^{252}Cf SF decay   2009Hw03,2018Bh07

	Type	Author	History Citation	Literature Cutoff Date
	Full Evaluation	N. Nica	NDS 160, 1 (2019)	21-Oct-2019

Parent: ^{252}Cf: E=0; J$^\pi$=0$^+$; T$_{1/2}$=2.645 y 8; %SF decay=3.092 8

^{252}Cf-%SF decay: %SF(^{252}Cf)=3.092 8 (2005Ni22).

Compiled for the XUNDL database by K. Zuber (IFJ,PAN, Krakow) and B. Singh (McMaster).

Includes population through ^{9}Be(^{238}U,F), E=6.2 MeV/nucleon (2018Bh07).

2009Hw03: measured Eγ, Iγ, $\gamma\gamma$, (Pm x ray)$\gamma\gamma$ coin, cross coincidences Pm-Rb, using the Gammasphere array at LBNL with 101 Compton-suppressed HPGe detectors. The ^{252}Cf source (α-decay) intensity was 62 μCi, and was placed between two 13-micron thick Fe foils inside a 7.62 cm polyethylene ball.

2018Bh07: measured Eγ, Iγ, $\gamma\gamma\gamma$, $\gamma\gamma\gamma\gamma$, (Pm x ray)$\gamma\gamma$ coin using the Gammasphere array at LBNL with 101 Compton-suppressed Ge detectors. Also measured fission fragments, time of flight, Eγ, Iγ, $\gamma\gamma$- and (fragment)γ-coin using ^{9}Be(^{238}U,F) reaction, E(^{9}Be)= 55.8 MeV with VAMOS++ magnetic spectrometer for fragment separation and the EXOGAM segmented Clover array at Ganil.

Level scheme based on the coincidence data is that of 2009Hw03 confirmed and extended by 2018Bh07.

^{155}Pm Levels

E(level)[†]	J$^{\pi}$[‡]	E(level)[†]	J$^{\pi}$[‡]	E(level)[†]	J$^{\pi}$[‡]	E(level)[†]	J$^{\pi}$[‡]
0.0[@]	5/2$^-$[#]	260.1[&] 3	(11/2$^-$)	698.7[@] 4	(17/2$^-$)	1287.9[&] 5	(23/2$^-$)
67.40[&] 24	(7/2)$^-$[#]	387.6[@] 3	(13/2$^-$)	872.8[&] 4	(19/2$^-$)	1546.9[@] 8	(25/2$^-$)
154.60[@] 24	(9/2)$^-$[#]	529.6[&] 4	(15/2$^-$)	1085.9[@] 5	(21/2$^-$)	1769.9[&] 9	(27/2$^-$)

[†] From least-squares fit to Eγ's.

[‡] Tentatively postulated in 2009Hw03 and 2018Bh07 based on the continuation of the π5/2[532] extended above the (7/2)$^-$ and (9/2)$^-$ levels of the rotational band known before this study.

[#] From Adopted Levels, Gammas dataset.

[@] Band(A): π5/2[532], α=+1/2 band.

[&] Band(a): π5/2[532], α=−1/2 band.

γ(^{155}Pm)

E$_\gamma$[†]	I$_\gamma$[‡]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Comments
67.4 3	27 8	67.40	(7/2)$^-$	0.0	5/2$^-$	
87.2 3	54 14	154.60	(9/2)$^-$	67.40	(7/2)$^-$	
105.5 3	73 5	260.1	(11/2$^-$)	154.60	(9/2)$^-$	
127.5 3	100 5	387.6	(13/2$^-$)	260.1	(11/2$^-$)	
142.0 3	92 5	529.6	(15/2$^-$)	387.6	(13/2$^-$)	
154.6 3		154.60	(9/2)$^-$	0.0	5/2$^-$	E$_\gamma$: only from 2009Hw03; 2018Bh07 did not observe this γ ray.
169.1 3	81 5	698.7	(17/2$^-$)	529.6	(15/2$^-$)	
174.1 3	72 5	872.8	(19/2$^-$)	698.7	(17/2$^-$)	
192.7 3	27 5	260.1	(11/2$^-$)	67.40	(7/2)$^-$	
202.0 3	24 5	1287.9	(23/2$^-$)	1085.9	(21/2$^-$)	
213.1 3	41 5	1085.9	(21/2$^-$)	872.8	(19/2$^-$)	
223[#] 1	27 5	1769.9	(27/2$^-$)	1546.9	(25/2$^-$)	
233.0 3	46 5	387.6	(13/2$^-$)	154.60	(9/2)$^-$	
259[#] 1	14 3	1546.9	(25/2$^-$)	1287.9	(23/2$^-$)	
269.5 3	51 5	529.6	(15/2$^-$)	260.1	(11/2$^-$)	
311.1 3	78 8	698.7	(17/2$^-$)	387.6	(13/2$^-$)	
343.2 3	70 8	872.8	(19/2$^-$)	529.6	(15/2$^-$)	

