
$I_3$ [kCnts]	1445.2513	---	---
$A_4$ [kCnts/Chnl]	-0.4098	---	---
$\tau_4$ [ns]	5.4135	---	---
$I_4$ [kCnts]	-22.1870	---	---
$Bkg_{Dec}$ [kCnts]	0.0247	---	---
$Bkg_{RF}$ [Cnts/Chnl]	0.2412	---	---
$Shift_{RF}$ [ps]	-37.4902	---	---
$A_{Scat}$ [kCnts]	-32.3145	---	---
$\lambda_{Det}$ [nm]	550.0000	---	---

Relative Intensities



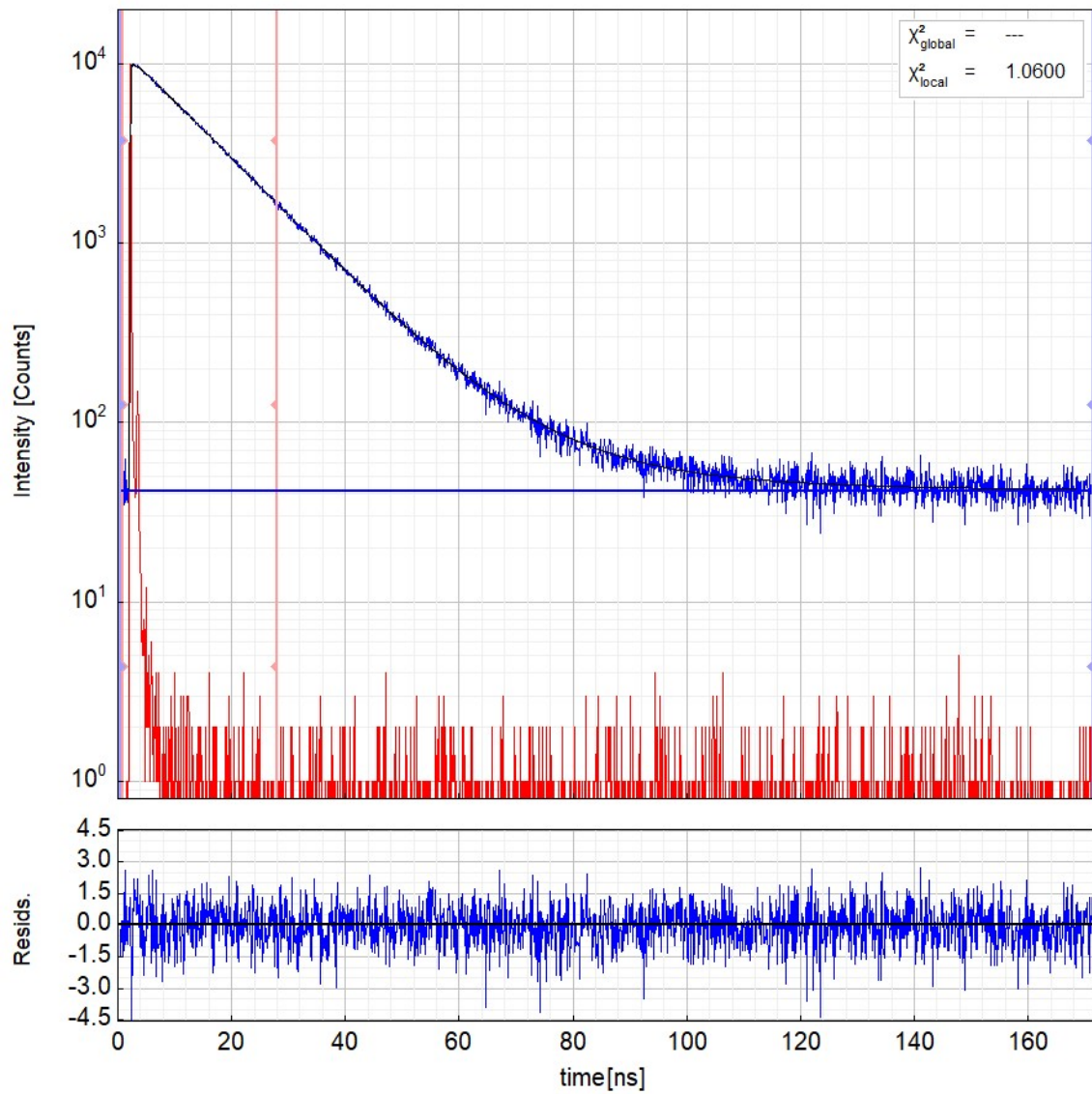
Relative Amplitudes



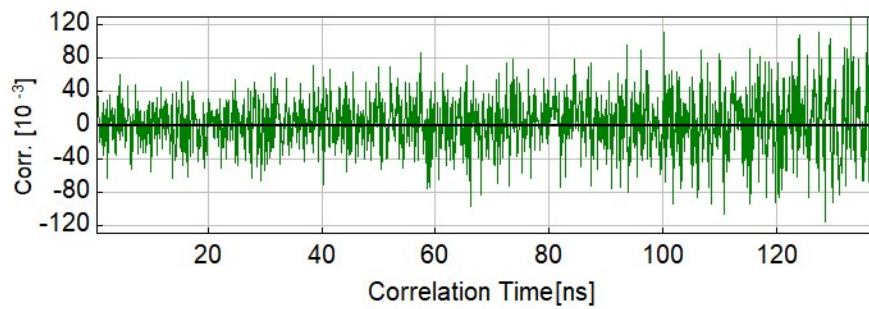
**Data Set: 9 / 11**

Decay: crv[9]; IRF: crv[0]

Fit



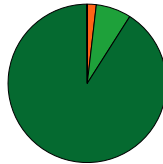
Autocorrelation (Residuals)



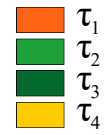
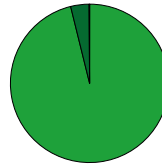
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0819	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	30.0861	---	---
$A_2$ [kCnts/Chnl]	294.3213	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	118.1606	---	---
$A_3$ [kCnts/Chnl]	11.4848	---	---
$\tau_3$ [ns]	13.0091	---	---
$I_3$ [kCnts]	1494.0755	---	---
$A_4$ [kCnts/Chnl]	-0.8258	---	---
$\tau_4$ [ns]	6.0500	---	---
$I_4$ [kCnts]	-49.9602	---	---
$Bkg_{Dec}$ [kCnts]	0.0415	---	---
$Bkg_{RF}$ [Cnts/Chnl]	0.2126	---	---
$Shift_{RF}$ [ps]	-39.6952	---	---
$A_{Scat}$ [kCnts]	-34.9684	---	---
$\lambda_{Det}$ [nm]	570.0000	---	---

