

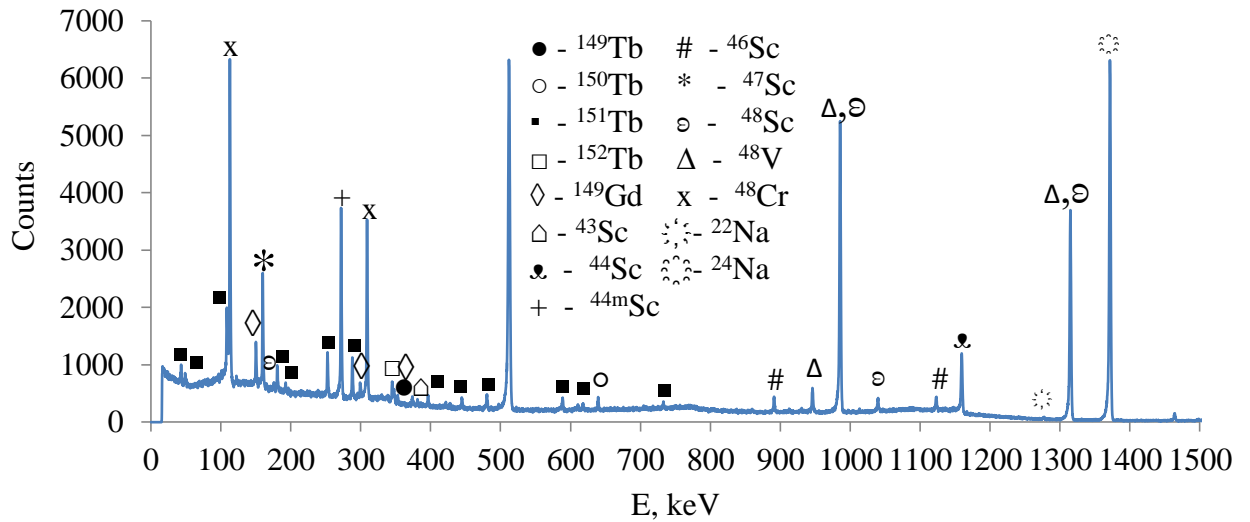
Cross section measurements of $^{151}\text{Eu}(^3\text{He},5\text{n})$ reaction: new opportunities for medical alpha emitter ^{149}Tb production

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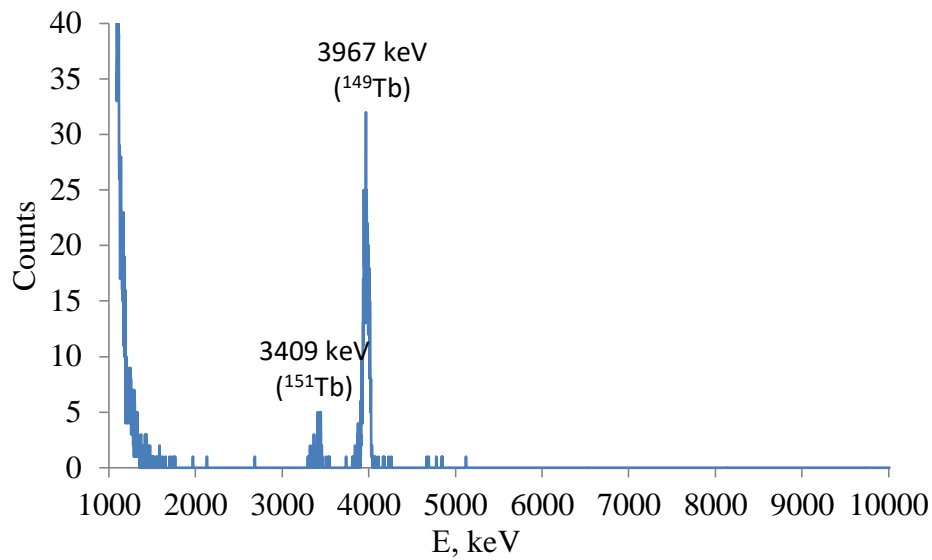
Supplementary information