^{252}**Cf SF decay**   **2009Hw03,2018Bh07 (continued)**

γ(^{155}Pm) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f
387.2 *3*	46 *5*	1085.9	(21/2$^-$)	698.7	(17/2$^-$)
415.1 *3*	38 *5*	1287.9	(23/2$^-$)	872.8	(19/2$^-$)
461[#] *1*	38 *5*	1546.9	(25/2$^-$)	1085.9	(21/2$^-$)
482[#] *1*	41 *5*	1769.9	(27/2$^-$)	1287.9	(23/2$^-$)

[†] From 2009Hw03 unless noted otherwise. Uncertainty of 0.3 keV assigned as per e-mail reply from the first author on Sept 21, 2009 to XUNDL compilers.

[‡] From 2018Bh07. 2009Hw03 do not list relative γ ray intensities (large background under the low-energy transitions made them very imprecise).
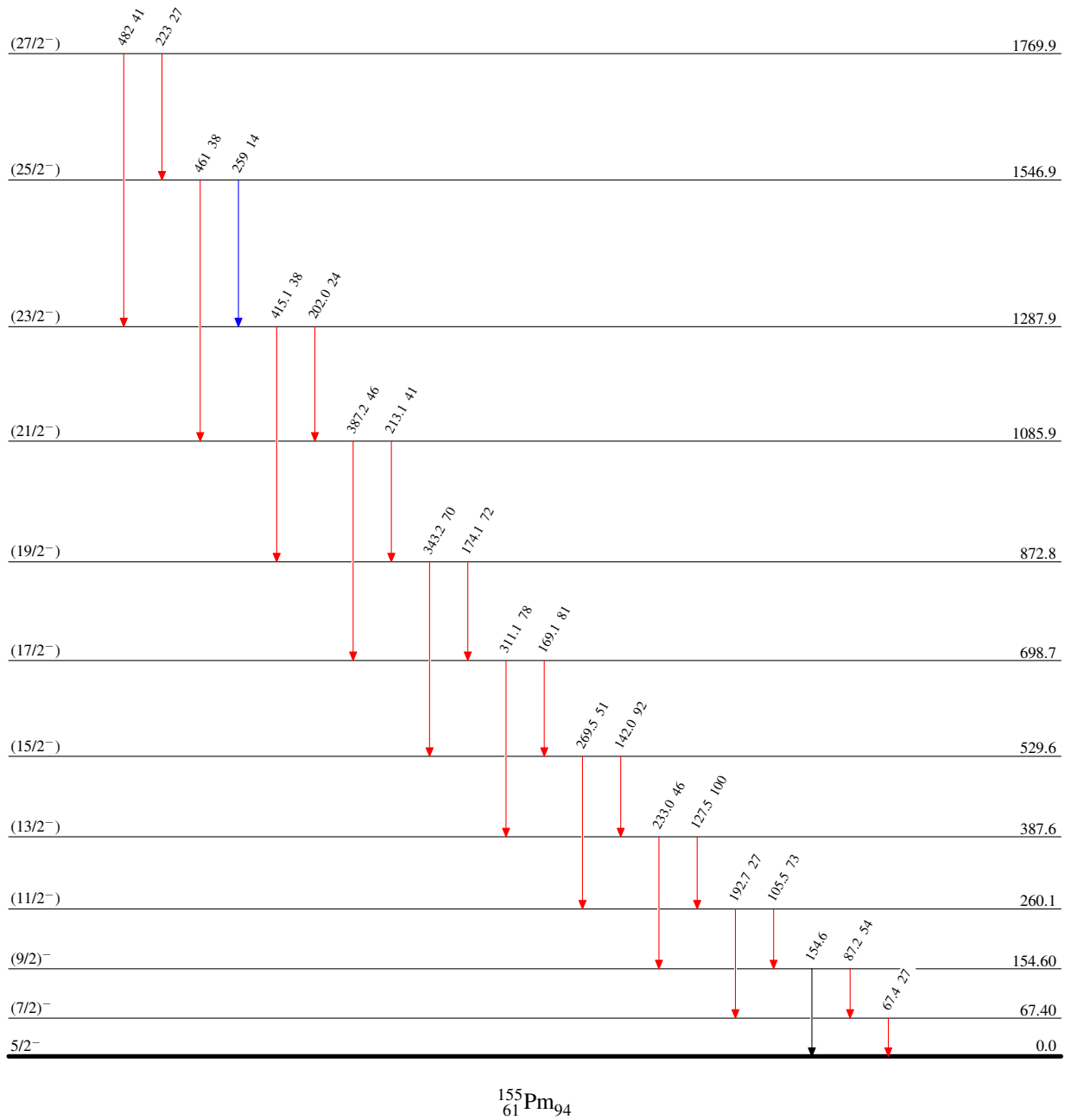
[#] From 2018Bh07 (uncertainty assigned by evaluator).