Relative Intensities



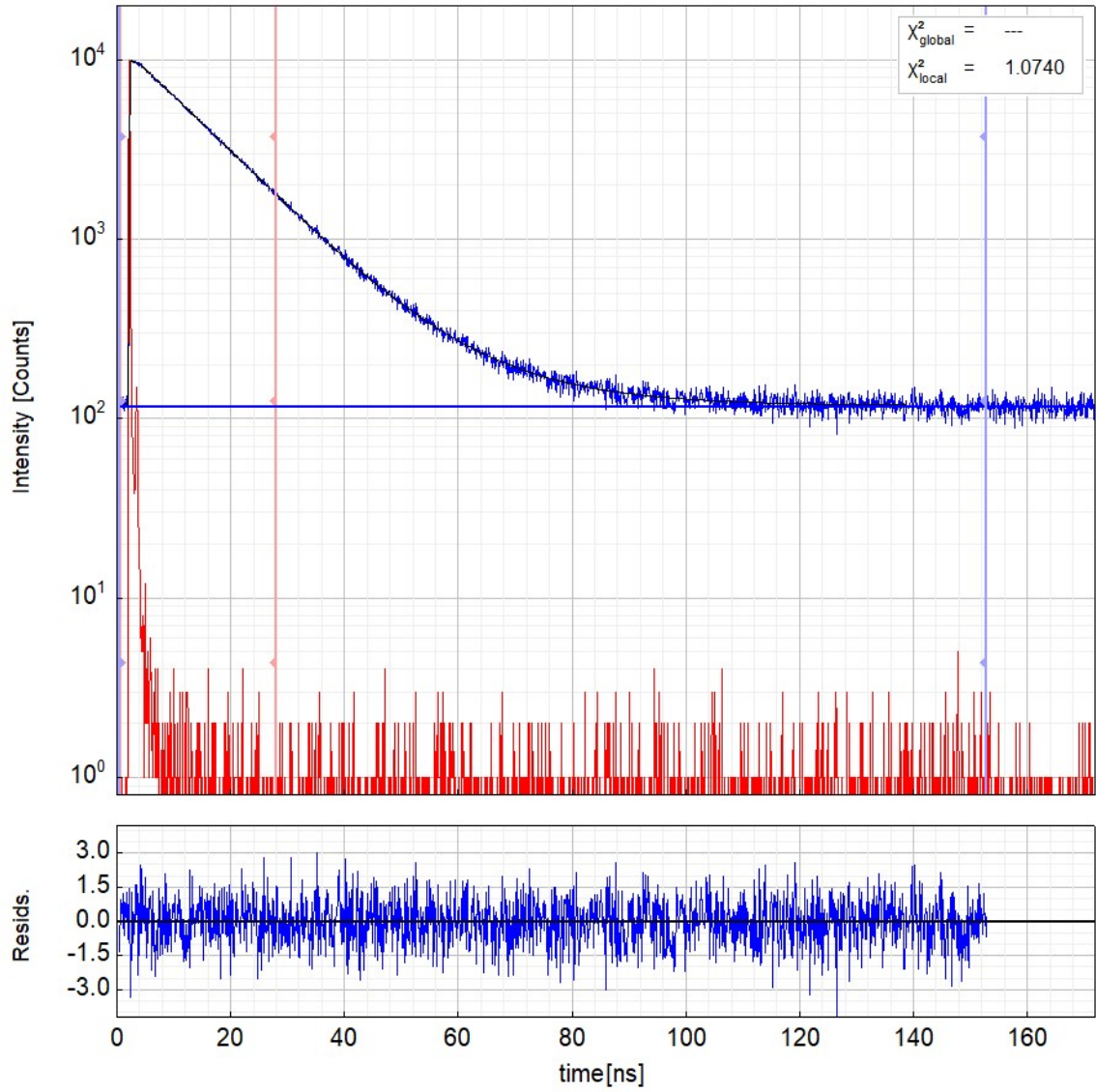
Relative Amplitudes



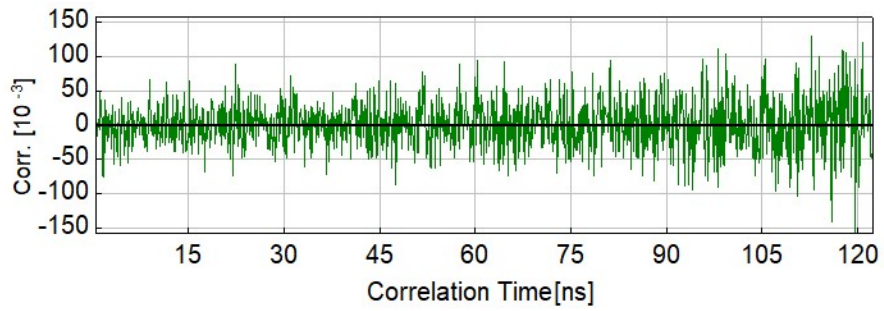
**Data Set: 10 / 11**

Decay: crv[10]; IRF: crv[0]

