

$^{154}\text{Sm}(\text{p},4\text{n}\gamma)$ 1983Bo23

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 110, 1 (2009)	20-Nov-2008

E=30-45 MeV.

1983Bo23: measured γ , $\gamma\gamma$, $\gamma(\theta)$ and excitation functions.For levels and radiation data, consult ENSDF database (<http://www.nndc.bnl.gov/ensdf/>) and/or Nuclear Data Sheets 80, 263 (1997). ^{151}Eu Levels

E(level)	J^π [†]	E(level)	J^π [†]	E(level)	J^π [†]	E(level)	J^π [†]
0.0	5/2 ⁺	353.8 3	5/2 ⁻ , 7/2 ⁻	611.4 3	13/2 ⁻	957.2 5	19/2 ⁻
21.542 3	7/2 ⁺	415.7 2	(7/2 ⁺)	632.7?‡ 5		973.1 4	(15/2 ⁺)
196.3 3	11/2 ⁻	499.7 2	(7/2 ⁺)	697.2 4		1040.7 4	17/2 ⁻
196.4 2	(3/2 ⁺)	502.2 4	15/2 ⁻	698.3 4	(11/2 ⁻)	1093.3 4	
243.3 3	7/2 ⁻	503.3 3	9/2 ⁺	714.8 3	(9/2 ⁺)	1113.3 5	15/2 ⁺
260.5 2	5/2 ⁺	511.0 2	(11/2 ⁺)	718.7 5	(7/2 ⁺ , 9/2 ⁺)	1220.6 5	(17/2 ⁺)
307.1 3	(5/2 ⁺)	522.0 4		735.0 3		1463.4 5	19/2 ⁺
307.5 2	(7/2 ⁺)	546.2 5	(5/2 ⁺)	752.3 3	13/2 ⁺	1503.0 6	(23/2 ⁻)
307.8 2	(9/2 ⁺)	580.2 4		789.9 4	(7/2, 11/2)	1506.4 5	19/2 ⁺
332.3 3	3/2 ⁺ , 5/2 ⁺	587.1 5		881.6 4	(11/2 ⁻)	1563.5 5	21/2 ⁻
336.2 4		600.5 3		943? 1		1996.9 6	(23/2 ⁺)
349.8 3	9/2 ⁻	600.6 4		945.9 4		2151.0 6	25/2 ⁻

[†] From 'Adopted Levels'.[‡] From (p,4n γ) (1983Bo23) only. $\gamma(^{151}\text{Eu})$

E_γ	I_γ [†]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
21.542 3		21.542	7/2 ⁺	0.0	5/2 ⁺	E $_\gamma$: from 'adopted gammas'.
84 1		1040.7	17/2 ⁻	957.2	19/2 ⁻	
109.2 3	13.0 5	611.4	13/2 ⁻	502.2	15/2 ⁻	
110.8 3	7.6 5	307.1	(5/2 ⁺)	196.4	(3/2 ⁺)	
139.8 3	4.9 5	336.2		196.4	(3/2 ⁺)	
149.9 3	2.9 4	499.7	(7/2 ⁺)	349.8	9/2 ⁻	
153.6 3	34.1 6	349.8	9/2 ⁻	196.3	11/2 ⁻	
155.2 3	4.1 3	415.7	(7/2 ⁺)	260.5	5/2 ⁺	
174.7 3	100.0 8	196.3	11/2 ⁻	21.542	7/2 ⁺	
192.8 3	4.8 5	499.7	(7/2 ⁺)	307.1	(5/2 ⁺)	
196.5 3	33.6 6	196.4	(3/2 ⁺)	0.0	5/2 ⁺	
203.2 3	7.4 6	511.0	(11/2 ⁺)	307.8	(9/2 ⁺)	
211.4 3	4.3 6	714.8	(9/2 ⁺)	503.3	9/2 ⁺	
238.9 3	11.0 7	260.5	5/2 ⁺	21.542	7/2 ⁺	
241.4 3	9.6 6	752.3	13/2 ⁺	511.0	(11/2 ⁺)	
243.3 3	33.8 7	243.3	7/2 ⁻	0.0	5/2 ⁺	
260.5 3	5.6 7	260.5	5/2 ⁺	0.0	5/2 ⁺	I $_\gamma$: out of total I $_\gamma$ =6.6 7, I $_\gamma$ =1.0 1 is assigned (by evaluator) to a 260 γ from 503 level, based on results from Coul. ex.
261.6 3	8.5 7	611.4	13/2 ⁻	349.8	9/2 ⁻	
279‡		522.0		243.3	7/2 ⁻	
286.3 3	65.2 9	307.8	(9/2 ⁺)	21.542	7/2 ⁺	
302.9 3	4.1 7	546.2	(5/2 ⁺)	243.3	7/2 ⁻	Complex line.
306.0 3	154 1	502.2	15/2 ⁻	196.3	11/2 ⁻	
307.5 3	41.9 8	307.5	(7/2 ⁺)	0.0	5/2 ⁺	