Supplementary Table S1. Measured cross sections for $^{151}\text{Eu}(^3\text{He},x\text{n})^{154-x}\text{Tb}$ reactions

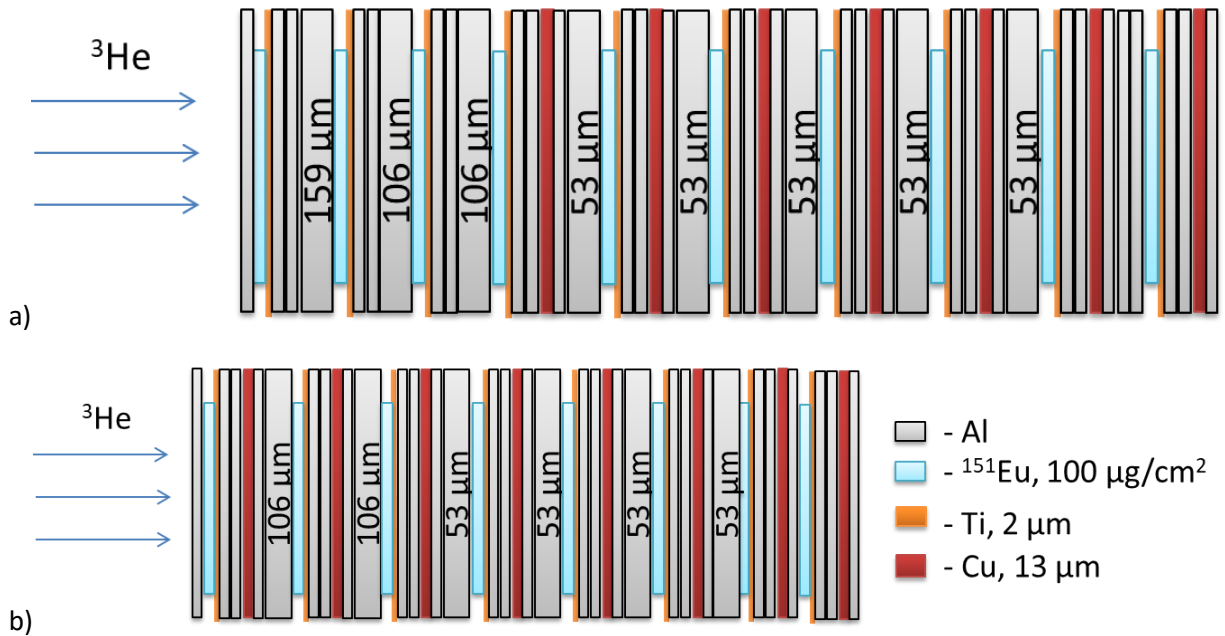
^3He energy, MeV	Reaction Cross-section (mb)			
	$^{151}\text{Eu}(^3\text{He};5\text{n})^{149}\text{Tb}$	$^{151}\text{Eu}(^3\text{He};4\text{n})^{150}\text{Tb}$	$^{151}\text{Eu}(^3\text{He};3\text{n})^{151}\text{Tb}$	$^{151}\text{Eu}(^3\text{He};2\text{n})^{152}\text{Tb}$
69.8±1.1	12.3±2.5	10.8±7.4	13.0±3.1	3.2±1.0
66.2±1.2	13.1±2.6	10.1±12.1	15.6±5.8	3.5±1.6
63.7±1.3	17.5±3.5	23.6±13.2	15.5±5.2	4.0±1.4
60.9±1.4	18.1±3.6	22.3±10.3	20.5±5.6	4.4±1.4
58.7±1.5	26.2±5.2	27.1±14.5	21.6±5.9	4.0±1.4
56.1±1.5	34.9±7.0	11.6±11.4	25.5±5.7	3.6±1.1
53.5±1.6	43.3±8.7	15.3±15.7	28.8±5.7	6.5±1.4
51.0±1.6	56.2±11.2	26.1±17.2	37.1±8.9	7.7±1.8
48.2±1.8	69.8±14.0	46.9±18.8	42.9±9.2	10.7±2.1
46.1±1.9	46.8±9.4	78.0±23.9	44.3±9.0	11.7±2.2
44.8±1.1	66.1±13.2	61.8±9.8	52.4±7.8	11.5±1.7
40.1±1.4	63.1±12.6	97.9±16.1	52.8±8.1	14.8±2.3
35.0±1.6	15.3±3.1	205.0±28.5	96.7±13.0	19.4±2.8
31.2±1.8	0.4±0.1	191.5±26.9	163.8±21.5	19.0±2.7
26.9±2.1	0.0	91.9±13.7	330.2±42.0	22.9±3.1
22.0±2.6	0.0	0.0	256.3±32.5	32.7±4.3
16.2±3.4	0.0	0.0	14.4±3.1	25.0±3.2
12.0±4.3	0.0	0.0	0.0	0.8±1.2



