

²⁵²Cf SF decay 2007Li21,2010Li03

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

Parent: ²⁵²Cf: E=0.0; J^π=0⁺; T_{1/2}=2.645 y 8; %SF decay=?

²⁵²Cf-T_{1/2}: From Adopted Levels of ²⁵²Cf.

2007Li21,2010Li03: Source of about 62 μCi ²⁵²Cf was sandwiched between two Fe foils and mounted in a plastic (CH) ball to absorb β particles and conversion electrons. γ rays were detected with the Gammasphere at LBNL consisting of 102 Compton-suppressed Ge detectors. Measured E_γ, I_γ, γγ-coin, γγ(θ). Deduced levels, J, π, configurations, band structures. Comparison with shell-model calculations.

All data are from **2007Li21** unless otherwise stated.

¹³⁸Cs Levels

E(level) [†]	J ^π #	T _{1/2} [‡]	E(level) [†]	J ^π #	E(level) [†]	J ^π #
0.0	3 ⁻	32.5 min 2	1832.8 ^{&c} 5	(11 ⁻)	3260.5 ^{ad} 7	(12 ⁺)
79.9 ^{@c}	6 ⁻	2.91 min 10	1917.5 ^{&c} 6	(12 ⁻)	3348.8 ^{ad} 7	(13 ⁺)
254.4 ^{@c} 3	7 ⁻		2731.9 6		4164.5 ^{bd} 8	(14 ⁺)
1411.3 ^{@c} 5	9 ⁻		2813.0 ^{ad} 6	(11 ⁺)	4258.6 8	
1596.8 ^{&c} 5	10 ⁻		3158.3 7		4626.1 ^{bd} 8	(16 ⁺)

[†] From a least-squares fit to γ-ray energies, assuming uncertainty of 0.5 keV.

[‡] From Adopted Levels.

Proposed by **2007Li21** and **2010Li03** based on γγ(θ) (**2010Li03**), band structures, and comparisons with shell-model predictions.

@ Member of configuration=πg_{7/2}⁵⊗vf_{7/2}.

& Member of configuration=πg_{7/2}⁴⊗πd_{5/2}⊗vf_{7/2}.

^a Member of configuration=πg_{7/2}⁴⊗πh_{11/2}⊗vf_{7/2}.

^b Member of configuration=πg_{7/2}³⊗πd_{5/2}⊗πh_{11/2}⊗vf_{7/2}.

^c Band(A): γ sequence based on 6⁻.

^d Band(B): γ sequence based on (11⁺).

γ(¹³⁸Cs)

Experimental conversion coefficients given in comments are deduced from γ-ray intensity balance (**2007Li21**).

E _γ	I _γ	E _f (level)	J _i ^π	E _f	J _f ^π	Mult. [‡]	α [†]	Comments
84.7	32.9	1917.5	(12 ⁻)	1832.8	(11 ⁻)	M1	1.448	α(exp)=1.39 22 (2007Li21) α(K)=1.240 18; α(L)=0.1656 24; α(M)=0.0339 5 α(N)=0.00717 10; α(O)=0.000996 14; α(P)=4.88×10 ⁻⁵ 7 Mult.: from α(exp) deduced from intensity balance.
174.5	100	254.4	7 ⁻	79.9	6 ⁻	(M1)	0.190	α(K)=0.1628 23; α(L)=0.0214 3; α(M)=0.00439 7 α(N)=0.000928 13; α(O)=0.0001292 18; α(P)=6.38×10 ⁻⁶ 9 Mult.: γγ(θ) consistent with M1 for 174.5γ and E2 for 1156.9γ. (1156.9γ)(174.5γ)(θ): A ₂ =-0.07 1, A ₄ =-0.02 2 (quoted by 2007Li21 from a paper to be published; ref 26 in 2007Li21).
185.5	52.5	1596.8	10 ⁻	1411.3	9 ⁻	M1+E2	0.19 3	α(exp)=0.18 4 (2007Li21) α(K)=0.152 15; α(L)=0.028 11; α(M)=0.0059 23 α(N)=0.0012 5; α(O)=0.00016 5; α(P)=5.31×10 ⁻⁶ 12 Mult.: M1+E2 or M1,E2 from α(exp) deduced from

Continued on next page (footnotes at end of table)

