^{152}Sm(p,4nγ) 1984Lo17,1986Bo13

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 185, 2 (2022)	23-Aug-2022

1984Lo17: E=30-42 MeV beam from the University of Milan Cyclotron. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, ce, $\gamma\gamma$(t), excitation functions.
1986Bo13: E=26-39 MeV. Measured Eγ, Iγ, $\gamma\gamma$, excitation functions.

^{149}Eu Levels

E(level)[†]	J$^\pi$[‡]	Comments
0.0	5/2$^+$	
149.6 *2*	7/2$^+$[#]	J$^\pi$: 7/2$^-$ in 1984Lo17.
459.9 *3*	3/2$^+$[#]	J$^\pi$: (3/2,5/2)$^+$ in the Adopted Levels.
496.3 *2*	11/2$^-$	
534.5 *2*	7/2$^+$[#]	
666.2 *2*	(9/2$^+$)	
748.8 *2*	7/2$^-$[#]	
794.8 *3*	9/2$^-$	
799.0 *3*	9/2$^+$[#]	
813.4 *6*	5/2$^+$[#]	
875.1? *4*	5/2$^+$[#]	
910.8 *3*	11/2$^+$[#]	J$^\pi$: 7/2$^+$,9/2$^+$ in 1984Lo17.
933.0 *5*	7/2$^+$[#]	J$^\pi$: (9/2)$^+$ in the Adopted Levels.
938.4 *6*	7/2$^+$[#]	
994.8 *3*	15/2$^-$	
1059.4 *5*		J$^\pi$: (9/2$^-$,11/2,13/2) in the Adopted Levels.
1177.2 *3*	13/2$^-$	
1185.0 *4*	(11/2$^+$)[#]	
1333.5 *4*	13/2$^+$[#]	J$^\pi$: (9/2,11/2)$^+$ in 1984Lo17.
1529.0 *4*	15/2$^+$[#]	J$^\pi$: 11/2$^-$,15/2$^-$ in 1984Lo17.
1610.2 *4*	19/2$^-$	
1658 *1*	15/2$^+$[#]	
1764.5 *5*	17/2$^-$	
1999.3 *5*	19/2$^+$[#]	J$^\pi$: 15/2$^-$,17/2$^-$,19/2$^-$ in 1984Lo17.
2335.8 *5*	23/2$^-$	
2342? *1*		J$^\pi$: (21/2)$^+$ in the Adopted Levels.
2497? *1*	(21/2$^-$)[#]	J$^\pi$: (23/2)$^-$ in the Adopted Levels.
2562? *1*	23/2$^+$[#]	
2576.9 *7*	25/2$^-$[#]	J$^\pi$: 21/2,25/2 in 1984Lo17.
2752 *1*	(27/2$^-$)[#]	

[†] From least-squares fit to Eγ data.
[‡] As given by 1984Lo17 and/or 1986Bo13, based on their $\gamma(\theta)$ data and decay patterns. Exceptions are noted. Values from the Adopted Levels are given in comments, when these are quite different from those in 1984Lo17 and/or 1986Bo13.
[#] From 1986Bo13. Assignment is either not given in 1984Lo17 or it is different from that in 1986Bo13 and in the Adopted Levels.

^{152}Sm(p,4nγ) 1984Lo17,1986Bo13 (continued)

$\gamma(^{149}Eu)$

A_2 and A_4 values are from 1984Lo17.

