Analysis of ^{15}N-^{1}H NMR relaxation in proteins by a combined experimental and molecular dynamics simulation approach: *Picosecond-nanosecond* dynamics of the Rho GTPase binding domain of plexin-B1 in the dimeric state indicate allosteric pathways.

Mirco Zerbetto, Ross Anderson, Sabine Bouguet-Bonnet, Mariano Rech, Liqun Zhang, Eva Meirovitch, Antonino Polimeno and& Matthias Buck

~~*Mirco Zerbetto et al.*~~

Supporting Information ~~lementary materials.:~~

~~**Supplementary Text:**~~

The SRLS generalized order parameter.

An order parameter S^2 can be defined from SRLS as follows.

In the Principal Axes System of the local ordering tensor, where only $\langle D^2_{0,0}\rangle$ and $\langle D^2_{0,2}+D^2_{0,-2}\rangle$ survive, one has:

$$S^2=\langle D^2_{0,0}\rangle^2+2\{\mathrm{Re}\langle D^2_{0,2}\rangle\}^2 . \qquad (1)$$

Given that $S^2_0=\langle D^2_{0,0}\rangle$ and $S^2_2=\langle D^2_{0,2}+D^2_{0,-2}\rangle=2\{\mathrm{Re}\langle D^2_{0,2}\rangle\}$, one obtains:

$$S^2=(S^2_0)^2+\frac{1}{2}(S^2_2)^2 . \qquad (2)$$

Formatted: Font: 14 pt, Bold
Formatted
Formatted: Font: 14 pt, Bold
Formatted: Font: Italic
Formatted: Font: Italic
Formatted: Font: 12 pt
Formatted: Font: 12 pt
Formatted: Indent: First line: 0"
Formatted: Font: Bold
Field Code Changed
Field Code Changed
Field Code Changed
Field Code Changed
Formatted
Field Code Changed
Field Code Changed
Formatted: Indent: First line: 0"
Field Code Changed

Thus, S^2 ~~S^2~~ is a composite including inseparably the physical order parameters S_0^2 and S_2^2.

Formatted

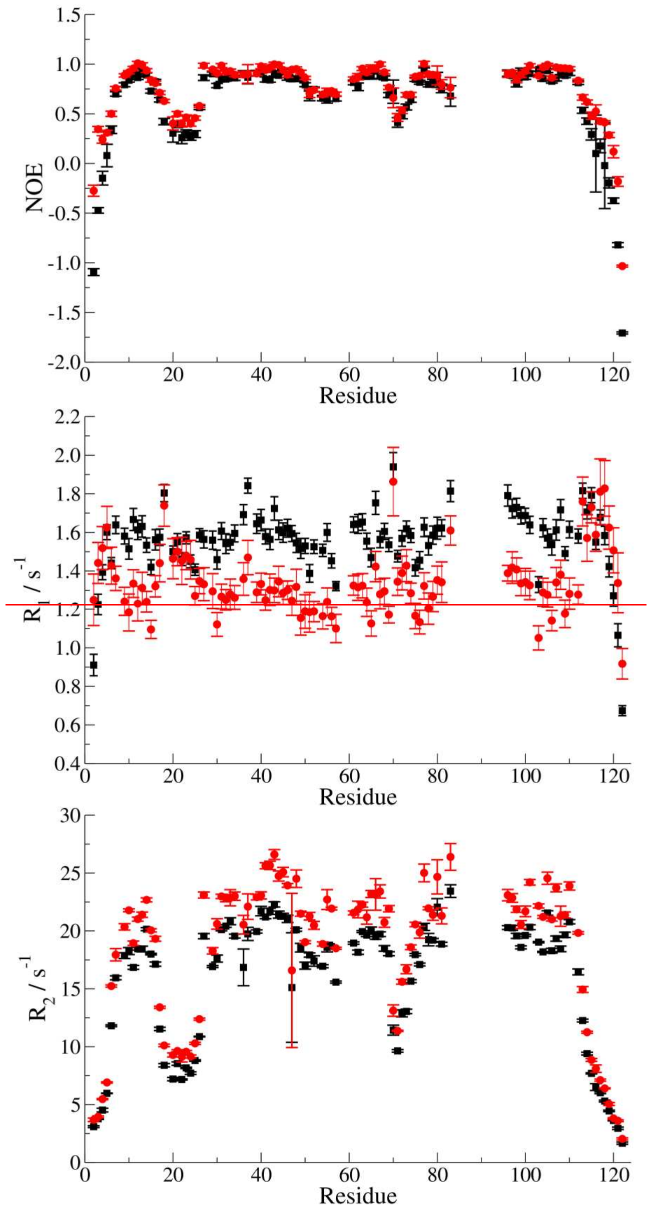
Field Code Changed

Field Code Changed

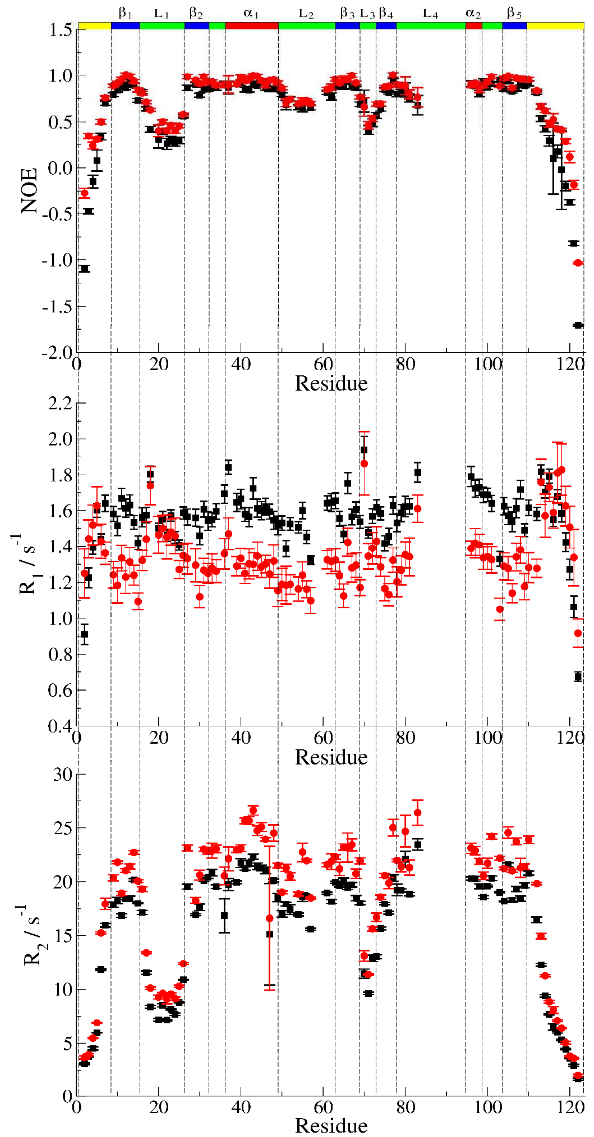
Field Code Changed

Models used in the MF-based computer programs Dynamics (see also Table S2)

S^2 is allowed to vary in model 1 (S^2 = 0 represents complete motional freedom whereas S^2 = 1 represents complete rigidity). S^2 and τ_e are allowed to vary in model 2 (larger values of τ_e signify enhanced mobility). S^2 and the conformational exchange term, R_{ex} (added phenomenologically to R_2) are allowed to vary in model 3. S^2, τ_e and R_{ex} are allowed to vary in model 4. S_s^2, S_f^2 and τ_s with $\tau_f = 0$ (S_s^2, S_f^2, τ_s and τ_f) are allowed to vary in model 5 (6). Model 5 represents the reduced EMF formula. Models 7 and 8 are not used herein. The data-fitting scheme considers first model 1. If the statistical requirements are fulfilled, this model will be accepted. Otherwise, the program proceeds systematically to the higher models according to statistical criteria.