Fit

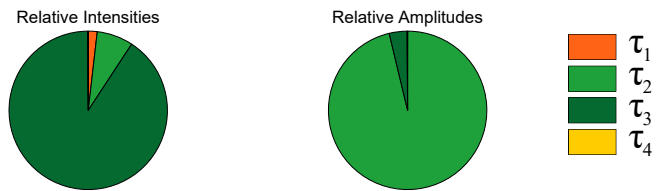


Autocorrelation (Residuals)



Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0820	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	30.1547	---	---
$A_2$ [kCnts/Chnl]	306.5360	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	123.0644	---	---
$A_3$ [kCnts/Chnl]	11.5912	---	---
$\tau_3$ [ns]	12.9691	---	---
$I_3$ [kCnts]	1503.2740	---	---
$A_4$ [kCnts/Chnl]	-1.0605	---	---
$\tau_4$ [ns]	5.1424	---	---
$I_4$ [kCnts]	-54.5358	---	---
$Bkg_{Dec}$ [kCnts]	0.1164	---	---
$Bkg_{RF}$ [Cnts/Chnl]	-0.4177	---	---
$Shift_{RF}$ [ps]	-42.0612	---	---
$A_{Scat}$ [kCnts]	-35.6018	---	---
$\lambda_{Det}$ [nm]	590.0000	---	---