^{252}**Cf SF decay**   **2009Hw03,2018Bh07 (continued)**
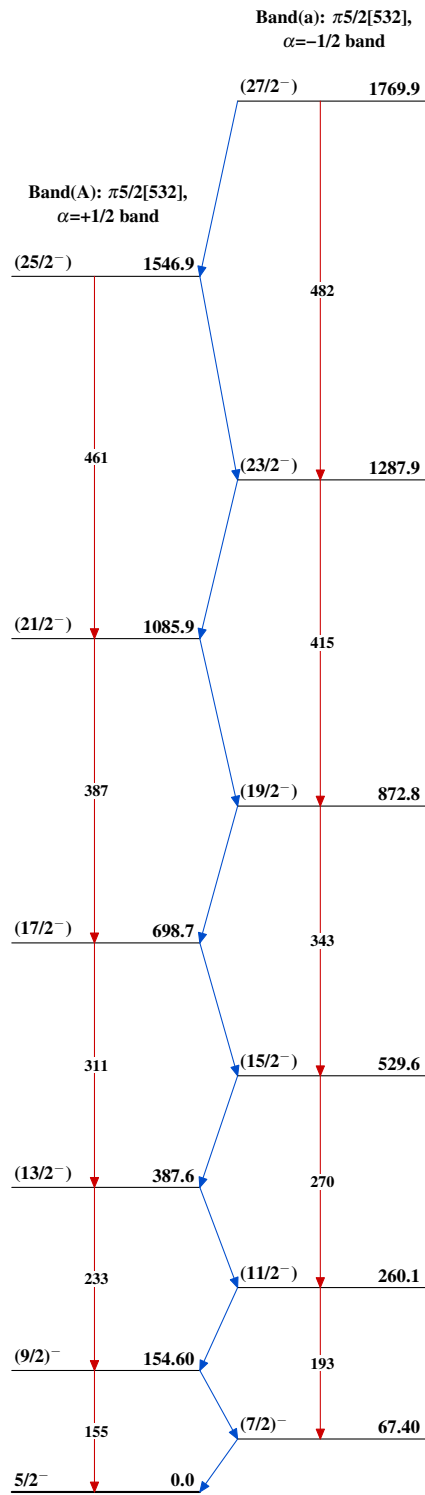
^{252}**Cf SF decay   2009Hw03,2018Bh07**

Level Scheme

Intensities: Relative I$_\gamma$

Legend

→ I$_\gamma$ < 2%×I$_\gamma^{max}$
→ I$_\gamma$ < 10%×I$_\gamma^{max}$
→ I$_\gamma$ > 10%×I$_\gamma^{max}$

$^{155}_{61}$Pm$_{94}$

^{252}Cf SF decay   2009Hw03,2018Bh07

Band(a): $\pi 5/2[532]$, $\alpha = -1/2$ band

Band(A): $\pi 5/2[532]$, $\alpha = +1/2$ band

(27/2⁻)		1769.9
(25/2⁻) 1546.9		
	(23/2⁻)	1287.9
(21/2⁻) 1085.9		
	(19/2⁻)	872.8
(17/2⁻) 698.7		
	(15/2⁻)	529.6
(13/2⁻) 387.6		
	(11/2⁻)	260.1
(9/2)⁻ 154.60		
	(7/2)⁻	67.40
5/2⁻ 0.0		

482

461

415

387

343

311

270

233

193

155

$^{155}_{61}$Pm$_{94}$