Formatted: Centered



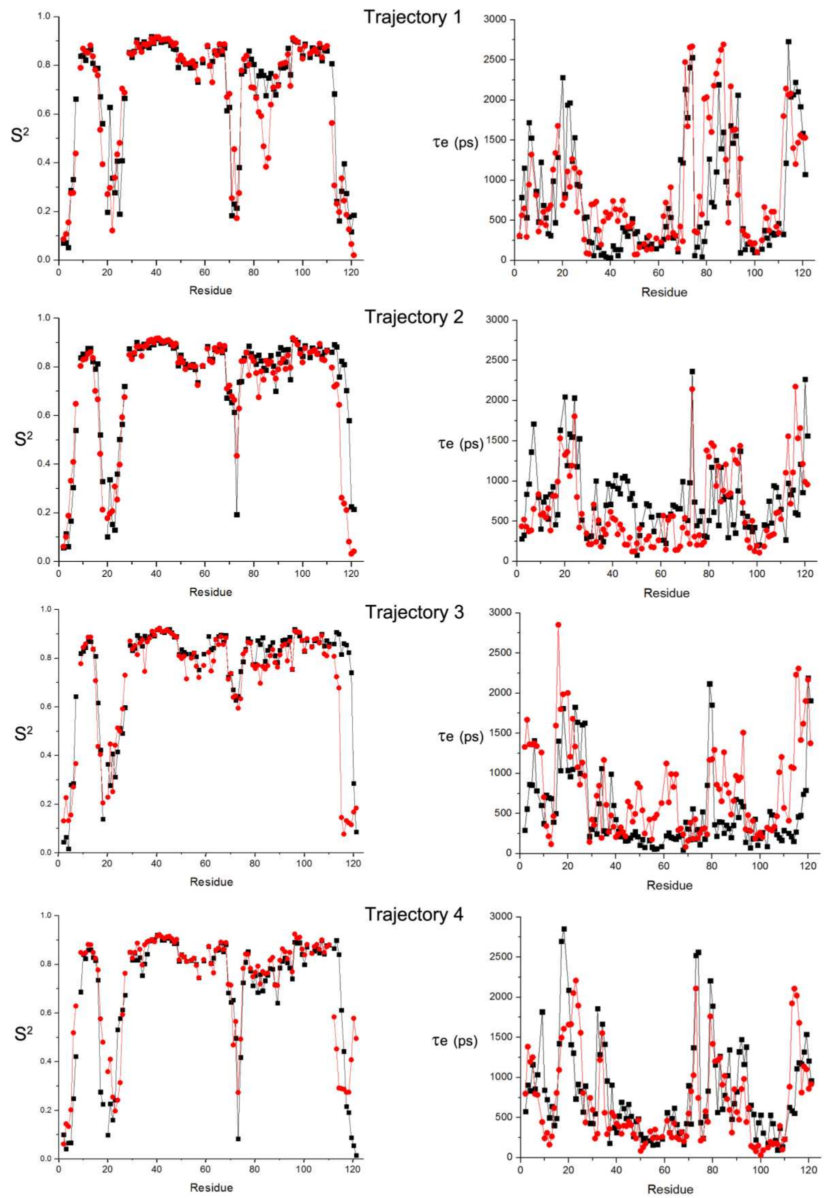
Fig~~ure~~. S1. Experimental ^{15}N R_1, R_2 and ^{15}N-{^{1}H} *NOE* for the RBD dimer acquired at magnetic fields of 14.1 T (black squares) and 18.8 T (red circles).

Formatted

Formatted: No underline

Formatted: Font: Bold

Formatted: Centered


Trajectory 1
Trajectory 2
Trajectory 3
Trajectory 4
S²
τe (ps)
Residue

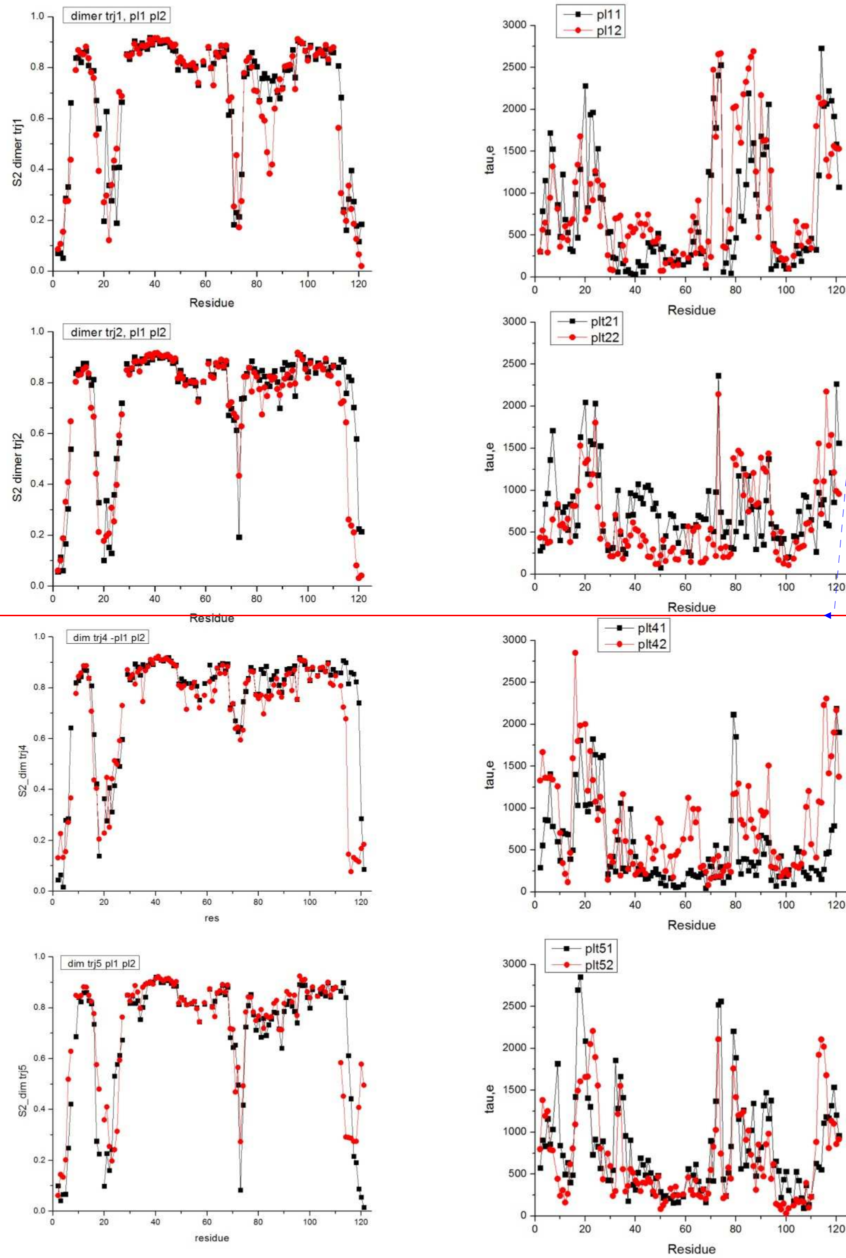


Fig. S2. Squared generalized order parameters, S^2, and effective correlation times for local motion, τ_e, obtained for the plexin-B1 RBD dimer from the

Formatted: Centered, Right: 0"

Comment [MB2]: I will replot this figure

Formatted: Font: Times New Roman, 12 pt

Formatted: Right: 0"