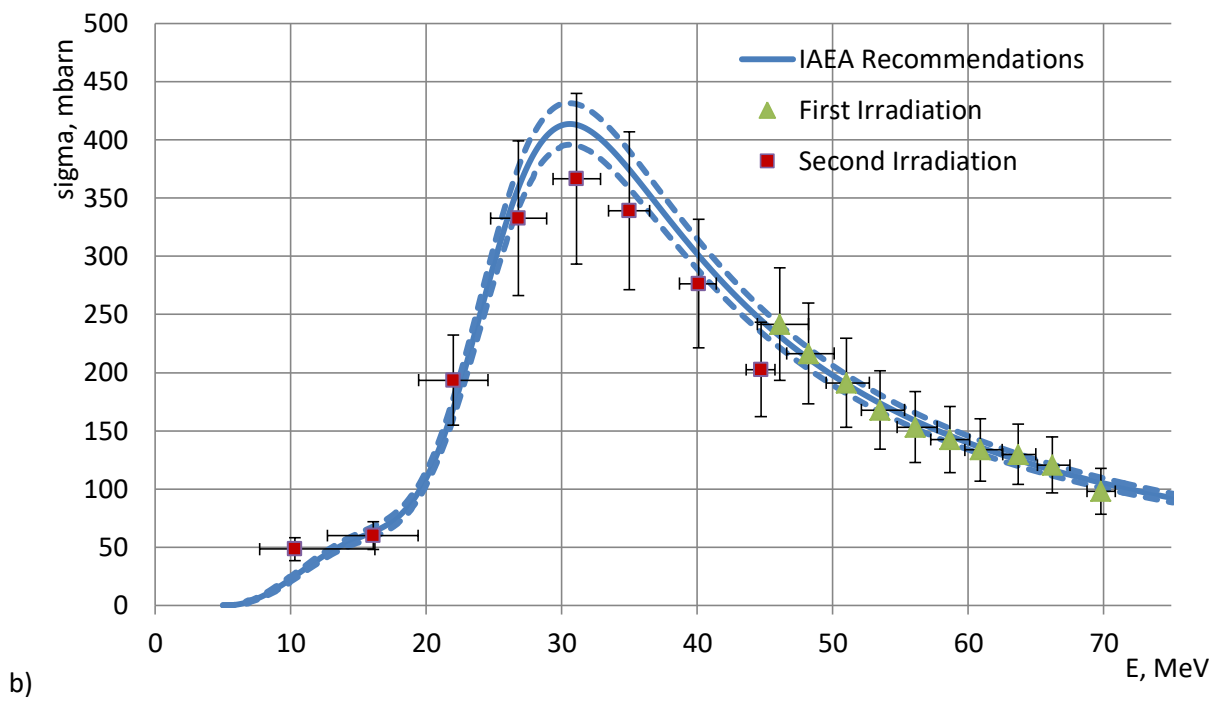
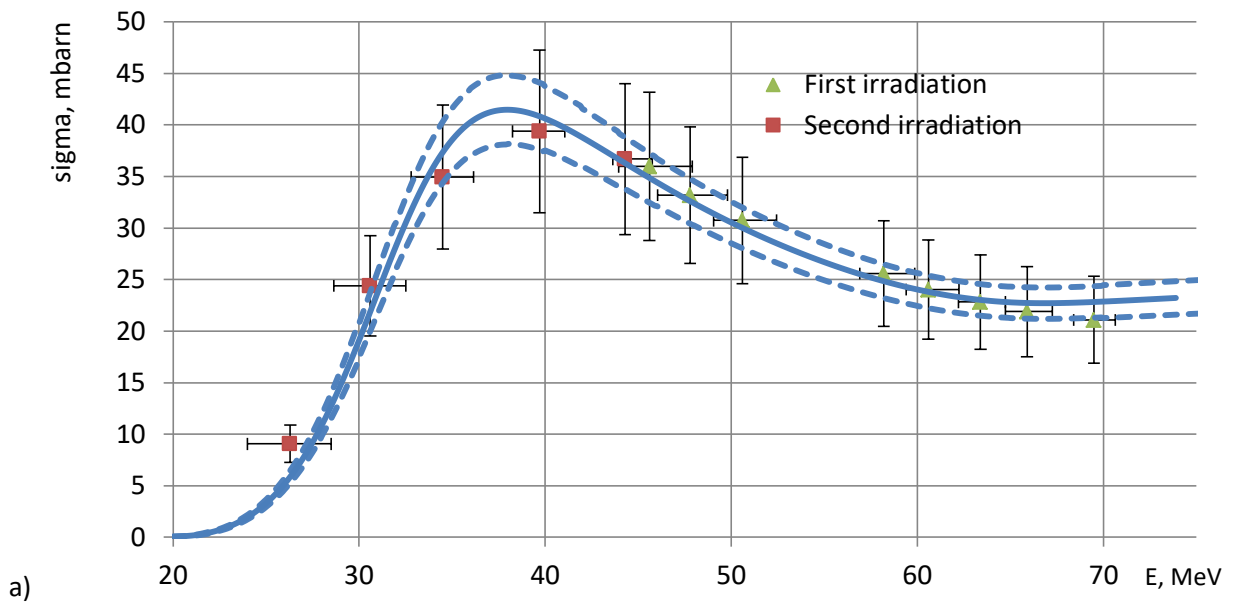
Supplementary Fig. S1. Typical Gamma-ray spectrum of ^{151}Eu target irradiated by ^3He nuclei with incident energy ~ 45 MeV, measured at ~ 6 cm distance during 1.5 h 5 h after EOB.