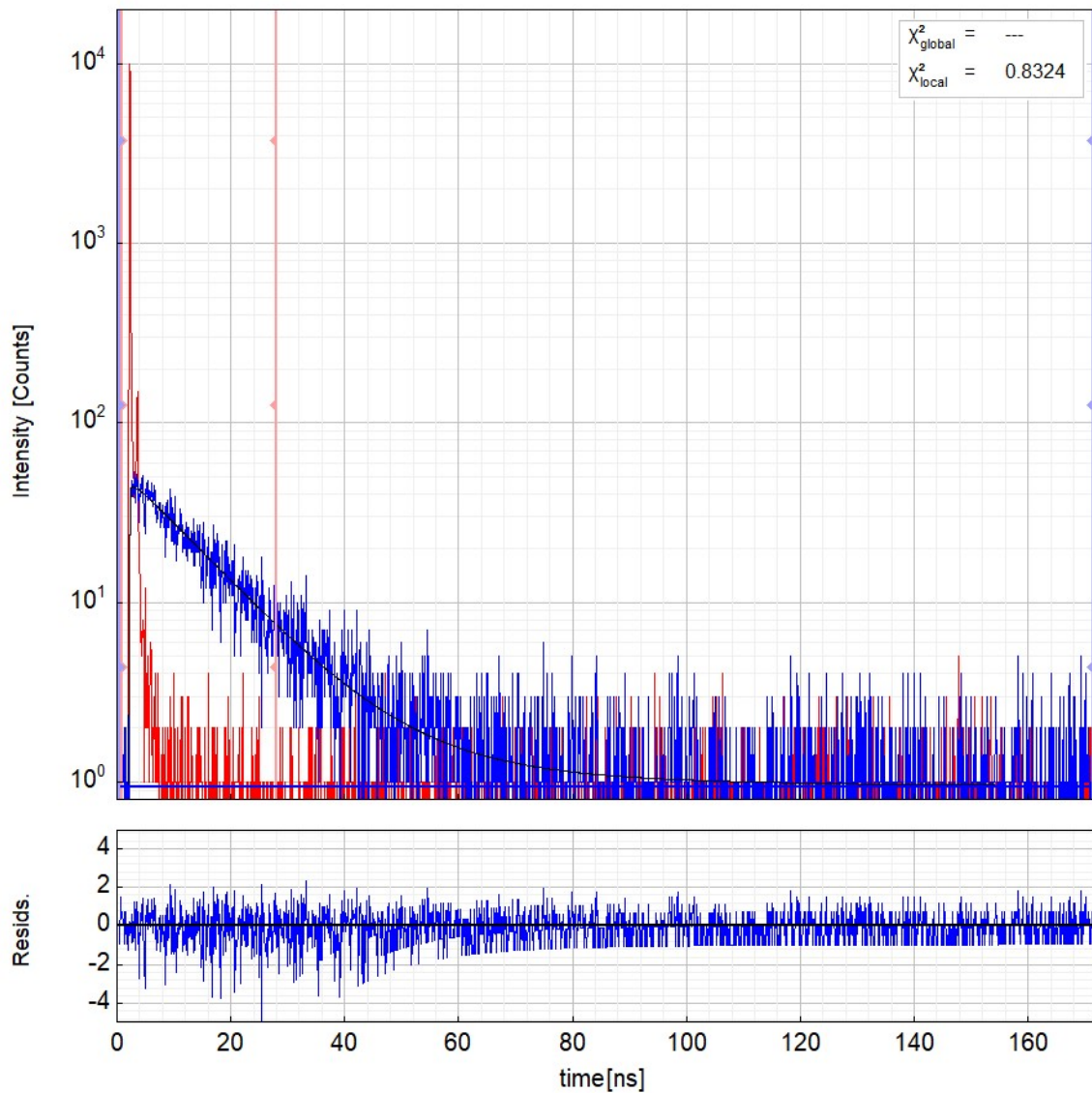




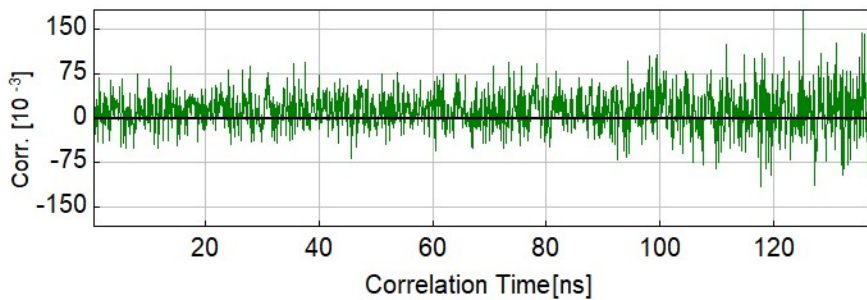
Data Set: 11 / 11

Decay: crv[11]; IRF: crv[0]

Fit



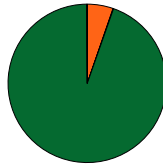
Autocorrelation (Residuals)



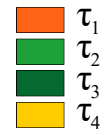
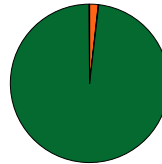
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.0010	---	---
$\tau_1$ [ns]	36.7555	---	---
$I_1$ [kCnts]	0.3593	---	---
$A_2$ [kCnts/Chnl]	-0.4829	---	---
$\tau_2$ [ns]	0.0401	---	---
$I_2$ [kCnts]	-0.1939	---	---
$A_3$ [kCnts/Chnl]	0.0548	---	---
$\tau_3$ [ns]	11.7085	---	---
$I_3$ [kCnts]	6.4203	---	---
$A_4$ [kCnts/Chnl]	-0.0084	---	---
$\tau_4$ [ns]	5.8283	---	---
$I_4$ [kCnts]	-0.4909	---	---
$Bkg_{Dec}$ [kCnts]	0.0009	---	---
$Bkg_{RF}$ [Cnts/Chnl]	-0.1878	---	---
$Shift_{RF}$ [ps]	-17.0066	---	---
$A_{Scat}$ [kCnts]	0.0192	---	---
$\lambda_{Det}$ [nm]	610.0000	---	---