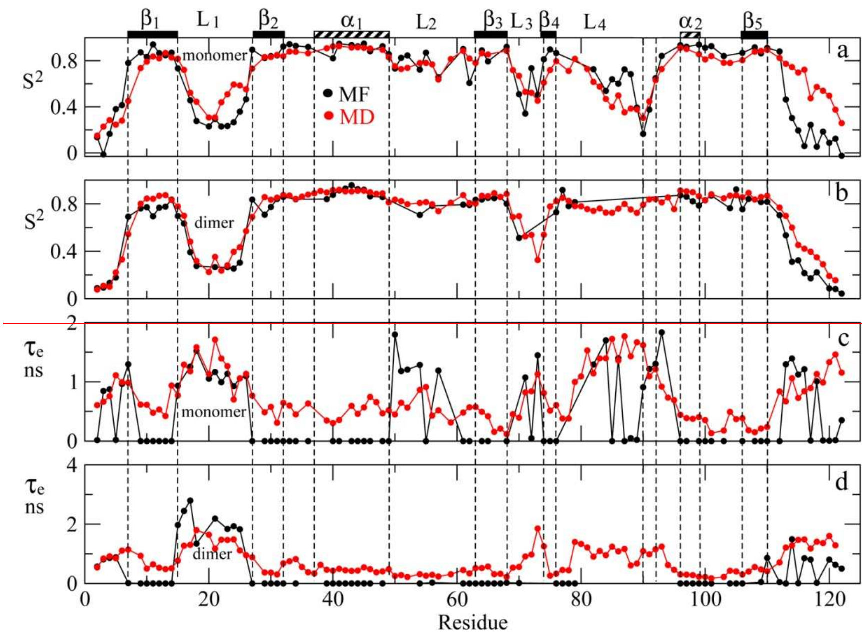
Field Code Changed

Field Code Changed

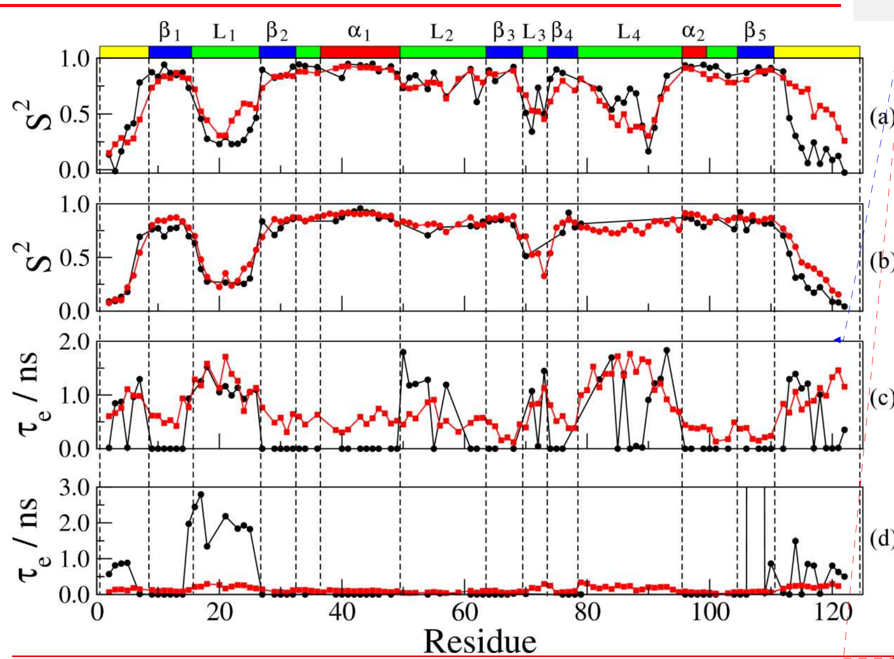
Formatted: Font: Times New Roman

individual MD trajectories, as described in the text. Black squares and red circles distinguish between data calculated respectively for the first monomer (residues 1 to 124) and the second one (residues 125 to 248).

Formatted



Formatted: Right: -0.81"



Formatted: Centered, Right: -0.81"

Formatted: Font: Not Bold, No underline

Fig. S3. Best-fit S^2 (a) and τ_e (c) values obtained for the monomer mutant of the RBD with MF (black cirlces) and MD (red squares) analyses. Best-fit S^2 (b) and τ_e (d) values obtained for the RBD dimer with MF (black circles) and MD (red squares) analyses.

Table S1. Parameters associated with the generation of the four MD trajectories for the plexin–B1 RBD dimer. Additional details, and pertinent references, are given in the text.

Protein Data Bank file	2JPH
Protein charge	+2, neutralized by counterions
Number of water molecules	14605
Water molecule model	TIP3P
Cubic periodic box dimension	80 Å
Ensemble	N (47661 atoms), P (1 atm), T (300 K)
Thermostat	Temperature coupling
Barostat	Nosé – Hoover Langevin piston (piston period 200 fs, piston decay 100 fs, piston temperature 300 K)
Non-bonded interactions cutoff	12 Å, smoothing switch at 10 Å
Pair list distance	13.5 Å
Electrostatics	PME
Time step of integration	2 fs
Coordinates and velocities saving frequency	2500 MD steps
Equilibration period	5 ns
Production period	50 ns

Table S2. Experimental ^{15}N R_1, ^{15}N R_2 data and their uncertainties in s^{-1}, and experimental $^{15}N-\{^1H\}$ *NOE*s and their uncertainties.

	14.1 T						18.8 T					
Res	*NOE*	σ(NOE)	R_1	$\sigma(R_1)$	R_2	$\sigma(R_2)$	*NOE*	σ(NOE)	R_1	$\sigma(R_1)$	R_2	$\sigma(R_2)$
2	-1.094	0.034	0.911	0.056	3.095	0.079	-0.275	0.056	1.250	0.135	3.686	0.155
3	-0.472	0.028	1.226	0.054	3.772	0.051	0.345	0.028	1.442	0.106	3.946	0.08
4	-0.148	0.069	1.394	0.039	4.525	0.159	0.242	0.037	1.519	0.112	5.477	0.050
5	0.080	0.113	1.601	0.039	5.976	0.023	0.310	0.023	1.626	0.109	6.912	0.058
6	0.339	0.038	1.441	0.029	11.810	0.077	0.500	0.026	1.428	0.096	15.240	0.097
7	0.700	0.022	1.639	0.045	15.950	0.171	0.757	0.019	1.362	0.063	17.940	0.53
9	0.793	0.020	1.581	0.041	17.870	0.252	0.887	0.017	1.242	0.074	20.350	0.277
10	0.838	0.019	1.515	0.053	18.260	0.302	0.918	0.017	1.184	0.097	21.780	0.122
11	0.899	0.021	1.667	0.057	16.850	0.167	0.956	0.020	1.335	0.072	18.940	0.188
12	0.865	0.020	1.613	0.050	18.460	0.117	1.008	0.020	1.230	0.091	21.020	0.174
13	0.930	0.025	1.631	0.055	18.440	0.246	0.992	0.022	1.313	0.081	21.400	0.23
14	0.891	0.020	1.534	0.037	20.150	0.130	0.935	0.020	1.240	0.055	22.680	0.17
15	0.729	0.021	1.420	0.039	18.000	0.067	0.840	0.021	1.095	0.047	20.050	0.137
16	0.824	0.023	1.562	0.053	17.130	0.186	0.809	0.020	1.321	0.055	19.320	0.21
17	0.640	0.022	1.575	0.043	11.530	0.144	0.712	0.018	1.441	0.097	13.400	0.094
18	0.421	0.032	1.804	0.045	8.399	0.142	0.629	0.017	1.739	0.107	10.110	0.11
20	0.306	0.091	1.501	0.029	7.205	0.147	0.403	0.066	1.464	0.104	9.288	0.178

21	0.394	0.033	1.552	0.042	8.540	0.145	0.500	0.023	1.500	0.072	9.631	0.108
22	0.259	0.060	1.462	0.033	7.170	0.054	0.401	0.033	1.453	0.122	9.127	0.449
23	0.298	0.041	1.572	0.031	8.170	0.058	0.463	0.025	1.480	0.073	9.561	0.112
24	0.273	0.039	1.450	0.033	7.718	0.110	0.401	0.026	1.459	0.100	9.151	0.13
25	0.295	0.034	1.407	0.029	8.809	0.065	0.457	0.021	1.271	0.049	10.290	0.09
26	0.562	0.020	1.586	0.034	10.870	0.027	0.578	0.016	1.348	0.065	12.380	0.096
27	0.864	0.028	1.564	0.045	19.550	0.224	0.985	0.024	1.332	0.085	23.100	0.263
29	0.902	0.019	1.560	0.047	16.920	0.088	0.946	0.016	1.295	0.092	18.280	0.27
30	0.785	0.021	1.459	0.049	17.610	0.304	0.910	0.019	1.121	0.061	20.600	0.45
31	0.849	0.023	1.607	0.044	20.110	0.100	0.985	0.020	1.267	0.065	22.980	0.18
32	0.849	0.020	1.542	0.051	20.420	0.111	0.924	0.019	1.250	0.054	22.830	0.31
33	0.864	0.023	1.549	0.040	20.840	0.303	0.929	0.022	1.279	0.079	22.870	0.699
34	0.862	0.025	1.595	0.044	19.550	0.167	0.893	0.020	1.262	0.063	23.000	0.358
36	0.904	0.030	1.692	0.052	16.850	1.586	0.896	0.029	1.359	0.084	20.540	0.80
37	0.868	0.066	1.842	0.039	19.740	0.567	0.901	0.094	1.470	0.089	22.100	1.10
39	0.908	0.029	1.645	0.050	19.950	0.136	0.906	0.022	1.290	0.053	22.920	0.23
40	0.910	0.025	1.664	0.055	21.710	0.408	0.978	0.024	1.333	0.056	23.070	0.308
41	0.845	0.026	1.579	0.039	21.210	0.161	0.941	0.024	1.249	0.054	25.630	0.26
42	0.842	0.023	1.564	0.053	21.690	0.264	0.967	0.019	1.302	0.083	25.660	0.35
43	0.907	0.026	1.724	0.061	22.290	0.226	0.998	0.022	1.300	0.064	26.600	0.42
44	0.887	0.023	1.613	0.050	21.410	0.307	0.991	0.020	1.346	0.079	24.740	0.43
45	0.923	0.024	1.599	0.050	21.270	0.248	0.941	0.021	1.287	0.061	25.080	0.41
46	0.866	0.027	1.622	0.046	21.040	0.315	0.894	0.026	1.301	0.048	23.930	0.16
47	0.851	0.025	1.594	0.041	15.110	4.729	0.945	0.018	1.246	0.078	16.590	6.66