Continued on next page (footnotes at end of table)

$^{154}\text{Sm}(\text{p},4\text{n}\gamma)$ **1983Bo23** (continued) $\gamma(^{151}\text{Eu})$ (continued)

E_γ	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
325 ‡		632.7?		307.8	(9/2) ⁺	
325.6 3	3.0 10	522.0		196.4	(3/2) ⁺	
332.3 3	5.5 8	332.3	3/2 ⁺ , 5/2 ⁺	0.0	5/2 ⁺	
340.1 3	16.9 9	600.6		260.5	5/2 ⁺	
343.8 3	2.4 7	587.1		243.3	7/2 ⁻	I_γ : from adopted branching, $I_\gamma \approx 0.4$ is expected to be from the decay of 697.2 level.
348.6 3	3.7 8	698.3	(11/2) ⁻	349.8	9/2 ⁻	
353.8 3	12.5 9	353.8	5/2 ⁻ , 7/2 ⁻	0.0	5/2 ⁺	
^x 380.4 3	4.6 10					
383.9 3	3.0 9	580.2		196.4	(3/2) ⁺	
389.7 3	3.2 11	697.2		307.5	(7/2) ⁺	
394.1 3	5.3 9	415.7	(7/2) ⁺	21.542	7/2 ⁺	
407.4 3	6.2 10	714.8	(9/2) ⁺	307.5	(7/2) ⁺	
415.1 3	35.6 11	611.4	13/2 ⁻	196.3	11/2 ⁻	I_γ : based on 'adopted gammas', some of the intensity ($I_\gamma \approx 3.8$) may be from 416 level.
^x 421.7 3	2.3 10					
427.4 3	1.9 8	735.0		307.5	(7/2) ⁺	
429.3 3	22.3 9	1040.7	17/2 ⁻	611.4	13/2 ⁻	
436.2 ‡		632.7?		196.3	11/2 ⁻	
441 ‡		943?		502.2	15/2 ⁻	
444.4 3	28.5 10	752.3	13/2 ⁺	307.8	(9/2) ⁺	
455.0 3	55.7 14	957.2	19/2 ⁻	502.2	15/2 ⁻	
462.2 3	21.5 11	973.1	(15/2) ⁺	511.0	(11/2) ⁺	
465.7 3	4.8 12	1506.4	19/2 ⁺	1040.7	17/2 ⁻	
468.3 3	8.4 9	1220.6	(17/2) ⁺	752.3	13/2 ⁺	
475.4 3	5.5 10	718.7	(7/2 ⁺ , 9/2 ⁺)	243.3	7/2 ⁻	
482.1 3	6.4 9	789.9	(7/2, 11/2)	307.8	(9/2) ⁺	
489.4 3	56.9 17	511.0	(11/2) ⁺	21.542	7/2 ⁺	
490.2 3	4 1	1463.4	19/2 ⁺	973.1	(15/2) ⁺	Deexcites a 1001 level (1983Bo23).
499.6 3	7.7 10	499.7	(7/2) ⁺	0.0	5/2 ⁺	
501.9 3	13.3 10	698.3	(11/2) ⁻	196.3	11/2 ⁻	I_γ : combined with 698 and 1114 level.
501.9 3	13.3 10	1113.3	15/2 ⁺	611.4	13/2 ⁻	γ with 698 and 1114 levels.
503.2 3	11.9 13	503.3	9/2 ⁺	0.0	5/2 ⁺	
^x 518.4 3	5.2 12					
522.8 3	11.9 14	1563.5	21/2 ⁻	1040.7	17/2 ⁻	
531.8 3	5.9 9	881.6	(11/2) ⁻	349.8	9/2 ⁻	
533.5 3	5.3 12	1996.9	(23/2) ⁺	1463.4	19/2 ⁺	Deexcites a 1507 level (1983Bo23).
538.4 3	10.7 17	1040.7	17/2 ⁻	502.2	15/2 ⁻	
545.8 3	18.1 18	1503.0	(23/2) ⁻	957.2	19/2 ⁻	
^x 554.9 3	6.9 14					
574 ‡		881.6	(11/2) ⁻	307.8	(9/2) ⁺	
579.0 3	5.6 12	600.5		21.542	7/2 ⁺	
582.4 3	4.8 14	1093.3		511.0	(11/2) ⁺	
587.5 3	2.1 14	2151.0	25/2 ⁻	1563.5	21/2 ⁻	
633 ‡		632.7?		0.0	5/2 ⁺	Additional information 1.
638.1 3	5.5 16	945.9		307.8	(9/2) ⁺	
735.2 ‡		735.0		0.0	5/2 ⁺	

[†] At 35 MeV.[‡] Placement of transition in the level scheme is uncertain.^x γ ray not placed in level scheme.

