

**Adopted Levels, Gammas**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 141, 1 (2017)	1-Feb-2017

Q( $\beta^-$ )=2005 10; S(n)=6644 7; S(p)=10242 9; Q( $\alpha$ )=-1.85×10<sup>3</sup> 5 2017Wa10  
 S(2n)=12032 7; S(2p)=1.935×10<sup>4</sup> 9 2017Wa10  
 Additional information 1.

<sup>158</sup>Sm Levels

Cross Reference (XREF) Flags

- A <sup>252</sup>Cf SF decay
- B <sup>158</sup>Pm  $\beta^-$  decay

E(level) <sup>†</sup>	J $\pi^{\ddagger}$	T <sub>1/2</sub>	XREF	Comments
0.0 <sup>#</sup>	0 <sup>+</sup>	5.30 min 3	AB	% $\beta^-$ =100 T <sub>1/2</sub> : From 1990An31 (and 1988GrZY by same authors); others: 5.51 min 9 (1980Ba51 by same group as 1990An31) and 5.20 min 20 (1986Ma12). Other: from <sup>158</sup> Eu grow-in (1975DoZN).
72.80 <sup>#</sup> 10	(2 <sup>+</sup> )		AB	
240.30 <sup>#</sup> 15	(4 <sup>+</sup> )		A	
498.40 <sup>#</sup> 17	(6 <sup>+</sup> )		A	
842.4 <sup>#</sup> 3	(8 <sup>+</sup> )		A	
1266.8 <sup>#</sup> 4	(10 <sup>+</sup> )		A	
1279.70 <sup>&amp;</sup> 17	(5 <sup>-</sup> )	74 ns 6	A	T <sub>1/2</sub> : adopted in <sup>252</sup> Cf SF decay dataset: weighted average of 72 ns 6 (2014Wa53, quoted by them from their measurement reported in: N.T. Brewer et al in "Fission and Properties of Neutron-rich Nuclei", Sanibel 2012) and 83 ns 12 (2009Si21); Others: 115 ns (1995Zh15; this value also appears in table V of 2009Si21 which seems a misprint); 1973TaZG report that the 167-keV $\gamma$ follows an isomeric level with T <sub>1/2</sub> = 164 ns (presumably the decay from this 5 <sup>-</sup> level was observed). J $\pi$ : assigned by 1995Zh15 and 1998Ga12 in <sup>252</sup> Cf SF decay dataset based on calculations and in analogy with 5 <sup>-</sup> level in <sup>156</sup> Sm at 1397 keV, and sustained by transitions to (4 <sup>+</sup> ) and (6 <sup>+</sup> ). Dominant configuration= $\nu$ 5/2[642]@ $\nu$ 5/2[523].
1322.3 <sup>b</sup> 4	(5 <sup>-</sup> )		A	J $\pi$ : associated by 2014Wa53 ( <sup>252</sup> Cf SF decay dataset) with the predicted second (5 <sup>-</sup> )-based band and partially sustained by the transition to (4 <sup>+</sup> ) (however the transition to (6 <sup>+</sup> ) as in the case of first (5 <sup>-</sup> )-based band was not identified). Dominant configuration= $\pi$ 5/2[532]@ $\pi$ 5/2[413].
1391.4 <sup>@</sup> 3	(6 <sup>-</sup> )		A	
1422.3 <sup>a</sup> 5	(6 <sup>-</sup> )		A	
1521.7 <sup>&amp;</sup> 3	(7 <sup>-</sup> )		A	
1540.9 <sup>b</sup> 5	(7 <sup>-</sup> )		A	
1670.1 <sup>@</sup> 4	(8 <sup>-</sup> )		A	
1679.8 <sup>a</sup> 6	(8 <sup>-</sup> )		A	
1765.8 <sup>#</sup> 4	(12 <sup>+</sup> )		A	
1836.2 <sup>b</sup> 6	(9 <sup>-</sup> )		A	
1836.9 <sup>&amp;</sup> 4	(9 <sup>-</sup> )		A	
2012.8 <sup>a</sup> 7	(10 <sup>-</sup> )		A	
2021.5 <sup>@</sup> 5	(10 <sup>-</sup> )		A	
2206.2 <sup>b</sup> 7	(11 <sup>-</sup> )		A	

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**Adopted Levels, Gammas (continued)**

<sup>158</sup>Sm Levels (continued)