Formatted ... [59]
Formatted ... [60]
Formatted ... [61]
Formatted ... [62]
Formatted ... [63]
Formatted ... [64]
Formatted ... [65]
Formatted ... [66]
Formatted ... [67]
Formatted ... [68]
Formatted ... [69]
Formatted ... [70]
Formatted ... [71]
Formatted ... [74]
Formatted ... [75]
Formatted ... [76]
Formatted ... [77]
Formatted ... [78]
Formatted ... [79]
Formatted ... [80]
Formatted ... [72]
Formatted ... [73]
Formatted ... [81]
Formatted ... [82]
Formatted ... [83]
Formatted ... [84]
Formatted ... [85]
Formatted ... [86]
Formatted ... [87]
Formatted ... [88]
Formatted ... [89]
Formatted ... [90]
Formatted ... [91]
Formatted ... [92]
Formatted ... [93]
Formatted ... [94]
Formatted ... [95]
Formatted ... [96]
Formatted ... [97]
Formatted ... [98]
Formatted ... [99]
Formatted ... [100]
Formatted ... [101]
Formatted ... [102]
Formatted ... [103]
Formatted ... [104]
Formatted ... [105]
Formatted ... [106]
Formatted ... [107]

48	0.853	0.027	1.546	0.050	20.100	0.133	0.950	0.023	1.318	0.091	24.510	0.752
49	0.857	0.023	1.517	0.052	18.550	0.372	0.919	0.020	1.155	0.089	21.490	0.218
50	0.793	0.020	1.530	0.039	17.000	0.302	0.861	0.017	1.189	0.088	19.030	0.127
51	0.681	0.049	1.388	0.046	17.920	0.184	0.706	0.042	1.185	0.104	21.270	0.328
52	0.746	0.023	1.526	0.035	17.400	0.448	0.740	0.021	1.189	0.054	20.480	0.343
54	0.658	0.027	1.507	0.032	16.950	0.134	0.695	0.024	1.164	0.067	18.870	0.181
55	0.650	0.042	1.600	0.046	18.600	0.412	0.722	0.035	1.240	0.073	22.710	0.859
56	0.710	0.022	1.453	0.037	18.650	0.128	0.729	0.019	1.163	0.047	21.930	0.119
57	0.654	0.025	1.322	0.024	15.580	0.090	0.697	0.022	1.100	0.073	18.500	0.088
61	0.815	0.023	1.641	0.040	18.950	0.099	0.849	0.022	1.325	0.050	21.560	0.169
62	0.772	0.038	1.644	0.049	18.160	0.185	0.874	0.031	1.316	0.068	21.850	0.714
63	0.881	0.024	1.654	0.043	19.940	0.084	0.955	0.020	1.324	0.063	22.270	0.213
64	0.876	0.021	1.555	0.041	19.640	0.130	0.916	0.021	1.237	0.075	21.180	0.604
65	0.882	0.032	1.470	0.048	20.100	0.235	0.956	0.036	1.126	0.065	23.190	0.298
66	0.953	0.024	1.753	0.060	19.500	0.220	0.955	0.023	1.423	0.078	23.150	1.363
67	0.879	0.023	1.564	0.043	19.720	0.205	0.999	0.022	1.280	0.078	23.410	0.573
68	0.862	0.019	1.605	0.042	18.490	0.243	0.918	0.018	1.295	0.068	20.740	0.424
69	0.689	0.024	1.536	0.035	18.030	0.171	0.765	0.020	1.172	0.043	21.920	0.271
70	0.723	0.117	1.939	0.075	11.430	0.430	0.661	0.099	1.863	0.177	13.120	0.491
71	0.412	0.049	1.477	0.030	9.639	0.110	0.463	0.039	1.345	0.071	11.370	0.055
72	0.491	0.041	1.569	0.041	12.880	0.303	0.536	0.033	1.390	0.088	15.610	0.208
73	0.568	0.030	1.619	0.040	13.050	0.193	0.691	0.022	1.428	0.083	16.690	0.385
74	0.642	0.026	1.584	0.036	15.660	0.130	0.693	0.023	1.285	0.052	18.590	0.202
75	0.847	0.020	1.417	0.043	17.950	0.103	0.873	0.016	1.166	0.067	20.560	0.188

76	0.818	0.019	1.456	0.045	17.100	0.123	0.882	0.018	1.133	0.061	19.880	0.50
77	0.936	0.027	1.627	0.048	20.350	0.308	1.004	0.025	1.323	0.068	25.010	0.76
78	0.796	0.024	1.532	0.049	19.250	0.535	0.898	0.020	1.204	0.082	21.950	0.12
79	0.817	0.031	1.586	0.047	19.210	0.135	0.892	0.028	1.267	0.080	21.390	0.47
80	0.842	0.076	1.622	0.057	22.050	0.739	0.886	0.095	1.353	0.073	24.670	1.47
81	0.756	0.043	1.623	0.043	18.860	0.161	0.795	0.048	1.342	0.105	21.300	0.69
83	0.679	0.103	1.814	0.054	23.440	0.547	0.764	0.103	1.610	0.076	26.390	1.15
96	0.909	0.032	1.791	0.055	20.290	0.161	0.899	0.032	1.389	0.041	23.090	0.49
97	0.885	0.022	1.723	0.049	20.260	0.204	0.916	0.022	1.418	0.082	22.850	0.37
98	0.802	0.031	1.730	0.047	19.570	0.222	0.844	0.031	1.408	0.060	21.870	0.26
99	0.931	0.030	1.688	0.045	18.580	0.136	0.891	0.026	1.336	0.064	20.550	0.34
100	0.871	0.023	1.687	0.038	19.610	0.090	0.929	0.019	1.343	0.071	21.690	0.46
101	0.906	0.020	1.639	0.045	20.320	0.208	0.985	0.019	1.326	0.074	24.200	0.24
103	0.947	0.017	1.330	0.041	19.030	0.060	0.884	0.015	1.051	0.063	22.160	0.17
104	0.854	0.024	1.624	0.047	18.190	0.047	0.968	0.021	1.289	0.074	21.210	0.12
105	0.935	0.019	1.570	0.048	21.550	0.197	0.993	0.016	1.277	0.066	24.550	0.53
106	0.828	0.020	1.537	0.055	18.290	0.204	0.863	0.017	1.141	0.053	21.000	0.14
107	0.856	0.025	1.613	0.053	19.340	0.225	0.967	0.023	1.341	0.078	23.720	0.34
108	0.918	0.023	1.717	0.053	18.450	0.244	0.959	0.021	1.381	0.075	21.270	0.87
109	0.886	0.022	1.491	0.035	19.660	0.231	0.958	0.018	1.177	0.072	21.380	0.26
110	0.912	0.027	1.615	0.043	20.790	0.185	0.953	0.021	1.282	0.082	23.880	0.35
112	0.813	0.018	1.581	0.037	16.460	0.257	0.834	0.015	1.278	0.050	19.830	0.10
113	0.535	0.030	1.816	0.039	12.260	0.123	0.665	0.028	1.760	0.127	14.940	0.25
114	0.426	0.032	1.706	0.036	9.403	0.120	0.619	0.020	1.571	0.120	11.250	0.08

115	0.293	0.057	1.793	0.039	7.697	0.046	0.481	0.036	1.730	0.081	8.858	0.124
116	0.100	0.388	1.550	0.038	6.513	0.294	0.524	0.065	1.588	0.086	8.107	0.32
117	0.177	0.068	1.678	0.039	6.023	0.080	0.425	0.025	1.811	0.170	7.115	0.09
118	-0.021	0.433	1.584	0.048	5.307	0.079	0.413	0.018	1.828	0.144	6.400	0.04
119	-0.196	0.051	1.423	0.053	4.456	0.069	0.286	0.026	1.625	0.112	5.049	0.12
120	-0.375	0.027	1.272	0.056	3.629	0.035	0.119	0.062	1.507	0.117	3.808	0.06
121	-0.820	0.022	1.065	0.060	2.955	0.102	-0.182	0.048	1.338	0.157	3.608	0.074
122	-1.707	0.010	0.674	0.026	1.668	0.097	-1.034	0.010	0.917	0.079	2.034	0.09