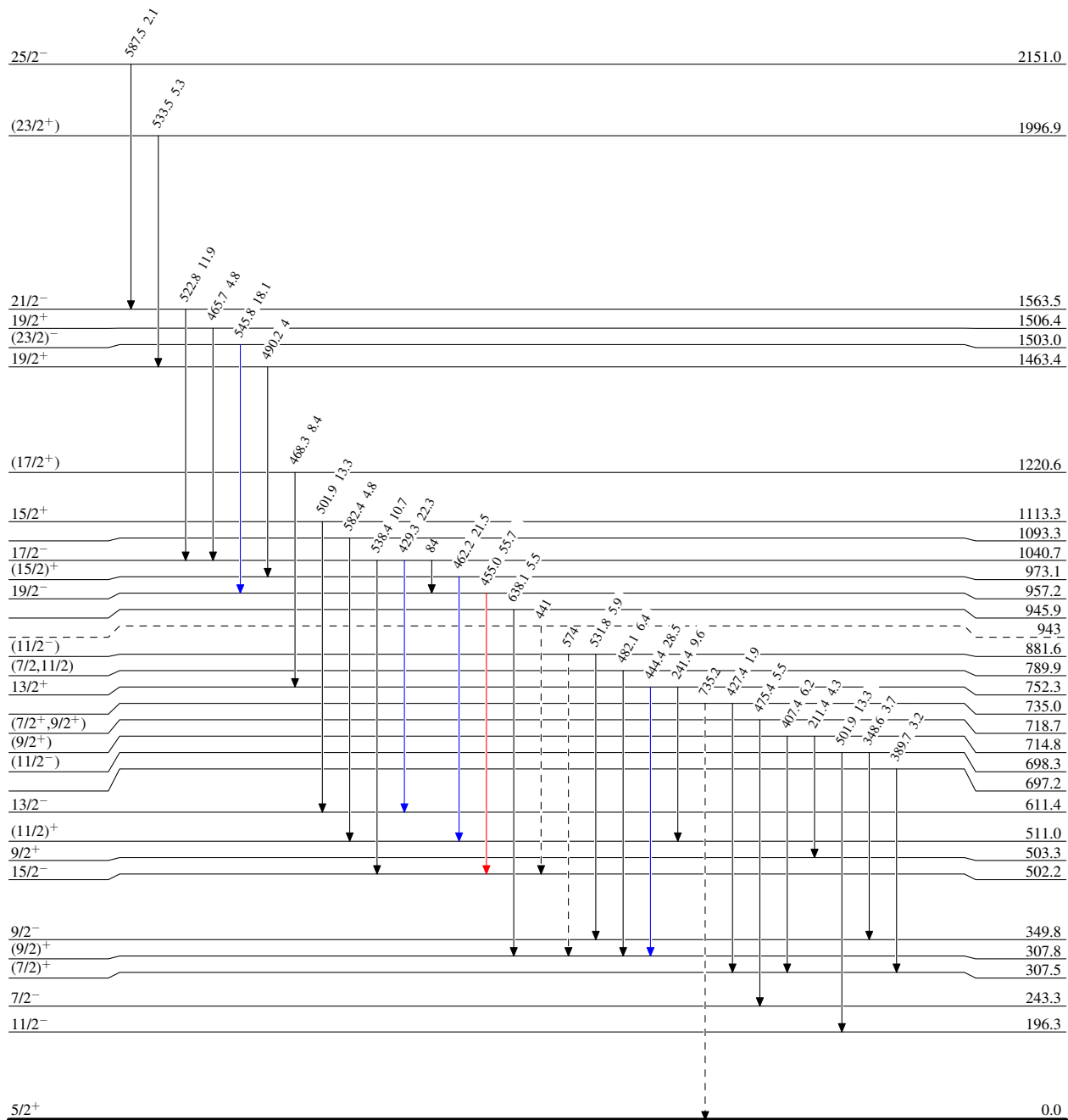
$^{154}\text{Sm}(p,4n\gamma)$ 1983Bo23

Legend

Level Scheme

Intensities: Relative I_γ

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 $\cdots\cdots\cdots\longrightarrow$ γ Decay (Uncertain)

 $^{151}_{63}\text{Eu}_{88}$

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Legend

Level Scheme (continued)

Intensities: Relative I_γ

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 $\cdots\cdots\cdots$ γ Decay (Uncertain)

