^{252}Cf SF decay 2009Ur04,2008Hw03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	07-June-2023

Parent: ^{252}Cf: E=0.0; $J^\pi=0^+$; $T_{1/2}$=2.647 y *3*; %SF decay=3.102 *3*

^{252}Cf-$T_{1/2}$: From ^{252}Cf Adopted Levels in the ENSDF database (June 2021 update).

^{252}Cf-%SF decay: From ^{252}Cf Adopted Levels in the ENSDF database (June 2021 update).

2009Ur04: γ radiation studied using the Gammasphere array, with ^{252}Cf spontaneous-fission source. Measured Eγ, Iγ, triple and higher-fold $\gamma\gamma$-coin using the Gammasphere array of anti-Compton HPGe detectors at Argonne National Laboratory. Comparison with quasiparticle rotor model calculations. Authors reported α=+1/2 members of the g.s. band up to (29/2$^-$), and ten levels assigned as the bandhead and excited states of an ν11/2[505] band. Comparison with quasiparticle rotor model calculations.

2008Hw03: γ radiation studied using the Gammasphere array (at LBNL) containing 101 HPGe detectors, with a ^{252}Cf spontaneous-fission source. Measured Eγ, triple and higher-fold $\gamma\gamma$-coin. Reported six excited states and six (E2) γ transitions associated with ΔJ=2, g.s. band, with ν5/2[523] configuration, but with no explicit J^π assignments were listed in authors' Fig. 4 level scheme.

^{159}Sm Levels

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0[#]	5/2$^-$	11.37 s *15*	
163.7[#]	(9/2$^-$)		
407.1[#]	(13/2$^-$)		
728.1[#]	(17/2$^-$)		
1124.0[#]	(21/2$^-$)		
1276.8[&]	(11/2$^-$)	115 ns *10*	$T_{1/2}$: from fitting the time spectrum for 869.7γ (2009Ur04); note that authors quote 116 ns *8* in the abstract, but 115 ns *10* in level-scheme Fig. 5 and in the text. Proposed configuration=ν11/2[505] extruder orbital (2009Ur04).
1419.5[@]	(13/2$^-$)		
1578.6[&]	(15/2$^-$)		
1592.1[#]	(25/2$^-$)		
1754.5[@]	(17/2$^-$)		
1946.2[&]	(19/2$^-$)		
2128.8[#]	(29/2$^-$)		
2154.1[@]	(21/2$^-$)		
2378.0[&]	(23/2$^-$)		
2616.5[@]	(25/2$^-$)		
2872[&]	(27/2$^-$)		
3142[@]	(29/2$^-$)		

[†] From least-squares fit to the Eγ data, assuming a general uncertainty of 0.3 keV in Eγ, except that 1 keV is assigned when Eγ quoted to nearest keV.

[‡] 2009Ur04 listed J^π values for the g.s. band but, except for the 11/2$^-$ bandhead, do not list these for the excited members of this band. Evaluator has listed them here, regarding them as quite reasonable and consistent with the authors' discussion. No J^π assignments were explicitly listed in level-scheme Fig. 4 of 2008Hw03, although, the γ transitions were proposed as E2, and the ΔJ=2 band was assigned ν5/2[523].

[#] Band(A): ν5/2[523] band. Band assignment from 2009Ur04 and 2008Hw03. The unfavored branch of this band was not observed (2009Ur04).

[@] Band(B): ν11/2[505] band, α=+1/2.

[&] Band(C): ν11/2[505] band, α=−1/2.

^{252}Cf SF decay 2009Ur04,2008Hw03 (continued)