41	0.845	0.026	1.579	0.039	21.210	0.161	0.941	0.024	1.249	0.054	25.630	0.261
42	0.842	0.023	1.564	0.053	21.690	0.264	0.967	0.019	1.302	0.083	25.660	0.357
43	0.907	0.026	1.724	0.061	22.290	0.226	0.998	0.022	1.300	0.064	26.600	0.426
44	0.887	0.023	1.613	0.050	21.410	0.307	0.991	0.020	1.346	0.079	24.740	0.436
45	0.923	0.024	1.599	0.050	21.270	0.248	0.941	0.021	1.287	0.061	25.080	0.413
46	0.866	0.027	1.622	0.046	21.040	0.315	0.894	0.026	1.301	0.048	23.930	0.162
47	0.851	0.025	1.594	0.041	15.110	4.729	0.945	0.018	1.246	0.078	16.590	6.662
48	0.853	0.027	1.546	0.050	20.100	0.133	0.950	0.023	1.318	0.091	24.510	0.752
49	0.857	0.023	1.517	0.052	18.550	0.372	0.919	0.020	1.155	0.089	21.490	0.218
50	0.793	0.020	1.530	0.039	17.000	0.302	0.861	0.017	1.189	0.088	19.030	0.127
51	0.681	0.049	1.388	0.046	17.920	0.184	0.706	0.042	1.185	0.104	21.270	0.328
52	0.746	0.023	1.526	0.035	17.400	0.448	0.740	0.021	1.189	0.054	20.480	0.343
54	0.658	0.027	1.507	0.032	16.950	0.134	0.695	0.024	1.164	0.067	18.870	0.181
55	0.650	0.042	1.600	0.046	18.600	0.412	0.722	0.035	1.240	0.073	22.710	0.859
56	0.710	0.022	1.453	0.037	18.650	0.128	0.729	0.019	1.163	0.047	21.930	0.119

57	0.654	0.025	1.322	0.024	15.580	0.090	0.697	0.022	1.100	0.073	18.500	0.088
61	0.815	0.023	1.641	0.040	18.950	0.099	0.849	0.022	1.325	0.050	21.560	0.169
62	0.772	0.038	1.644	0.049	18.160	0.185	0.874	0.031	1.316	0.068	21.850	0.714
63	0.881	0.024	1.654	0.043	19.940	0.084	0.955	0.020	1.324	0.063	22.270	0.215
64	0.876	0.021	1.555	0.041	19.640	0.130	0.916	0.021	1.237	0.075	21.180	0.604
65	0.882	0.032	1.470	0.048	20.100	0.235	0.956	0.036	1.126	0.065	23.190	0.298
66	0.953	0.024	1.753	0.060	19.500	0.220	0.955	0.023	1.423	0.078	23.150	1.363
67	0.879	0.023	1.564	0.043	19.720	0.205	0.999	0.022	1.280	0.078	23.410	0.573
68	0.862	0.019	1.605	0.042	18.490	0.243	0.918	0.018	1.295	0.068	20.740	0.424
69	0.689	0.024	1.536	0.035	18.030	0.171	0.765	0.020	1.172	0.043	21.920	0.271
70	0.723	0.117	1.939	0.075	11.430	0.430	0.661	0.099	1.863	0.177	13.120	0.491
71	0.412	0.049	1.477	0.030	9.639	0.110	0.463	0.039	1.345	0.071	11.370	0.055
72	0.491	0.041	1.569	0.041	12.880	0.303	0.536	0.033	1.390	0.088	15.610	0.208
73	0.568	0.030	1.619	0.040	13.050	0.193	0.691	0.022	1.428	0.083	16.690	0.385
74	0.642	0.026	1.584	0.036	15.660	0.130	0.693	0.023	1.285	0.052	18.590	0.202
75	0.847	0.020	1.417	0.043	17.950	0.103	0.873	0.016	1.166	0.067	20.560	0.188
76	0.818	0.019	1.456	0.045	17.100	0.123	0.882	0.018	1.133	0.061	19.880	0.507
77	0.936	0.027	1.627	0.048	20.350	0.308	1.004	0.025	1.323	0.068	25.010	0.765
78	0.796	0.024	1.532	0.049	19.250	0.535	0.898	0.020	1.204	0.082	21.950	0.129
79	0.817	0.031	1.586	0.047	19.210	0.135	0.892	0.028	1.267	0.080	21.390	0.472
80	0.842	0.076	1.622	0.057	22.050	0.739	0.886	0.095	1.353	0.073	24.670	1.476
81	0.756	0.043	1.623	0.043	18.860	0.161	0.795	0.048	1.342	0.105	21.300	0.692
83	0.679	0.103	1.814	0.054	23.440	0.547	0.764	0.103	1.610	0.076	26.390	1.153

Formatted ... [108]
Formatted ... [109]
Formatted ... [110]
Formatted ... [111]
Formatted ... [112]
Formatted ... [113]
Formatted ... [114]
Formatted ... [115]
Formatted ... [116]
Formatted ... [117]
Formatted ... [118]
Formatted ... [119]
Formatted ... [120]
Formatted ... [121]
Formatted ... [122]
Formatted ... [123]
Formatted ... [124]
Formatted ... [125]
Formatted ... [126]
Formatted ... [127]
Formatted ... [128]
Formatted ... [129]
Formatted ... [130]
Formatted ... [131]
Formatted ... [132]
Formatted ... [133]
Formatted ... [134]
Formatted ... [135]
Formatted ... [136]
Formatted ... [137]
Formatted ... [138]
Formatted ... [139]
Formatted ... [140]
Formatted ... [141]
Formatted ... [142]
Formatted ... [143]
Formatted ... [144]
Formatted ... [145]
Formatted ... [146]
Formatted ... [147]
Formatted ... [148]
Formatted ... [149]
Formatted ... [150]
Formatted ... [151]
Formatted ... [152]
Formatted ... [153]
Formatted ... [154]

96	0.909	0.032	1.791	0.055	20.290	0.161	0.899	0.032	1.389	0.041	23.090	0.491
97	0.885	0.022	1.723	0.049	20.260	0.204	0.916	0.022	1.418	0.082	22.850	0.374
98	0.802	0.031	1.730	0.047	19.570	0.222	0.844	0.031	1.408	0.060	21.870	0.269
99	0.931	0.030	1.688	0.045	18.580	0.136	0.891	0.026	1.336	0.064	20.550	0.341
100	0.871	0.023	1.687	0.038	19.610	0.090	0.929	0.019	1.343	0.071	21.690	0.461
101	0.906	0.020	1.639	0.045	20.320	0.208	0.985	0.019	1.326	0.074	24.200	0.241
103	0.947	0.017	1.330	0.041	19.030	0.060	0.884	0.015	1.051	0.063	22.160	0.179
104	0.854	0.024	1.624	0.047	18.190	0.047	0.968	0.021	1.289	0.074	21.210	0.126
105	0.935	0.019	1.570	0.048	21.550	0.197	0.993	0.016	1.277	0.066	24.550	0.530
106	0.828	0.020	1.537	0.055	18.290	0.204	0.863	0.017	1.141	0.053	21.000	0.146
107	0.856	0.025	1.613	0.053	19.340	0.225	0.967	0.023	1.341	0.078	23.720	0.341
108	0.918	0.023	1.717	0.053	18.450	0.244	0.959	0.021	1.381	0.075	21.270	0.874
109	0.886	0.022	1.491	0.035	19.660	0.231	0.958	0.018	1.177	0.072	21.380	0.262
110	0.912	0.027	1.615	0.043	20.790	0.185	0.953	0.021	1.282	0.082	23.880	0.355
112	0.813	0.018	1.581	0.037	16.460	0.257	0.834	0.015	1.278	0.050	19.830	0.105
113	0.535	0.030	1.816	0.039	12.260	0.123	0.665	0.028	1.760	0.127	14.940	0.252
114	0.426	0.032	1.706	0.036	9.403	0.120	0.619	0.020	1.571	0.120	11.250	0.087
115	0.293	0.057	1.793	0.039	7.697	0.046	0.481	0.036	1.730	0.081	8.858	0.124
116	0.100	0.388	1.550	0.038	6.513	0.294	0.524	0.065	1.588	0.086	8.107	0.325
117	0.177	0.068	1.678	0.039	6.023	0.080	0.425	0.025	1.811	0.170	7.115	0.090
118	-0.021	0.433	1.584	0.048	5.307	0.079	0.413	0.018	1.828	0.144	6.400	0.046
119	-0.196	0.051	1.423	0.053	4.456	0.069	0.286	0.026	1.625	0.112	5.049	0.126
120	-0.375	0.027	1.272	0.056	3.629	0.035	0.119	0.062	1.507	0.117	3.808	0.062
121	-0.820	0.022	1.065	0.060	2.955	0.102	-0.182	0.048	1.338	0.157	3.608	0.074

Formatted ... [155]
Formatted ... [156]
Formatted ... [157]
Formatted ... [158]
Formatted ... [159]
Formatted ... [160]
Formatted ... [161]
Formatted ... [162]
Formatted ... [163]
Formatted ... [164]
Formatted ... [165]
Formatted ... [166]
Formatted ... [167]
Formatted ... [168]
Formatted ... [169]
Formatted ... [170]
Formatted ... [171]
Formatted ... [172]
Formatted ... [173]
Formatted ... [174]
Formatted ... [175]
Formatted ... [176]
Formatted ... [177]
Formatted ... [178]
Formatted ... [179]
Formatted ... [180]
Formatted ... [181]
Formatted ... [182]
Formatted ... [183]
Formatted ... [184]
Formatted ... [185]
Formatted ... [186]
Formatted ... [187]
Formatted ... [188]
Formatted ... [189]
Formatted ... [190]
Formatted ... [191]
Formatted ... [192]
Formatted ... [193]
Formatted ... [194]
Formatted ... [195]
Formatted ... [196]
Formatted ... [197]
Formatted ... [198]
Formatted ... [199]
Formatted ... [200]
Formatted ... [201]
Formatted ... [202]

122	-1.707	0.010	0.674	0.026	1.668	0.097	-1.034	0.010	0.917	0.079	2.034	0.091

Formatted: Font: 12 pt

Formatted

Formatted

Table S3. Best-fit values of S^2 and τ_e and their errors obtained with MF analysis (note that both τ_e and τ_s are denoted as τ_e).