<u>E(level)<sup>†</sup></u>	<u>J<sup>π</sup><sup>‡</sup></u>	<u>XREF</u>	<u>E(level)<sup>†</sup></u>	<u>J<sup>π</sup><sup>‡</sup></u>	<u>XREF</u>	<u>E(level)<sup>†</sup></u>	<u>J<sup>π</sup><sup>‡</sup></u>	<u>XREF</u>
2224.6 <sup>&amp;</sup> 5	(11 <sup>-</sup> )	A	2443.8 <sup>@</sup> 7	(12 <sup>-</sup> )	A	2967.3 <sup>?#</sup> 5	(16 <sup>+</sup> )	A
2334.3 <sup>#</sup> 5	(14 <sup>+</sup> )	A	2682.4 <sup>&amp;</sup> 7	(13 <sup>-</sup> )	A	3489.2 <sup>@</sup> 9	(16 <sup>-</sup> )	A
2418.9 <sup>a</sup> 8	(12 <sup>-</sup> )	A	2934.4 <sup>@</sup> 7	(14 <sup>-</sup> )	A	4097.8 <sup>?@</sup> 12	(18 <sup>-</sup> )	A

<sup>†</sup> From least-square's fit to the E $\gamma$ 's.

<sup>‡</sup> Based on the rotational character, systematics, and theoretical calculations.

# Band(A): K $\pi$ =0<sup>+</sup> yrast band.

@ Band(B): K $\pi$ =(5<sup>-</sup>) band based on 1279.7 level, $\alpha$ =0.

& Band(b): K $\pi$ =(5<sup>-</sup>) band based on 1279.7 level, $\alpha$ =1.

<sup>a</sup> Band(C): K $\pi$ =(5<sup>-</sup>) band based on 1322.3 level, $\alpha$ =0.

<sup>b</sup> Band(c): K $\pi$ =(5<sup>-</sup>) band based on 1322.3 level, $\alpha$ =1.

$\gamma(^{158}\text{Sm})$

<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub><math>\gamma</math></sub><sup>‡</sup></u>	<u>I<sub><math>\gamma</math></sub><sup>‡</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Mult.</u>	<u><math>\alpha</math><sup>†</sup></u>	<u>Comments</u>
72.80	(2 <sup>+</sup> )	72.8 1	100	0.0	0 <sup>+</sup>	[E2]	7.62	$\alpha(K)=2.61$ 4; $\alpha(L)=3.89$ 6; $\alpha(M)=0.905$ 14 $\alpha(N)=0.198$ 3; $\alpha(O)=0.0245$ 4; $\alpha(P)=0.0001096$ 16
240.30	(4 <sup>+</sup> )	167.5 1	100	72.80	(2 <sup>+</sup> )	[E2]	0.380	$\alpha(K)=0.259$ 4; $\alpha(L)=0.0942$ 14; $\alpha(M)=0.0215$ 3 $\alpha(N)=0.00474$ 7; $\alpha(O)=0.000620$ 9; $\alpha(P)=1.234\times 10^{-5}$ 18
498.40	(6 <sup>+</sup> )	258.1 1	100	240.30	(4 <sup>+</sup> )	[E2]	0.0904	$\alpha(K)=0.0687$ 10; $\alpha(L)=0.01691$ 24; $\alpha(M)=0.00379$ 6 $\alpha(N)=0.000842$ 12; $\alpha(O)=0.0001143$ 16; $\alpha(P)=3.59\times 10^{-6}$ 5
842.4	(8 <sup>+</sup> )	344.0 2	100	498.40	(6 <sup>+</sup> )	[E2]	0.0370	$\alpha(K)=0.0293$ 5; $\alpha(L)=0.00600$ 9; $\alpha(M)=0.001330$ 19 $\alpha(N)=0.000297$ 5; $\alpha(O)=4.13\times 10^{-5}$ 6; $\alpha(P)=1.613\times 10^{-6}$ 23
1266.8	(10 <sup>+</sup> )	424.4 2	100	842.4	(8 <sup>+</sup> )	[E2]	0.0201	$\alpha(K)=0.01628$ 23; $\alpha(L)=0.00299$ 5; $\alpha(M)=0.000657$ 10 $\alpha(N)=0.0001471$ 21; $\alpha(O)=2.08\times 10^{-5}$ 3; $\alpha(P)=9.21\times 10^{-7}$ 13
1279.70	(5 <sup>-</sup> )	781.3 2	39 3	498.40	(6 <sup>+</sup> )	[E1]	1.66 $\times 10^{-3}$	$\alpha(K)=0.001429$ 20; $\alpha(L)=0.000186$ 3; $\alpha(M)=3.95\times 10^{-5}$ 6 $\alpha(N)=8.92\times 10^{-6}$ 13; $\alpha(O)=1.332\times 10^{-6}$ 19; $\alpha(P)=8.23\times 10^{-8}$ 12 B(E1)(W.u.)=1.8 $\times 10^{-9}$ 3
		1039.4 1	100 11	240.30	(4 <sup>+</sup> )	[E1]	9.60 $\times 10^{-4}$	$\alpha(K)=0.000825$ 12; $\alpha(L)=0.0001059$ 15; $\alpha(M)=2.25\times 10^{-5}$ 4 $\alpha(N)=5.09\times 10^{-6}$ 8; $\alpha(O)=7.62\times 10^{-7}$ 11; $\alpha(P)=4.78\times 10^{-8}$ 7 B(E1)(W.u.)=2.0 $\times 10^{-9}$ 4
1322.3	(5 <sup>-</sup> )	1082.0 3	100	240.30	(4 <sup>+</sup> )	[E1]	8.91 $\times 10^{-4}$	$\alpha(K)=0.000767$ 11; $\alpha(L)=9.82\times 10^{-5}$ 14; $\alpha(M)=2.09\times 10^{-5}$ 3 $\alpha(N)=4.72\times 10^{-6}$ 7; $\alpha(O)=7.07\times 10^{-7}$ 10; $\alpha(P)=4.44\times 10^{-8}$ 7
1391.4	(6 <sup>-</sup> )	111.7 3	100	1279.70	(5 <sup>-</sup> )			