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
149.7 *2*	119 *12*	149.6	7/2$^+$	0.0	5/2$^+$	D	A_2=−0.05 *1*; A_4=−0.004 *10*
154.2 *5*	2.2[&] *7*	1764.5	17/2$^-$	1610.2	19/2$^-$		
161[@c] *1*	0.4[@] *2*	2497?	(21/2$^-$)	2335.8	23/2$^-$		
175 *1*	5.2 *10*	2752	(27/2$^-$)	2576.9	25/2$^-$		A_2=0.00 *6*; A_4=0.00 *8* I_γ: 1.4 (1986Bo13).
182.4 *5*	2.6 *9*	1177.2	13/2$^-$	994.8	15/2$^-$		A_2=+0.05 *6*; A_4=−0.13 *9*
241.1 *5*	2.8 *9*	2576.9	25/2$^-$	2335.8	23/2$^-$	D	A_2=−0.28 *9*; A_4=+0.01 *13*
244.6[a] *5*		910.8	11/2$^+$	666.2	(9/2$^+$)		
264.6[b] *3*	7.5[b] *15*	799.0	9/2$^+$	534.5	7/2$^+$	D	A_2=−0.02 *2*; A_4=+0.01 *3* $\gamma(\theta)$ for composite line.
264.6[b] *3*	7.5[b] *15*	1059.4		794.8	9/2$^-$		
298.5 *2*	12.3 *12*	794.8	9/2$^-$	496.3	11/2$^-$	D	A_2=−0.20 *2*; A_4=−0.008 *20*
346.7 *2*	100 *10*	496.3	11/2$^-$	149.6	7/2$^+$		A_2=−0.02 *1*; A_4=+0.001 *10*
351.6 *5*	2.6 *9*	1529.0	15/2$^+$	1177.2	13/2$^-$	D	A_2=−0.31 *6*; A_4=+0.14 *9*
386.0[b] *5*	4.2[b] *14*	534.5	7/2$^+$	149.6	7/2$^+$		
386.0[b] *3*	4.2[b] *14*	1185.0	(11/2$^+$)	799.0	9/2$^+$		A_2=+0.01 *4*; A_4=0.00 *6*
388.9[a] *5*	2.2 *7*	1999.3	19/2$^+$	1610.2	19/2$^-$		A_2=+0.36 *6*; A_4=−0.16 *8* $\gamma(\theta)$ for composite line.
422.9 *5*	4.5 *15*	1333.5	13/2$^+$	910.8	11/2$^+$		A_2=+0.07 *4*; A_4=+0.06 *6*
459.9[@] *3*	6.0[@] *12*	459.9	3/2$^+$	0.0	5/2$^+$		
470.4 *5*	3.8 *13*	1999.3	19/2$^+$	1529.0	15/2$^+$	(Q)	A_2=+0.25 *6*; A_4=−0.06 *8*
496.4 *3*	6.5[&] *16*	496.3	11/2$^-$	0.0	5/2$^+$	E3	Mult.: from the Adopted Gammas.
498.5 *2*	66 *6*	994.8	15/2$^-$	496.3	11/2$^-$	Q	A_2=+0.23 *1*; A_4=−0.029 *10*
516.6 *2*	19 *2*	666.2	(9/2$^+$)	149.6	7/2$^+$		A_2=+0.24 *14*; A_4=+0.021 *20*
534.3[b] *2*	23.7[b] *24*	534.5	7/2$^+$	0.0	5/2$^+$		A_2=+0.10 *2*; A_4=+0.03 *2* $\gamma(\theta)$ for composite line.
534.3[b] *2*	23.7[b] *24*	1529.0	15/2$^+$	994.8	15/2$^-$		
563[@c] *1*	3[@] *1*	2562?	23/2$^+$	1999.3	19/2$^+$		
615.4 *2*	23.3 *24*	1610.2	19/2$^-$	994.8	15/2$^-$	(Q)	A_2=+0.26 *1*; A_4=+0.02 *2*
663.9[@] *5*	3.9[@] *13*	813.4	5/2$^+$	149.6	7/2$^+$		
666.1 *3*	6 *1*	666.2	(9/2$^+$)	0.0	5/2$^+$	Q	A_2=+0.18 *3*; A_4=−0.07 *4*
667.1 *5*	3.9 *13*	1333.5	13/2$^+$	666.2	(9/2$^+$)		A_2=+0.13 *4*; A_4=+0.20 *6*
680.9 *2*	11.6 *12*	1177.2	13/2$^-$	496.3	11/2$^-$	D	A_2=−0.54 *2*; A_4=+0.11 *3*
725.6[b] *3*	6.3[b] *13*	875.1?	5/2$^+$	149.6	7/2$^+$		Placement from 1986Bo13 only.
725.6[b] *3*	6.3[b] *12*	2335.8	23/2$^-$	1610.2	19/2$^-$	(Q)	A_2=+0.29 *5*; A_4=+0.05 *6*
732[@c] *1*	2[@] *1*	2342?		1610.2	19/2$^-$		
747[a] *1*		1658	15/2$^+$	910.8	11/2$^+$		
748.8 *2*	12.5[&] *12*	748.8	7/2$^-$	0.0	5/2$^+$		
761.3 *2*	16.3 *16*	910.8	11/2$^+$	149.6	7/2$^+$		A_2=+0.15 *2*; A_4=−0.002 *22*
769.8 *5*	3.7 *12*	1764.5	17/2$^-$	994.8	15/2$^-$	D+Q	A_2=−0.62 *6*; A_4=+0.05 *8*
788.9 *5*		938.4	7/2$^+$	149.6	7/2$^+$		
799.0 *3*	7.4[&] *15*	799.0	9/2$^+$	0.0	5/2$^+$		
933.0 *5*	2.9[&] *10*	933.0	7/2$^+$	0.0	5/2$^+$		

[†] From 1984Lo17, unless otherwise stated. Uncertainty=0.2-0.5 keV. The evaluators assign uncertainty of 0.2 (for Iγ>10), 0.3 (for Iγ=5-10) and 0.5 or 1 (for Iγ<5).

Continued on next page (footnotes at end of table)

^{152}Sm(p,4nγ) 1984Lo17,1986Bo13 (continued)

$\gamma(^{149}Eu)$ (continued)