Res	S^2	σ_{S^2}	τ_e	σ_{τ_e}
2	0.0900	0.0057	0.5708	0.0141
3	0.0942	0.0044	0.8128	0.0159
4	0.1339	0.0037	0.8632	0.0358
5	0.1794	0.0031	0.8821	0.0280
7	0.6920	0.0102	0.0133	0.0015
9	0.7612	0.0109	0.0000	0.0000
10	0.7713	0.0061	0.0000	0.0000
11	0.6952	0.0071	0.0000	0.0000
12	0.7676	0.0058	0.0000	0.0000
13	0.7759	0.0092	0.0000	0.0000
14	0.8360	0.0060	0.0000	0.0000
15	0.6978	0.0054	1.9726	0.1896
16	0.6342	0.0107	2.4440	0.3039
17	0.3925	0.0195	2.7946	0.8457
18	0.2756	0.0063	1.3436	0.0452
21	0.2667	0.0109	2.1859	0.5151
23	0.2662	0.0081	1.8379	0.4551
24	0.2541	0.0091	1.9294	0.4740
25	0.3041	0.0071	1.8264	0.3954
26	0.1088	0.0995	12.1583	3.5300
27	0.8360	0.0094	0.0000	0.0000
29	0.7084	0.0055	0.0000	0.0000
30	0.7732	0.0143	0.0000	0.0000
31	0.8413	0.0054	0.0000	0.0000
32	0.8581	0.0063	0.0000	0.0000
34	0.8383	0.0089	0.0000	0.0000
36	0.6060	0.0366	3.4433	0.9775
37	0.5896	0.0248	3.7763	0.2995
39	0.8397	0.0071	0.0000	0.0000
40	0.8752	0.0135	0.0000	0.0000
41	0.9131	0.0079	0.0000	0.0000
42	0.9288	0.0127	0.0000	0.0000
43	0.9574	0.0116	0.0000	0.0000
44	0.9230	0.0144	0.0000	0.0000
45	0.9190	0.0129	0.0000	0.0000
46	0.8637	0.0079	0.0000	0.0000
47	0.4974	0.1577	4.4814	1.5770

Field Code Changed ... [203]
Field Code Changed ... [204]
Field Code Changed ... [205]
Field Code Changed ... [206]
Field Code Changed ... [207]
Formatted ... [212]
Field Code Changed ... [213]
Field Code Changed ... [216]
Formatted ... [214]
Field Code Changed ... [215]
Field Code Changed ... [211]
Formatted ... [208]
Formatted ... [209]
Formatted Table ... [210]
Formatted ... [217]
Formatted ... [218]
Formatted ... [219]
Formatted ... [220]
Formatted ... [221]
Formatted ... [222]
Formatted ... [223]
Formatted ... [224]
Formatted ... [225]
Formatted ... [226]
Formatted ... [227]
Formatted ... [228]
Formatted ... [229]
Formatted ... [230]
Formatted ... [231]
Formatted ... [232]
Formatted ... [233]
Formatted ... [234]
Formatted ... [235]
Formatted ... [236]
Formatted ... [237]
Formatted ... [238]
Formatted ... [239]
Formatted ... [240]
Formatted ... [241]
Formatted ... [242]
Formatted ... [243]
Formatted ... [244]
Formatted ... [245]
Formatted ... [246]
Formatted ... [247]
Formatted ... [248]
Formatted ... [249]
Formatted ... [250]
Formatted ... [251]
Formatted ... [252]
Formatted ... [253]

48	0.8565	0.0080	0.0000	0.0000
52	0.5834	0.0767	4.0034	2.0336
54	0.7066	0.0062	0.0000	0.0000
56	0.7822	0.0047	0.0287	0.0029
57	0.6017	0.0065	2.5103	0.3635
61	0.7928	0.0051	0.0000	0.0000
62	0.7897	0.0107	0.0000	0.0000
63	0.8347	0.0046	0.0000	0.0000
64	0.8355	0.0078	0.0000	0.0000
65	0.8502	0.0111	0.0000	0.0000
66	0.8480	0.0135	0.0000	0.0000
67	0.8577	0.0117	0.0000	0.0000
68	0.8012	0.0126	0.0241	0.0034
69	0.6974	0.0149	2.9635	0.6911
70	0.5126	0.0184	0.0156	0.0021
71	0.3272	0.0195	2.5541	0.9763
74	0.5770	0.0124	3.1451	0.4757
75	0.6895	0.0090	2.6908	0.4040
76	0.7294	0.0076	0.0000	0.0000
77	0.9170	0.0158	0.0000	0.0000
78	0.7808	0.0069	0.0000	0.0000
79	0.8145	0.0079	0.0000	0.0000
80	0.6244	0.0325	2.2094	0.4948
81	0.7149	0.0119	3.1963	0.2348
83	0.5034	0.0486	3.9385	0.7290
96	0.8722	0.0091	0.0000	0.0000
97	0.8602	0.0107	0.0000	0.0000
98	0.8210	0.0097	0.0000	0.0000
99	0.7857	0.0073	0.0000	0.0000
100	0.8311	0.0055	0.0000	0.0000
101	0.8702	0.0090	0.0000	0.0000
103	0.7541	0.0068	2.4303	0.3461
104	0.7636	0.0030	0.0000	0.0000
105	0.9219	0.0114	0.0000	0.0000
106	0.7545	0.0066	0.0000	0.0000
107	0.8412	0.0114	0.0000	0.0000
108	0.5214	0.0629	4.3819	1.1003
109	0.8148	0.0103	0.0473	0.0061
110	0.8167	0.0109	0.8616	0.0759
112	0.7046	0.0053	0.0443	0.0047
113	0.5348	0.0069	0.0000	0.0000
114	0.3116	0.0315	1.4914	1.3704
115	0.3241	0.0026	0.0068	0.0004

116	0.2160	0.0142	0.8510	0.0244
117	0.1718	0.0134	0.8047	0.3544
118	0.2226	0.0021	0.0221	0.0007
119	0.1284	0.0043	3.0862	0.4265
120	0.0872	0.0043	0.8044	0.0195
121	0.0817	0.0051	0.6269	0.0108
122	0.0432	0.0042	0.4985	0.0203

Formatted: Centered
Formatted: Centered
Formatted: Centered
Formatted: Centered
Formatted: Centered
Formatted: Centered
Formatted: Centered
Formatted

Table S4.3 —Potential coefficients, c_0^2 and c_2^2 (unit-less), and order parameters calculated as described in the text. The residues marked in red were subjected to a more ~~intricate~~ complex fitting scheme, as outlined in the title of Table S45.