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**Adopted Levels, Gammas (continued)** $\gamma(^{158}\text{Sm})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\ddagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$	$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\ddagger$	$I_\gamma^\ddagger$	$E_f$	$J_f^\pi$
1422.3	(6 <sup>-</sup> )	100.0 5	100	1322.3	(5 <sup>-</sup> )	2021.5	(10 <sup>-</sup> )	184.6 5	25 5	1836.9	(9 <sup>-</sup> )
1521.7	(7 <sup>-</sup> )	130.3 3	100 6	1391.4	(6 <sup>-</sup> )			351.4 3	100 9	1670.1	(8 <sup>-</sup> )
		242.0 3	57 4	1279.70	(5 <sup>-</sup> )	2206.2	(11 <sup>-</sup> )	193.4 5	50 13	2012.8	(10 <sup>-</sup> )
1540.9	(7 <sup>-</sup> )	118.6 3	100 15	1422.3	(6 <sup>-</sup> )			370.0 5	100 13	1836.2	(9 <sup>-</sup> )
		218.6 5	65 10	1322.3	(5 <sup>-</sup> )	2224.6	(11 <sup>-</sup> )	203.1 5	<4	2021.5	(10 <sup>-</sup> )
1670.1	(8 <sup>-</sup> )	148.4 3	76 7	1521.7	(7 <sup>-</sup> )			387.7 3	100 18	1836.9	(9 <sup>-</sup> )
		278.7 3	100 10	1391.4	(6 <sup>-</sup> )	2334.3	(14 <sup>+</sup> )	568.5 2	100	1765.8	(12 <sup>+</sup> )
1679.8	(8 <sup>-</sup> )	138.9 5	27 4	1540.9	(7 <sup>-</sup> )	2418.9	(12 <sup>-</sup> )	212.7 <sup>#</sup> 5		2206.2	(11 <sup>-</sup> )
		257.5 3	100 15	1422.3	(6 <sup>-</sup> )			406.1 5	100 20	2012.8	(10 <sup>-</sup> )
1765.8	(12 <sup>+</sup> )	499.0 2	100	1266.8	(10 <sup>+</sup> )	2443.8	(12 <sup>-</sup> )	422.3 5	100	2021.5	(10 <sup>-</sup> )
1836.2	(9 <sup>-</sup> )	156.4 5	31 6	1679.8	(8 <sup>-</sup> )	2682.4	(13 <sup>-</sup> )	457.8 5	100	2224.6	(11 <sup>-</sup> )
		295.3 5	100 13	1540.9	(7 <sup>-</sup> )	2934.4	(14 <sup>-</sup> )	490.6 2	100	2443.8	(12 <sup>-</sup> )
1836.9	(9 <sup>-</sup> )	166.8 3	90 8	1670.1	(8 <sup>-</sup> )	2967.3?	(16 <sup>+</sup> )	633.0 2	100	2334.3	(14 <sup>+</sup> )
		315.2 3	100 10	1521.7	(7 <sup>-</sup> )	3489.2	(16 <sup>-</sup> )	554.8 5	100	2934.4	(14 <sup>-</sup> )
2012.8	(10 <sup>-</sup> )	176.6 5	46 23	1836.2	(9 <sup>-</sup> )	4097.8?	(18 <sup>-</sup> )	609 <sup>#</sup> 1	100	3489.2	(16 <sup>-</sup> )
		333.0 5	100 14	1679.8	(8 <sup>-</sup> )						

† Additional information 2.

‡ From  $^{252}\text{Cf}$  SF decay.