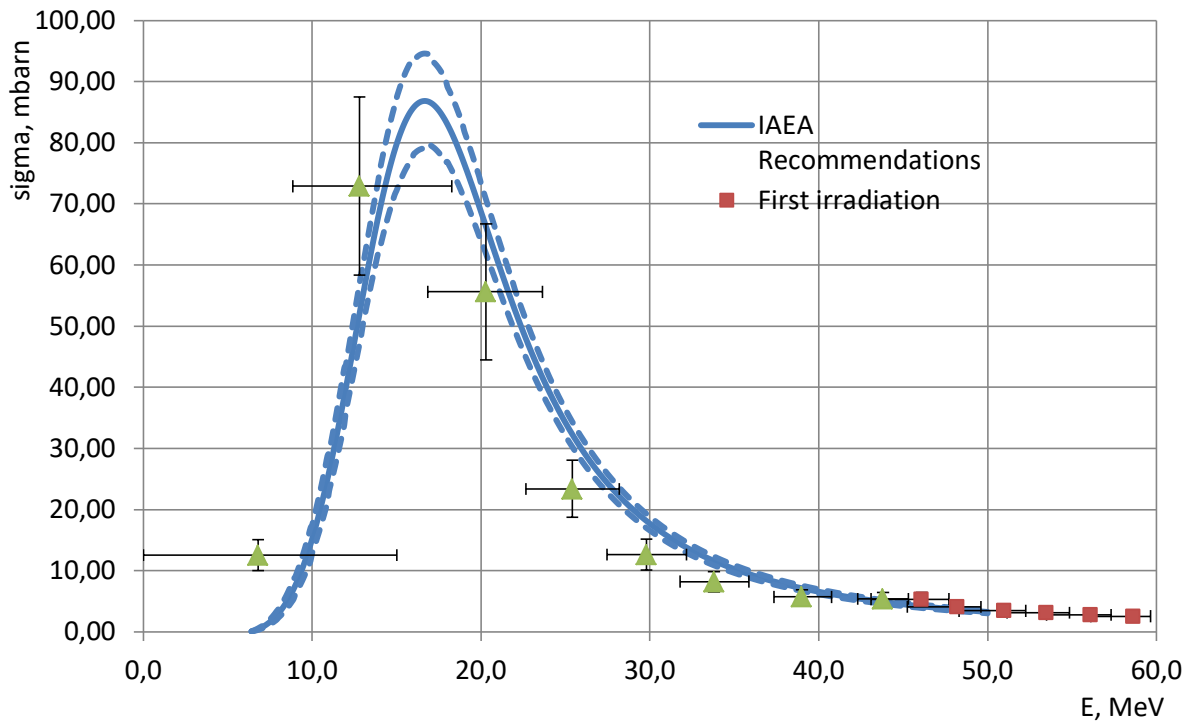


Supplementary Fig. S2. Typical Alpha particle spectrum of ^{151}Eu target irradiated by ^3He nuclei with incident energy ~ 40 MeV, measured at ~ 2 cm distance during 1.25 h 22 h after EOB.

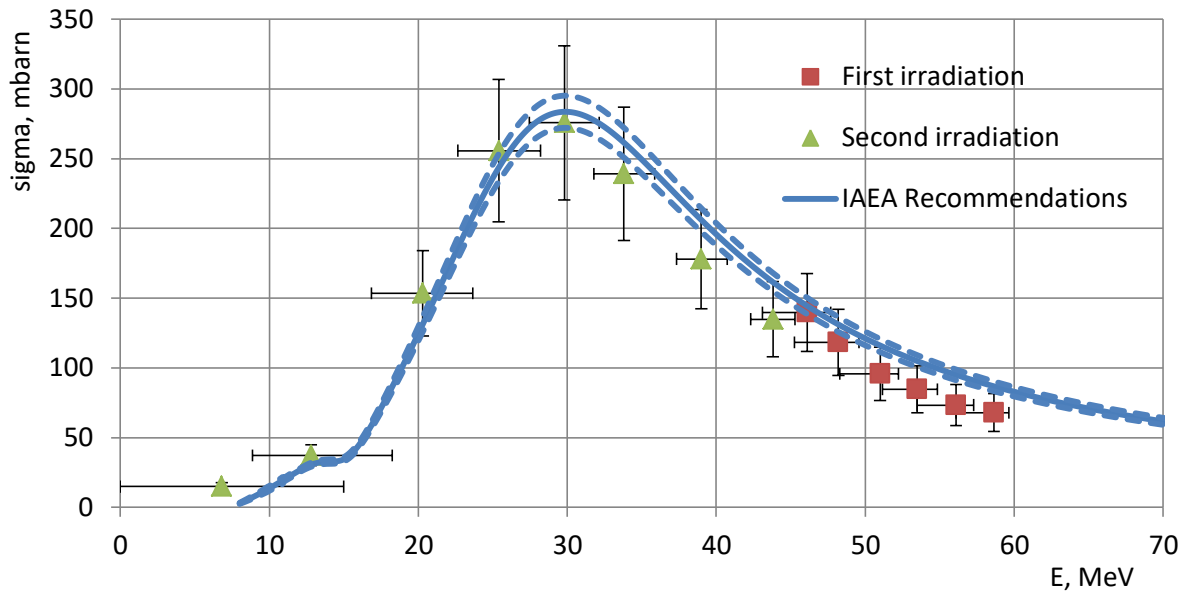


Supplementary Fig. S3. Stack configurations of target foils on the first irradiation (a) and the second (b).





c)



d)

Supplementary fig. S4. Energy control through monitor reactions: a) $^{27}\text{Al}(^3\text{He},x)^{24}\text{Na}$; b) $^{\text{nat}}\text{Ti}(^3\text{He},x)^{48}\text{V}$; c) $^{\text{nat}}\text{Cu}(^3\text{He},x)^{66}\text{Ga}$; d) $^{\text{nat}}\text{Cu}(^3\text{He},x)^{65}\text{Zn}$