Res	c_0^2	c_2^2 ~~c_2^2~~	S_0^2	S_2^2
6	-0.670	-0.550	-0.134	-0.252
7	-20.436	-1.207	-0.476	-0.705
10	-10.000	-2.000	-0.455	-0.892
11	-23.603	-3.112	-0.481	-1.032
12	-23.335	-2.615	-0.480	-0.992
13	-58.257	-3.869	-0.492	-1.080
15	-10.634	-1.564	-0.456	-0.801
17	-3.395	-1.076	-0.369	-0.580
20	-1.345	-0.996	-0.243	-0.476
21	-0.593	-1.326	-0.177	-0.540
24	-1.849	-1.440	-0.307	-0.655
26	-0.759	-1.272	-0.194	-0.536
27	-1.911	-1.836	-0.328	-0.760
30	1.393	-27.229	-0.476	-1.186
31	-6.684	-2.546	-0.440	-0.952
32	-7.277	-1.817	-0.440	-0.845
33	-16.640	-3.060	-0.473	-1.023
37	-24.160	-4.170	-0.482	-1.082
39	-33.508	-42.839	-0.493	-1.207
41	-36.069	-25.971	-0.491	-1.198
42	-34.376	-22.314	-0.490	-1.194
43	-25.666	-30.528	-0.490	-1.200
44	-43.264	-22.538	-0.492	-1.196
45	-24.518	-33.432	-0.490	-1.202
47	-19.740	-9.874	-0.482	-1.158
48	9.998	-34.451	-0.472	-1.187
49	-45.607	-7.096	-0.490	-1.144
51	1.140	-3.720	-0.186	-0.823
52	-1.042	-16.989	-0.471	-0.635
54	4.515	-10.357	-0.355	-1.056
55	-8.642	-10.508	-0.470	-1.152
56	6.073	-12.165	-0.351	-1.061
57	-4.233	-1.768	-0.403	-0.806

61	5.388	-11.491	-0.357	-1.063
62	-18.093	-2.682	-0.475	-0.994
64	-46.942	-11.728	-0.491	-1.174
65	-42.699	-1.686	-0.489	-0.858
66	-5.881	-39.048	-0.489	-1.127
67	-3.247	-52.724	-0.491	-1.049
68	-5.077	-4.241	-0.438	-1.049
69	-5.009	-2.072	-0.420	-0.874
70	2.156	-6.873	-0.330	-1.010
72	-3.570	-1.200	-0.377	-0.630
73	-0.638	-1.363	-0.186	-0.555
74	-7.941	-0.426	-0.438	-0.286
75	-5.041	-2.017	-0.419	-0.865
76	-10.501	-2.792	-0.460	-0.991
77	-15.973	-2.140	-0.471	-0.928
79	-14.540	-2.770	-0.470	-0.997
80	-3.970	-3.380	-0.420	-0.998
81	-10.851	-2.657	-0.460	-0.980
97	-35.617	-44.324	-0.493	-1.208
98	-58.202	-28.196	-0.494	-1.202
99	-68.164	-3.544	-0.493	-1.066
101	-21.819	-6.803	-0.482	-1.134
104	-27.229	-29.881	-0.490	-1.200
105	-6.279	-2.266	-0.435	-0.915
106	-20.608	-5.968	-0.480	-1.121
108	-70.841	-3.039	-0.493	-1.038
109	-40.130	-4.350	-0.489	-1.093
110	-24.863	-2.882	-0.481	-1.016
112	-20.929	-2.207	-0.478	-0.943
113	0.830	-6.231	-0.367	-1.032
115	5.121	-10.319	-0.321	-1.029
116	-0.816	-2.472	-0.288	-0.820
117	16.690	21.869	-0.052	0.836
118	2.550	-5.404	-0.180	-0.866
119	-0.202	-1.897	-0.176	-0.659

Table S54. Best-fit values of the local diffusion rates, $D_{2,\perp}$ and $D_{2,\parallel}$, and the Euler angle α_D ~~□D~~. Pre-set or best-fit (for the residues marked in red) values of the Euler angles α_D ~~□D~~, α_O ~~□O~~ and β_O ~~□O~~. To fit 6 parameters we divided them in two sets: (A) $D_{2,\perp}$, $D_{2,\parallel}$ and β_D ~~□D~~, and (B) α_D , α_O and β_O ~~□D, □O and □O~~. First we allowed set A to vary, with set B fixed at α_D ~~□D~~ = α_O ~~□O~~ = β_O ~~□O~~ = –90°. Subsequently we fixed set A at their new values and allowed set B to vary. This procedure was carried out twice.

Res	$D_{2,\perp}$ ~~,~~ / s^{-1}	$D_{2,\parallel}$ ~~,~~ / s^{-1}	α_O ~~□O,~~ / deg	β_O ~~□O,~~ / deg	α_D ~~□D,~~ / deg	β_D ~~□D,~~ / deg
6	1.58E+7	9.89E+8	-90.0	-90.0	-90.0	-65.4
7	1.78E+7	5.35E+8	-74.3	-107.6	-104.8	-104.5
10	9.61E+6	4.32E+7	-88.1	-52.8	-190.0	-111.3
11	2.79E+6	5.63E+10	0.0	0.0	-99.8	-116.2
12	1.76E+6	2.01E+10	0.0	0.0	-142.1	-116.0
13	2.04E+6	2.62E+11	0.0	0.0	-153.5	-117.4
15	6.96E+6	7.95E+7	-60.5	-96.6	66.8	-17.4
17	4.05E+7	3.43E+10	-90.0	-90.0	-103.7	-84.9
20	3.92E+7	1.59E+10	-90.0	-90.0	-92.2	-64.2
21	4.07E+7	1.55E+10	-90.0	-90.0	-85.0	-67.2
24	6.16E+7	1.07E+10	-90.0	-64.2	-90.0	-63.5
26	3.13E+7	1.21E+10	-90.0	-90.0	-82.4	-74.1
27	2.71E+7	2.85E+7	0.0	0.0	-90.1	-93.1
30	1.01E+8	9.19E+11	-79.7	-55.1	78.0	82.0
31	4.82E+6	4.83E+7	-90.0	-90.0	-66.4	-195.7
32	4.16E+6	5.40E+7	-90.0	-90.0	-75.6	-196.8

33	1.37E+7	1.66E+8	-90.0	-90.0	-90.0	-114.2
37	8.42E+6	2.38E+8	-90.0	-90.0	-90.0	-119.4
39	2.90E+7	2.52E+8	-90.1	-90.1	-68.7	-95.4
41	7.63E+6	7.11E+10	-94.3	-71.7	-60.1	-80.4
42	1.07E+7	5.57E+10	-69.0	-90.0	-62.2	-92.8
43	1.38E+7	6.77E+10	-85.1	-71.0	69.0	-98.2
44	5.52E+6	2.72E+10	-69.1	-89.8	-67.2	-110.3
45	7.76E+6	4.32E+10	-93.9	-109.8	-61.6	-95.1
47	1.38E+7	6.25E+10	-62.0	-90.0	-86.0	-123.1
48	1.20E+7	2.10E+10	-89.0	-115.2	-65.8	-102.2
49	1.09E+7	3.66E+10	-62.0	-90.0	-76.5	-113.6
51	2.48E+7	1.86E+10	-90.0	-90.0	-90.0	-77.2
52	2.10E+6	1.26E+8	-90.0	-90.0	-50.4	-39.3
54	5.19E+7	5.64E+7	-90.0	-90.0	-89.9	-57.2
55	3.75E+7	3.31E+8	-90.0	-90.0	-106.1	-76.5
56	4.24E+7	9.95E+7	-90.0	-90.0	-83.9	-65.3
57	4.65E+7	7.44E+10	-90.0	-90.0	-85.1	-75.6
61	2.63E+7	2.26E+8	-90.0	-90.0	-88.2	-107.9
62	2.82E+7	2.28E+8	-90.0	-90.0	-90.0	-108.8
64	1.37E+7	3.55E+10	-65.5	-89.6	-78.0	-110.9
65	8.78E+6	4.15E+7	-87.4	-79.2	-174.3	-2.1
66	1.16E+7	1.43E+13	0.0	0.0	-179.9	-34.1
67	1.50E+6	6.67E+10	0.0	0.0	-145.5	-117.5
68	2.71E+6	4.78E+11	0.0	0.0	-88.9	-115.3
69	1.18E+7	8.27E+9	0.0	0.0	-0.1	28.2
70	5.12E+7	2.69E+8	-90.0	-90.0	-94.2	-114.6
72	3.68E+7	1.62E+10	-90.0	-90.0	-90.0	-71.8
73	2.32E+7	9.35E+8	-90.0	-90.0	-90.0	-71.0
74	9.16E+6	4.93E+8	-90.0	-90.0	-123.2	-79.6
75	1.39E+6	6.08E+9	0.0	0.0	-1.3	-115.4
76	1.93E+7	1.70E+10	0.0	0.0	0.0	-158.3
77	9.77E+5	7.61E+9	0.0	0.0	-181.8	-118.5
79	2.32E+7	2.11E+8	-90.0	-90.0	-90.0	-110.6
80	1.58E+7	2.11E+8	-90.0	-90.0	-90.0	-110.0
81	3.11E+7	2.27E+8	-90.0	-90.0	-83.5	-106.6
97	1.86E+7	2.57E+8	-90.0	-90.2	-70.4	-103.3
98	1.76E+7	4.28E+8	-83.5	-98.8	-113.3	-98.6
99	1.67E+7	5.30E+8	-62.0	-90.0	-90.0	-115.3
101	7.61E+6	1.27E+8	-90.0	-90.0	-90.1	-121.7
104	3.14E+7	6.49E+10	-89.9	-115.4	-66.4	-89.4
105	7.97E+6	7.33E+9	-112.3	-86.2	-1.6	-23.2
106	6.25E+6	8.67E+7	0.0	0.0	-39.1	-120.1
108	1.56E+6	4.91E+10	0.0	0.0	-90.0	-118.6

