^{248}Cm SF decay 1996Ur02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	N. Nica and B. Singh	NDS 181, 1 (2022)	9-Mar-2022

Parent: ^{248}Cm: E=0.0; $J^\pi=0^+$; $T_{1/2}=3.48\times10^5$ y *6*; %SF decay=8.39 *16*

^{248}Cm-Data from 2014Ma86 (Adopted Levels).

1996Ur02: measured $\gamma\gamma\gamma$ coincidence with Eurogam2 array with 52 Compton-suppressed Ge detectors and 4 LEPS detectors. ^{147}La identified by transitions depopulating the previously known levels 74.3 keV, 120.8 keV, and 167.4 keV in ^{147}La (observed in β^- decay of ^{147}Ba, 1992De38).

Theory: 1996Ur02 show that the octupole correlations in n-rich La isotopes are similar in strength to those in their Ba core nuclei, and stronger than in Cs isotopes, in contradiction with theoretical predictions (1985Le04).

^{147}La Levels

E(level)[†]	J^π[‡]	Comments
0.0	$(5/2^+)$	
15.6		
74.3		
120.8		
167.4	$(7/2^-)$	J^π: $(3/2^-,7/2^-)$ from stretched E1 γ to g.s.; 1996Ur02 exclude $(3/2^-)$, which would give J(229)=$(3/2^-,5/2^-,7/2^-)$, and would make 229 level populated in ^{147}Ba β^- decay (from $(5/2^-)$) and γ decay directly to ^{147}La g.s. – neither of them observed (see also 229 level).
229.2[&]	$(11/2^-)$[#]	J^π: E2 γ to $(7/2^-)$ (1996Ur02 implicitly exclude $(9/2^-)$; smaller values excluded by arguments at 167 level).
441.0[&]	$(15/2^-)$[#]	
787.4[&]	$(19/2^-)$[#]	
1109.7?[a]	(17/2)[@]	
1241.8[&]	$(23/2^-)$[#]	
1357.6[a]	(21/2)[@]	J^π: explicitly assigned by 1996Ur02, based on excitation energy and decay pattern (most likely by analogy to ^{146}Ba octupole band).
1589.1[b]		
1729.6[a]	(25/2)[@]	
1770.6[&]	$(27/2^-)$[#]	
1963.9[b]		
2115.9[a]	(29/2)[@]	
2309.6[&]	$(31/2^-)$[#]	
2310.9[b]		
2519.3[a]	(33/2)[@]	
2753.2[&]	$(35/2^-)$[#]	

[†] From 1996Ur02.

[‡] From 1996Ur02 from γ multipolarities based on angular correlations (no values given), α(exp), α(K)exp, and systematics (^{144}Ba, ^{146}Ba, ^{145}La).

[#] Based on stretched E2 intra-band transitions (based on 1996Ur02 by angular correlations).

[@] Assigned by 1996Ur02 (most likely by analogy to ^{146}Ba octupole band).

[&] Band(A): Band 1 (the excitation scheme above 229 keV level resembles the g.s. band in ^{146}Ba with an octupole band decaying to it (1996Ur02)).

[a] Band(B): Band 2 (similar to the octupole band in ^{146}Ba).

[b] Band(C): band 3.

^{248}Cm SF decay 1996Ur02 (continued)