# Placement of transition in the level scheme is uncertain.

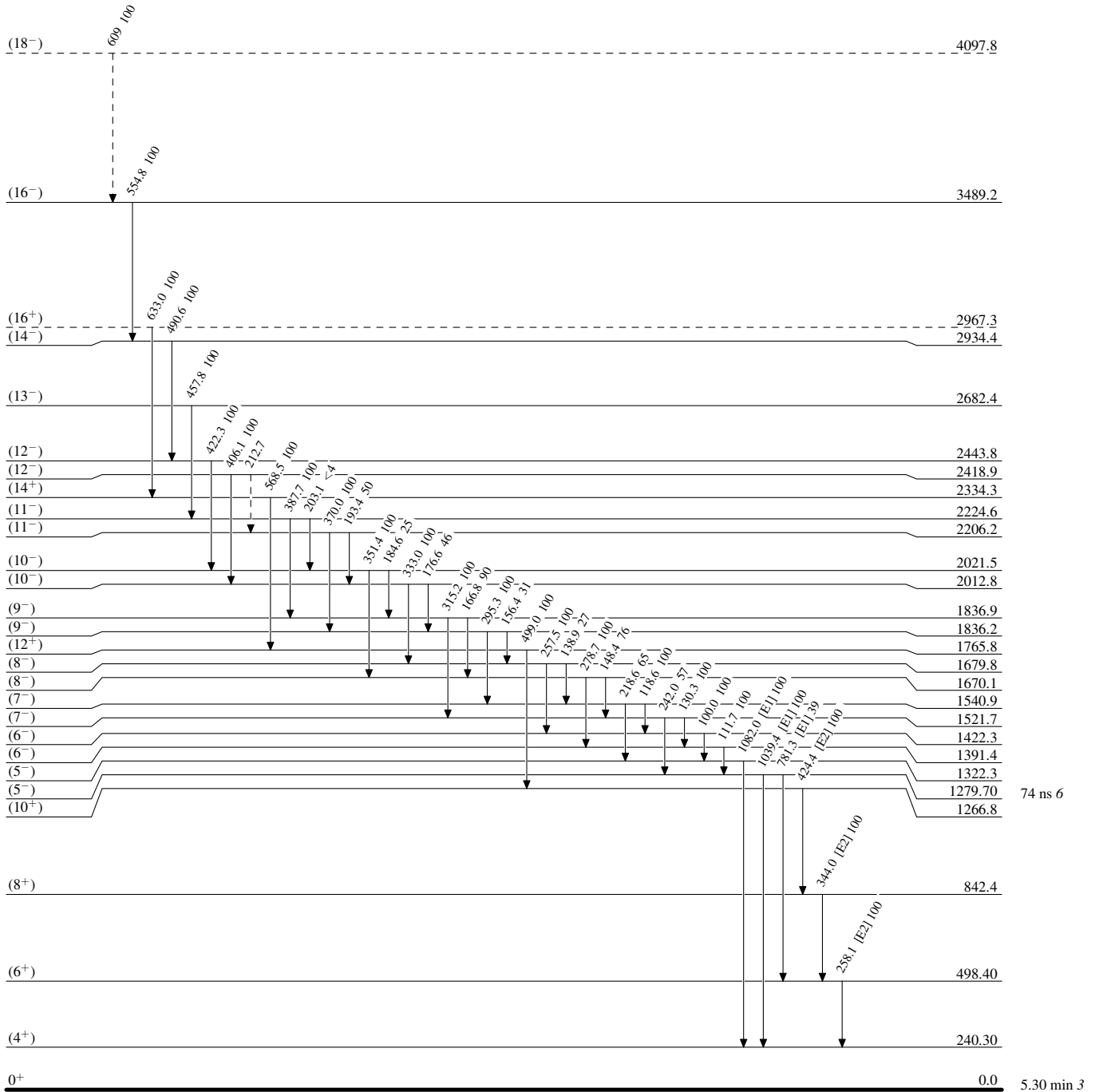
**Adopted Levels, Gammas**

Legend

**Level Scheme**

Intensities: Relative photon branching from each level

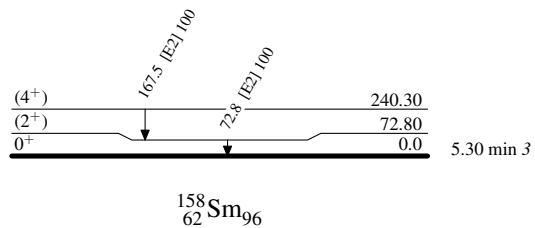
----->  $\gamma$  Decay (Uncertain)



<sup>158</sup>Sm<sub>96</sub>

**Adopted Levels, Gammas****Level Scheme (continued)**

Intensities: Relative photon branching from each level



Adopted Levels, Gammas