$\gamma(^{159}Sm)$

E_i(level)	J_i^π	E_γ[†]	I_γ	E_f	J_f^π	Comments
163.7	(9/2$^-$)	163.7		0.0	5/2$^-$	Eγ=163.4 (2008Hw03).
407.1	(13/2$^-$)	243.4		163.7	(9/2$^-$)	Eγ=243.4 (2008Hw03).
728.1	(17/2$^-$)	321.0		407.1	(13/2$^-$)	Eγ=321.3 (2008Hw03).
1124.0	(21/2$^-$)	395.9		728.1	(17/2$^-$)	Eγ=396.3 (2008Hw03).
1276.8	(11/2$^-$)	869.7		407.1	(13/2$^-$)	
1419.5	(13/2$^-$)	142.7		1276.8	(11/2$^-$)	
1578.6	(15/2$^-$)	159.2	330 *70*	1419.5	(13/2$^-$)	
		302.7	100	1276.8	(11/2$^-$)	E_γ: Level-energy difference=301.8.
1592.1	(25/2$^-$)	468.1		1124.0	(21/2$^-$)	Eγ=468.1 (2008Hw03).
1754.5	(17/2$^-$)	175.8	210 *40*	1578.6	(15/2$^-$)	
		335.1	100	1419.5	(13/2$^-$)	
1946.2	(19/2$^-$)	191.8		1754.5	(17/2$^-$)	
		367.5		1578.6	(15/2$^-$)	
2128.8	(29/2$^-$)	536.7		1592.1	(25/2$^-$)	Eγ=537.3 (2008Hw03).
2154.1	(21/2$^-$)	207.9		1946.2	(19/2$^-$)	
		400.5		1754.5	(17/2$^-$)	
2378.0	(23/2$^-$)	223.9		2154.1	(21/2$^-$)	
		432.0		1946.2	(19/2$^-$)	
2616.5	(25/2$^-$)	238.5		2378.0	(23/2$^-$)	
		462.4		2154.1	(21/2$^-$)	
2872	(27/2$^-$)	255		2616.5	(25/2$^-$)	
		494.0		2378.0	(23/2$^-$)	
3142	(29/2$^-$)	270		2872	(27/2$^-$)	
		525		2616.5	(25/2$^-$)	

[†] From 2009Ur04. Values from 2008Hw03 are in general agreement, and are listed in comments.

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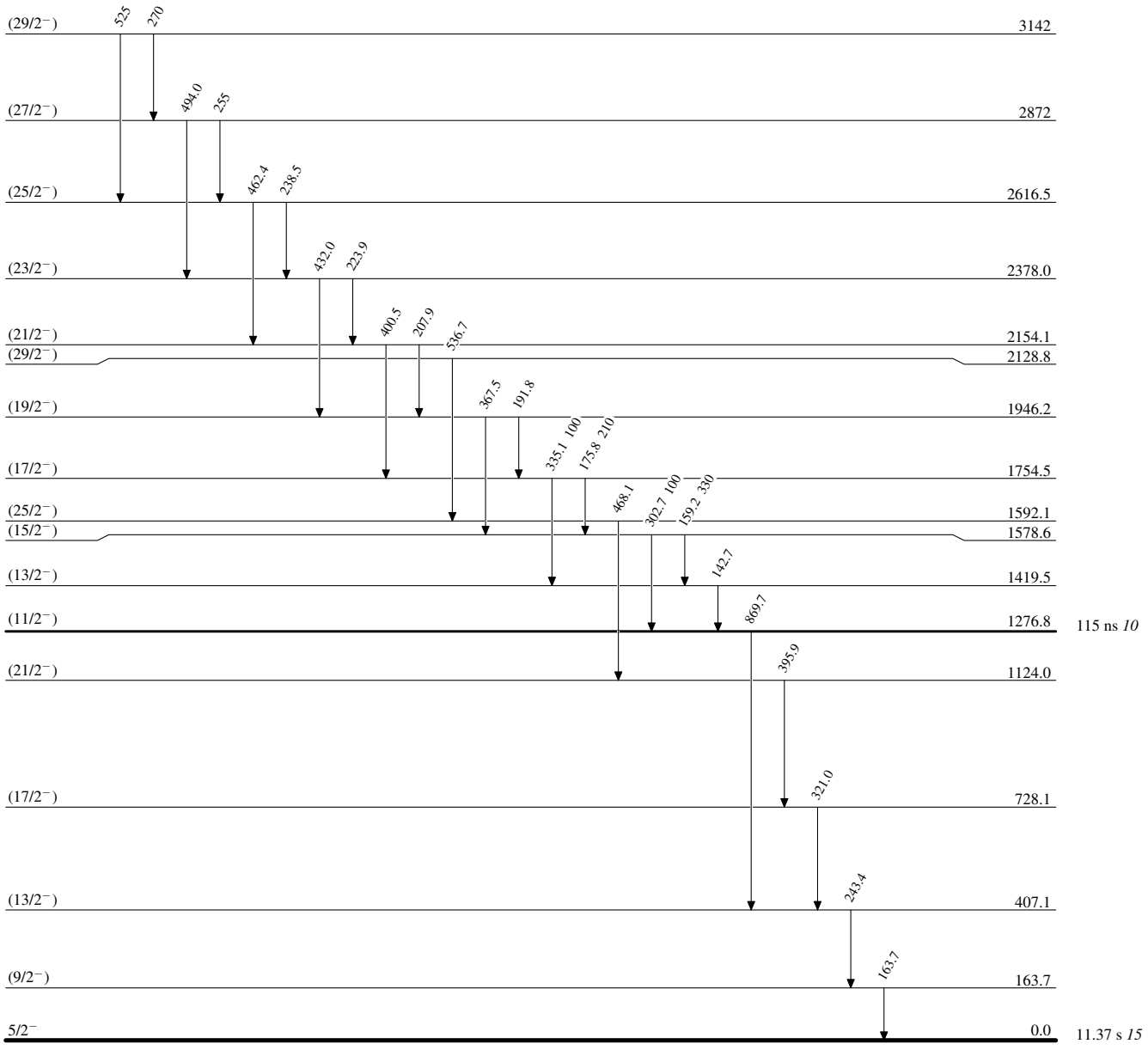
Level Scheme