$\gamma(^{147}La)$

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
(15.7)	15.6		0.0	$(5/2^+)$		
46.5	120.8		74.3			
46.6	167.4	$(7/2^-)$	120.8			
61.8	229.2	$(11/2^-)$	167.4	$(7/2^-)$	E2	α(exp)=12 *2*; α(K)exp=6 *1* (1996Ur02) Mult.: based on α(exp), α(K)exp from coincidence data.
74.3	74.3		0.0	$(5/2^+)$		
93.0	167.4	$(7/2^-)$	74.3			
105.3	120.8		15.6			
120.8	120.8		0.0	$(5/2^+)$		
167.4	167.4	$(7/2^-)$	0.0	$(5/2^+)$	E1	α(exp)=0.05 *2* (1996Ur02) Mult.: based on α(exp) from coincidence data.
195.0	2310.9		2115.9	(29/2)		
209‡	2519.3	(33/2)	2309.6	$(31/2^-)$		
211.8	441.0	$(15/2^-)$	229.2	$(11/2^-)$	(E2)†	
231.5	1589.1		1357.6	(21/2)		
234‡	2753.2	$(35/2^-)$	2519.3	(33/2)		
234.5	1963.9		1729.6	(25/2)		
345.3	2115.9	(29/2)	1770.6	$(27/2^-)$		
346.4	787.4	$(19/2^-)$	441.0	$(15/2^-)$	(E2)†	
347.0	2310.9		1963.9			
371.8	1729.6	(25/2)	1357.6	(21/2)		
374.5	1963.9		1589.1			
386.3	2115.9	(29/2)	1729.6	(25/2)		
403.4	2519.3	(33/2)	2115.9	(29/2)		
443.6	2753.2	$(35/2^-)$	2309.6	$(31/2^-)$	(E2)†	
454.4	1241.8	$(23/2^-)$	787.4	$(19/2^-)$	(E2)†	
487.8	1729.6	(25/2)	1241.8	$(23/2^-)$		
528.8	1770.6	$(27/2^-)$	1241.8	$(23/2^-)$	(E2)†	
539.0	2309.6	$(31/2^-)$	1770.6	$(27/2^-)$	(E2)†	
570.2	1357.6	(21/2)	787.4	$(19/2^-)$		
668.7‡	1109.7?	(17/2)	441.0	$(15/2^-)$		

† Quadrupole transition (from angular correlations) situated in band 1, most likely (E2) transition (1996Ur02).
‡ Placement of transition in the level scheme is uncertain.