109	3.73E+6	7.76E+11	0.0	0.0	-90.0	-112.5
110	1.29E+6	3.51E+10	0.0	0.0	-42.0	-116.4
112	3.25E+7	1.33E+8	-90.0	-90.0	-89.9	-109.4
113	5.93E+7	1.79E+8	-90.0	-90.0	-90.0	-55.6
115	1.63E+8	3.77E+9	-95.5	-44.4	-59.6	-87.2
116	1.31E+8	7.00E+8	86.7	-92.2	-86.3	-113.8
117	2.53E+7	2.67E+8	-90.0	-90.0	141.4	-170.4
118	2.03E+8	1.69E+11	27.6	0.3	-116.8	-69.1
119	6.25E+7	1.17E+9	-90.0	-90.0	-86.6	-121.0

Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted
Formatted: Font: Times New Roman
Formatted
Formatted: Left, Line spacing: single

Page 13: [1] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 13: [2] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 13: [3] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [4] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [5] Formatted Table	Mirzo Zerbetto	9/24/2012 8:36:00 AM

Formatted Table

Page 13: [6] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [7] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [8] Change	Unknown	

Field Code Changed

Page 13: [9] Change	Unknown	

Field Code Changed

Page 13: [10] Formatted	eva	9/24/2012 6:36:00 AM

Centered, Indent: Left: 0", Space After: 0 pt

Page 13: [11] Change	Unknown	

Field Code Changed

Page 13: [12] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [13] Change	Unknown	

Field Code Changed

Page 13: [14] Formatted	eva	9/24/2012 6:36:00 AM

Centered, Indent: First line: 0"

Page 13: [15] Change	Unknown	

Field Code Changed

Page 13: [16] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [17] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [18] Change	Unknown	

Field Code Changed

Page 13: [19] Change	Unknown	

Field Code Changed

Page 13: [20] Change	Unknown	

Field Code Changed

Page 13: [21] Change	Unknown	

Field Code Changed

Page 13: [22] Change	Unknown	

Field Code Changed

Page 13: [23] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [24] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [25] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [26] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [27] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [28] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [29] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [30] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [31] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [32] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Centered

Page 13: [33] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 13: [34] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Centered

Page 13: [35] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 13: [36] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Centered

Page 13: [37] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 13: [38] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Centered

Page 13: [39] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 13: [40] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Centered

Page 13: [41] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 13: [42] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Centered

Page 13: [43] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 13: [44] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Centered

Page 13: [45] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 13: [46] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Centered

Page 13: [47] Formatted	eva	9/24/2012 6:36:00 AM

Centered, Space Before: 0 pt, After: 0 pt, Don't keep with next

Page 13: [48] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: Times New Roman, 12 pt

Page 13: [49] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [50] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [51] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [52] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [53] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [54] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [55] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [56] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 13: [57] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 13: [58] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [59] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [60] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [61] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [62] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [63] Formatted **Mirzo Zerbetto** **9/21/2012 5:10:00 PM**

Font: 12 pt

Page 14: [64] Formatted **eva** **9/24/2012 6:36:00 AM**

Centered

Page 14: [65] Formatted **Mirzo Zerbetto** **9/21/2012 5:10:00 PM**

Font: 12 pt

Page 14: [66] Formatted **eva** **9/24/2012 6:36:00 AM**

Centered

Page 14: [67] Formatted **Mirzo Zerbetto** **9/21/2012 5:10:00 PM**

Font: 12 pt

Page 14: [68] Formatted **eva** **9/24/2012 6:36:00 AM**

Centered

Page 14: [69] Formatted **Mirzo Zerbetto** **9/21/2012 5:10:00 PM**

Font: 12 pt

Page 14: [70] Formatted **eva** **9/24/2012 6:36:00 AM**

Centered

Page 14: [71] Formatted **Mirzo Zerbetto** **9/21/2012 5:10:00 PM**

Font: 12 pt

Page 14: [72] Formatted **eva** **9/24/2012 6:36:00 AM**

Centered

Page 14: [73] Formatted **eva** **9/24/2012 6:36:00 AM**

Centered, Space Before: 0 pt, After: 0 pt, Don't keep with next

Page 14: [74] Formatted **Mirzo Zerbetto** **9/21/2012 5:10:00 PM**

Font: Times New Roman, 12 pt

Page 14: [75] Formatted **Mirzo Zerbetto** **9/21/2012 5:10:00 PM**

Font: 12 pt

Page 14: [76] Formatted **Mirzo Zerbetto** **9/21/2012 5:10:00 PM**

Font: Times New Roman, 12 pt

Page 14: [77] Formatted **Mirzo Zerbetto** **9/21/2012 5:10:00 PM**

Font: 12 pt

Page 14: [78] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: Times New Roman, 12 pt

Page 14: [79] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [80] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: Times New Roman, 12 pt

Page 14: [81] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [82] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [83] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [84] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [85] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [86] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [87] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [88] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [89] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [90] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [91] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [92] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [93] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [94] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [95] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [96] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [97] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [98] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [99] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 14: [100] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [101] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [102] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [103] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [104] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [105] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [106] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 14: [107] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 18: [108] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [109] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [110] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [111] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [112] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [113] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [114] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [115] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [116] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [117] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [118] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [119] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [120] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [121] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [122] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [123] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [124] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [125] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [126] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [127] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [128] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [129] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [130] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [131] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [132] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [133] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [134] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [135] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [136] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [137] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [138] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [139] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [140] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [141] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [142] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [143] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [144] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [145] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [146] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [147] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [148] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [149] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [150] Formatted	eva	9/24/2012 6:36:00 AM

Indent: Left: 0"

Page 18: [151] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [152] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 18: [153] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 18: [154] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [155] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [156] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [157] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [158] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [159] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [160] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [161] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [162] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [163] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [164] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [165] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [166] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [167] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [168] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [169] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [170] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [171] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [172] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [173] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [174] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [175] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [176] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [177] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [178] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [179] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [180] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [181] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [182] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [183] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [184] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 19: [185] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 19: [186] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Formatted

Page 19: [187] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 19: [188] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Formatted

Page 19: [189] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 19: [190] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Formatted

Page 19: [191] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 19: [192] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Formatted

Page 19: [193] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 19: [194] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Formatted

Page 19: [195] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 19: [196] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Formatted

Page 19: [197] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 19: [198] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Formatted

Page 19: [199] Formatted	**Mirzo Zerbetto**	**9/21/2012 5:10:00 PM**

Font: 12 pt

Page 19: [200] Formatted	**eva**	**9/24/2012 6:36:00 AM**

Formatted

Page 19: [201] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: 12 pt

Page 19: [202] Formatted	eva	9/24/2012 6:36:00 AM

Formatted

Page 22: [203] Change	Unknown	

Field Code Changed

Page 22: [204] Change	Unknown	

Field Code Changed

Page 22: [205] Change	Unknown	

Field Code Changed

Page 22: [206] Change	Unknown	

Field Code Changed

Page 22: [207] Change	Unknown	

Field Code Changed

Page 22: [208] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: Bold

Page 22: [209] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [210] Formatted Table	Mirzo Zerbetto	9/21/2012 8:53:00 AM

Formatted Table

Page 22: [211] Change	Unknown	

Field Code Changed

Page 22: [212] Formatted	eva	9/24/2012 6:36:00 AM

Centered, Line spacing: single

Page 22: [213] Change	Unknown	

Field Code Changed

Page 22: [214] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [215] Change	Unknown	

Field Code Changed

Page 22: [216] Change	Unknown	

Field Code Changed

Page 22: [217] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [218] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [219] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [220] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [221] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [222] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [223] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [224] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [225] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [226] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [227] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [228] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [229] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [230] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [231] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [232] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [233] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [234] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [235] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [236] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [237] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [238] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [239] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [240] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [241] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [242] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [243] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [244] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [245] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [246] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [247] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [248] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [249] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [250] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [251] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [252] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 22: [253] Formatted	eva	9/24/2012 6:36:00 AM

Centered

Page 27: [254] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [254] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [254] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [255] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [255] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [255] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [256] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [256] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [256] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [257] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [257] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [257] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman

Page 27: [257] Formatted	Mirzo Zerbetto	9/21/2012 5:10:00 PM

Font: (Default) Times New Roman