Intensities: Relative photon branching from each level



$^{159}_{62}Sm_{97}$

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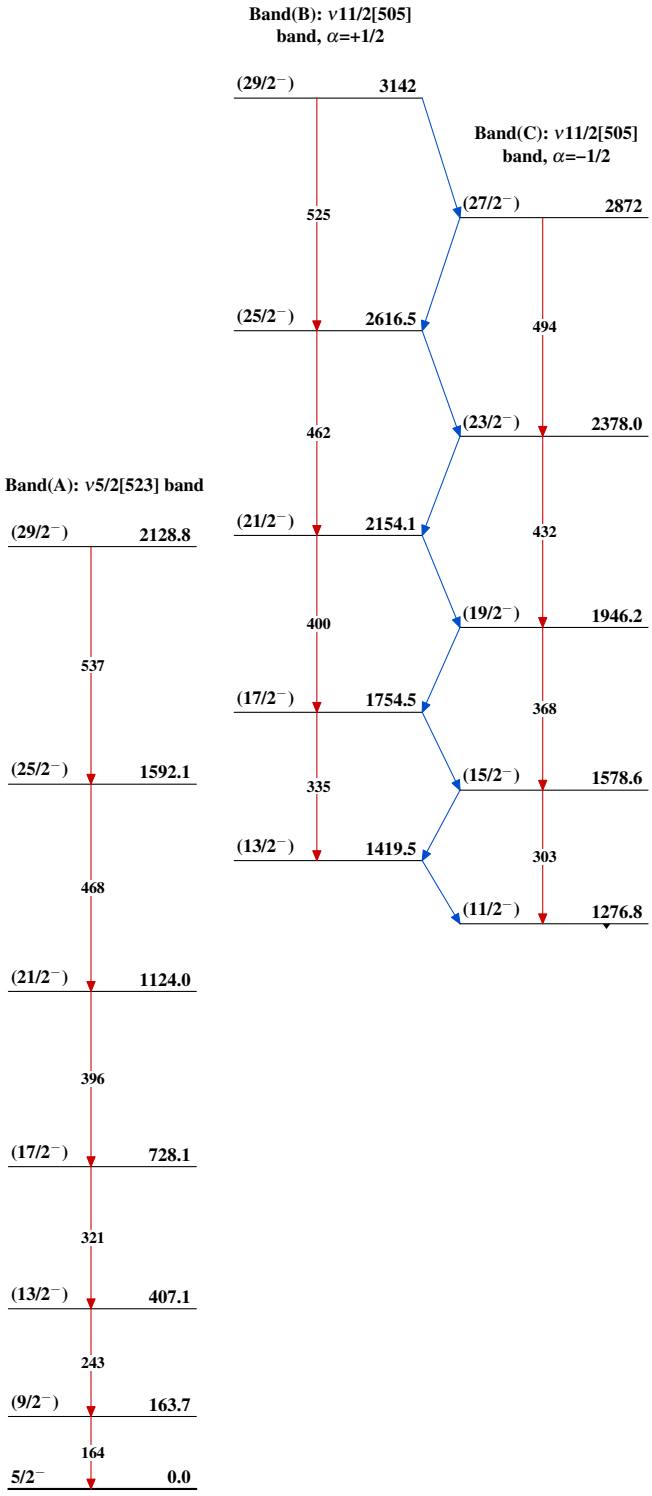

$^{159}_{62}Sm_{97}$