Legend

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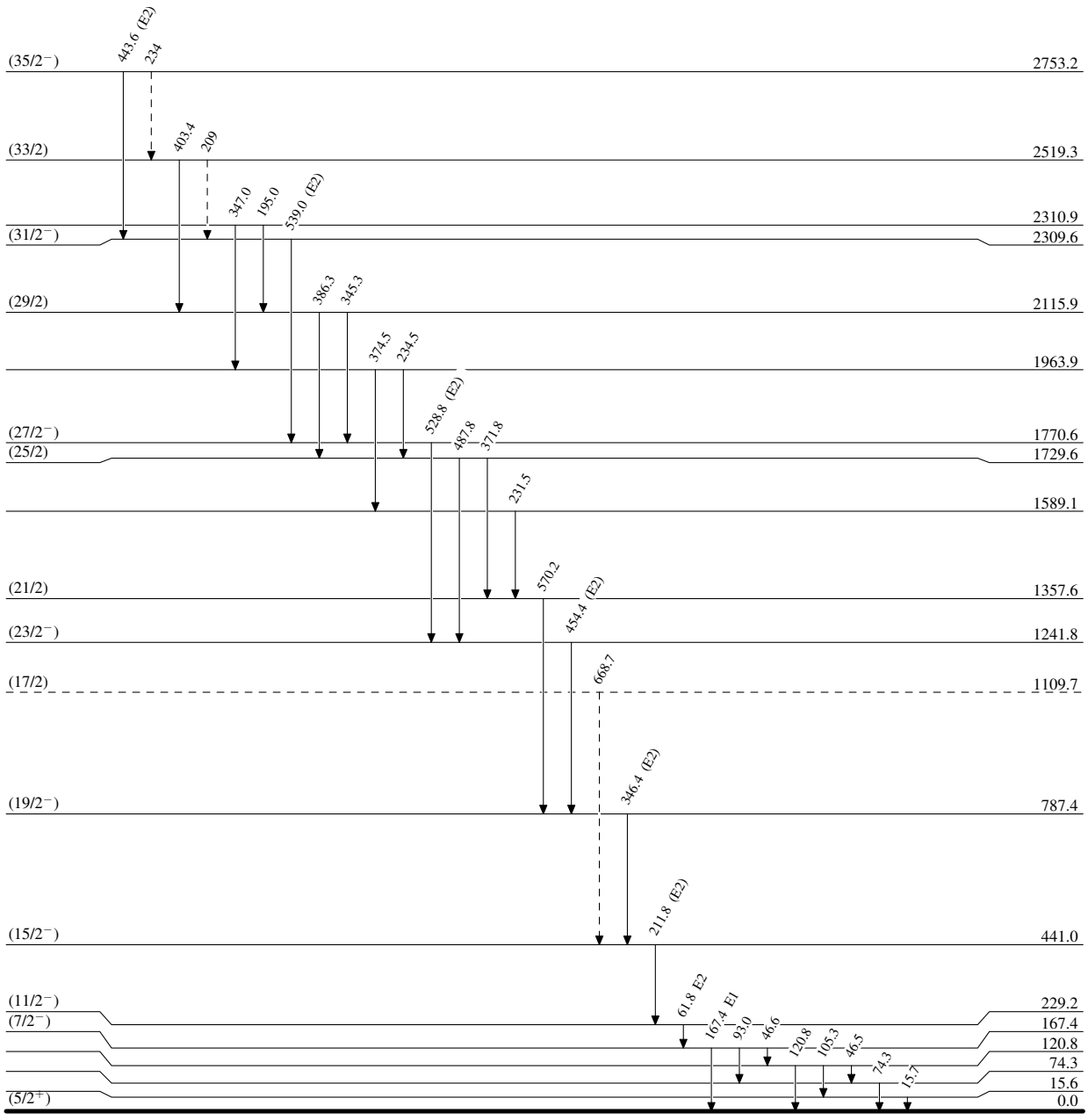
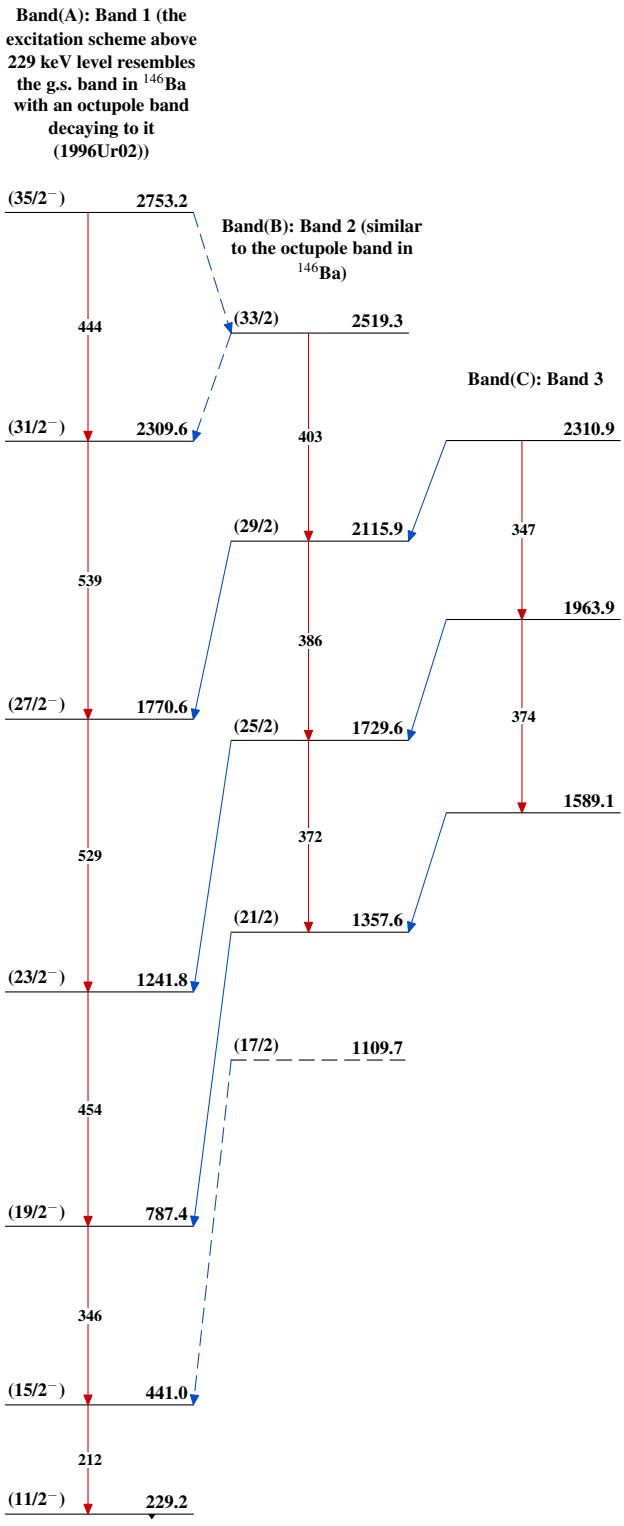
Level Scheme

γ Decay (Uncertain)



$^{147}_{57}La_{90}$

^{248}Cm SF decay 1996Ur02



$^{147}_{57}La_{90}$