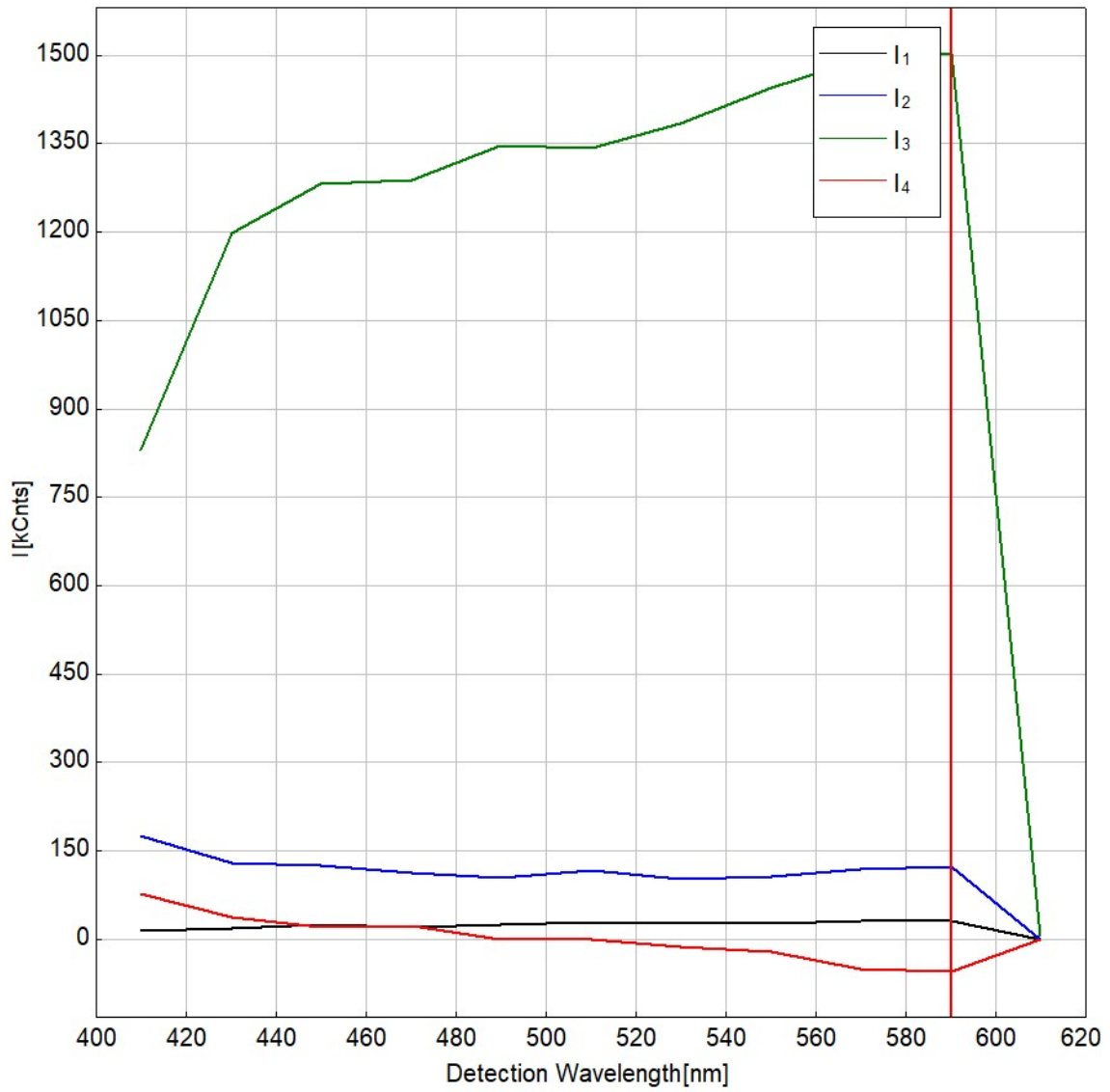
Relative Intensities



Relative Amplitudes



### Parameter Plot



### Global Parameters

Parameter	Value	$\Delta$	$\delta$
$\tau_1$ [ns]	36.7555	---	---
$\tau_2$ [ns]	0.0401	---	---