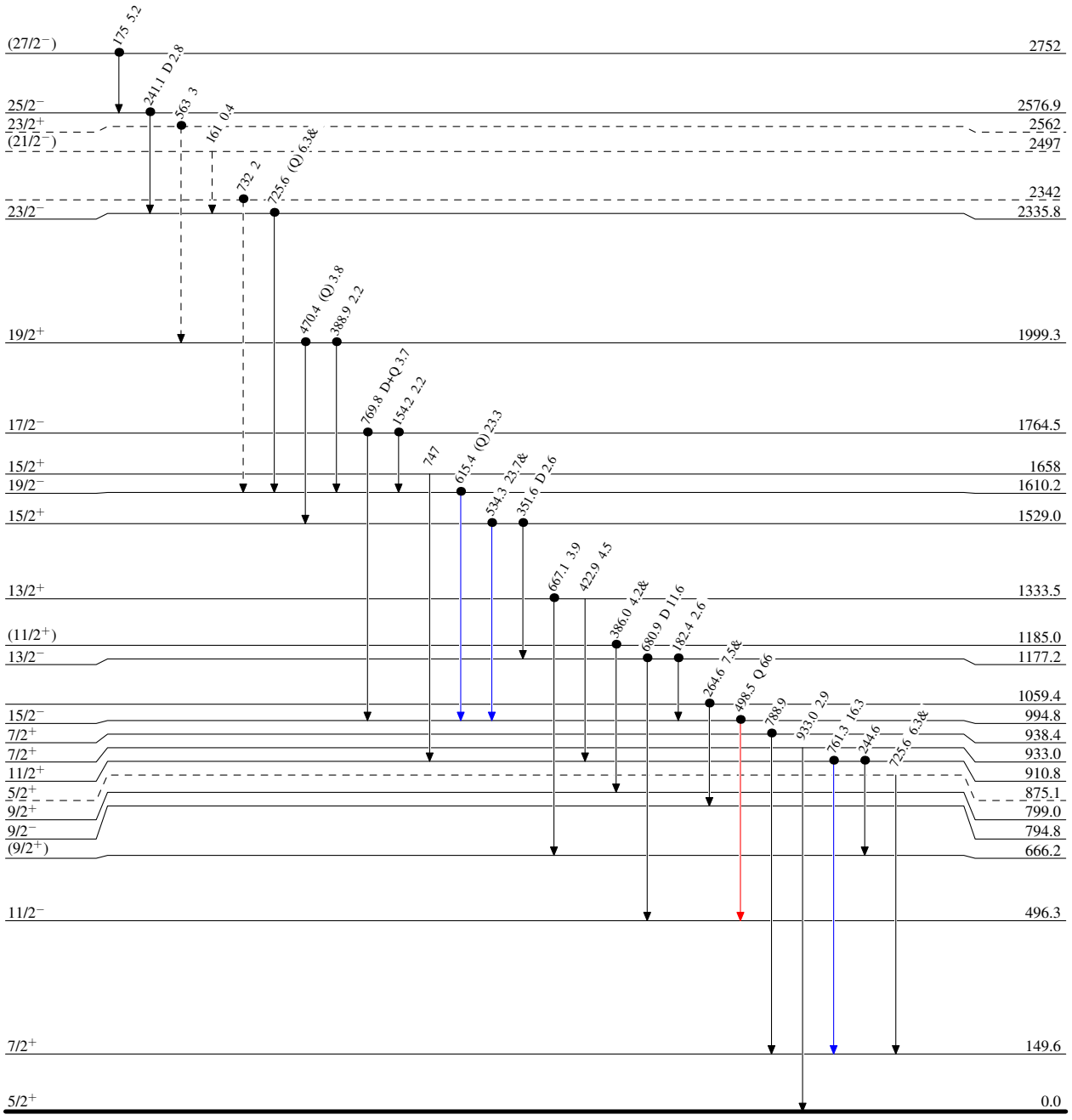
‡ From 1984Lo17 at E=37 MeV unless otherwise stated. Uncertainty=10-30%. Iγ values at 35 and 39 MeV are also available from 1986Bo13. The evaluators assign $\Delta I\gamma$=10% (for Iγ>10), 20% (for Iγ=5-10) and 30% for Iγ<5.
# From $\gamma(\theta)$. Mult=Q; E2 is more likely than M2 from systematics and from no evidence of long-lived states.
@ Reported by 1986Bo13 only.
& From 1986Bo13 at 35 MeV.
a Weak component of a multiplet.
b Multiply placed with undivided intensity.
c Placement of transition in the level scheme is uncertain.

^{152}Sm(p,4nγ) 1984Lo17,1986Bo13

Level Scheme

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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



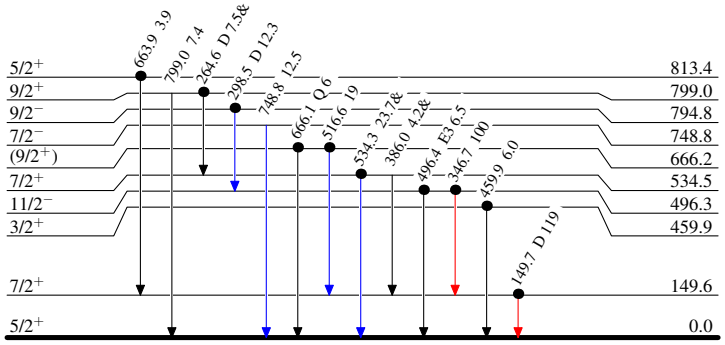
$^{149}_{63}Eu_{86}$

^{152}Sm(p,4nγ) 1984Lo17,1986Bo13

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
Coincidence



$^{149}_{63}Eu_{86}$