^{252}Cf SF decay [2007Li21,2010Li03](#) (continued) $\gamma(^{138}\text{Cs})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	α^\dagger	Comments
								intensity balance. (185.5 γ)(1156.9 γ)(θ): $A_2=-0.076$ 23; $A_4=0.007$ 34 (2010Li03) consistent with M1,E2-E2 cascade and 10^- $\rightarrow 9^- \rightarrow 7^-$ spin sequence.
236.0	40.3	1832.8	(11 $^-$)	1596.8	10 $^-$			
320.7	2.2	1917.5	(12 $^-$)	1596.8	10 $^-$			
421.5	5.9	1832.8	(11 $^-$)	1411.3	9 $^-$			
426.4	2.6	3158.3		2731.9				
447.5	8.2	3260.5	(12 $^+$)	2813.0	(11 $^+$)			
461.6	0.9	4626.1	(16 $^+$)	4164.5	(14 $^+$)			
535.8	2.0	3348.8	(13 $^+$)	2813.0	(11 $^+$)			
814.4	5.2	2731.9		1917.5	(12 $^-$)			
895.5	16.0	2813.0	(11 $^+$)	1917.5	(12 $^-$)			
904.0	3.5	4164.5	(14 $^+$)	3260.5	(12 $^+$)			
909.8	1.2	4258.6		3348.8	(13 $^+$)			
1156.9	77	1411.3	9 $^-$	254.4	7 $^-$	(E2)	1.26×10^{-3}	$\alpha(\text{K})=0.001084$ 16; $\alpha(\text{L})=0.0001382$ 20; $\alpha(\text{M})=2.82 \times 10^{-5}$ 4 $\alpha(\text{N})=5.94 \times 10^{-6}$ 9; $\alpha(\text{O})=8.25 \times 10^{-7}$ 12; $\alpha(\text{P})=4.02 \times 10^{-8}$ 6; $\alpha(\text{IPF})=2.48 \times 10^{-6}$ 4 Mult.: $\gamma\gamma(\theta)$ consistent with M1 for 174.5 γ and E2 for 1156.9 γ . (1156.9 γ)(174.5 γ)(θ): $A_2=-0.07$ 1, $A_4=-0.02$ 2 (quoted by 2007Li21 from a paper to be published; ref 26 in 2007Li21).

[†] Additional information 1.

[‡] From $\gamma\gamma(\theta)$ in [2010Li03](#) and conversion coefficients in [2007Li21](#) deduced based on γ -ray intensity balance.

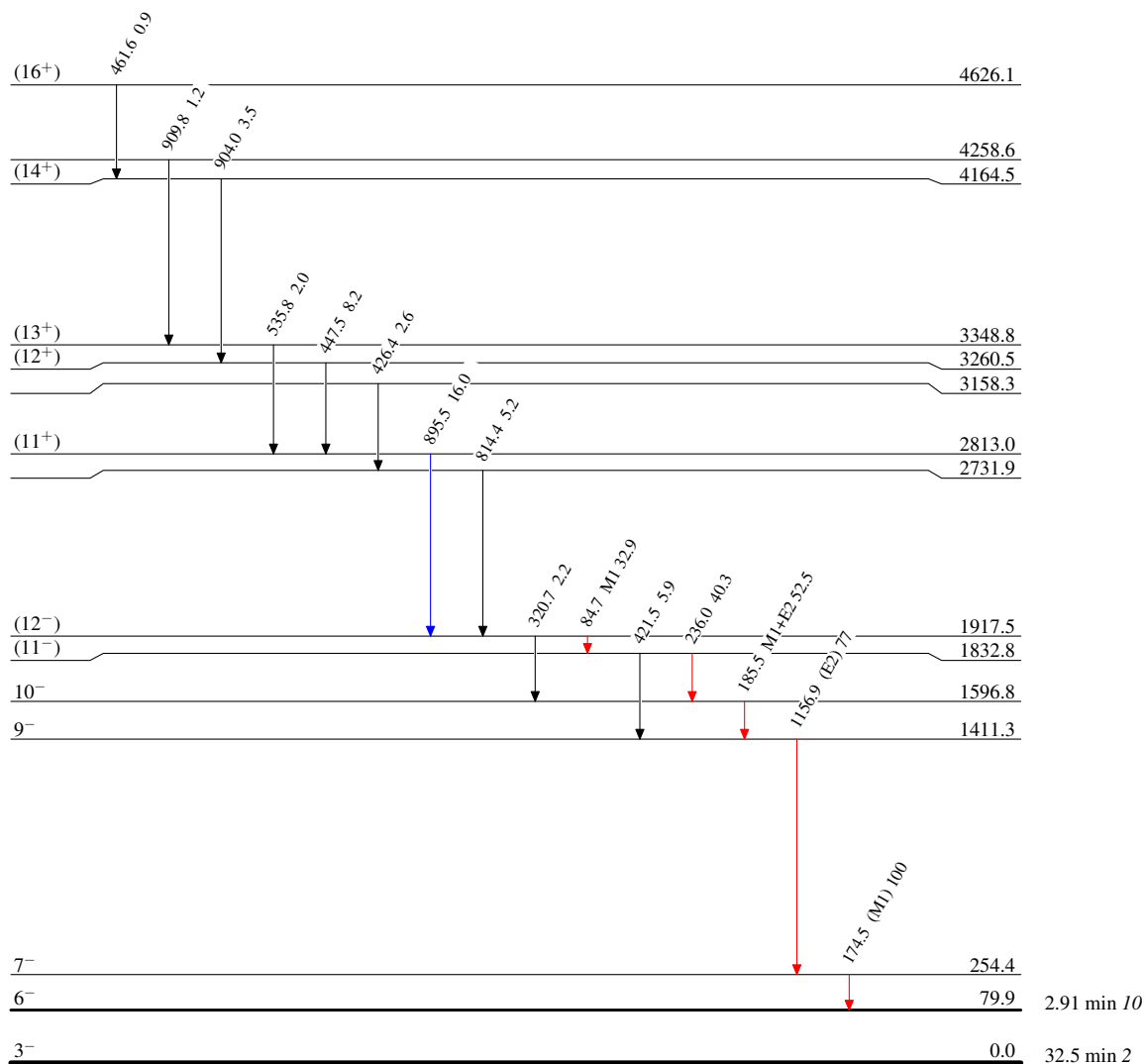
^{252}Cf SF decay 2007Li21,2010Li03

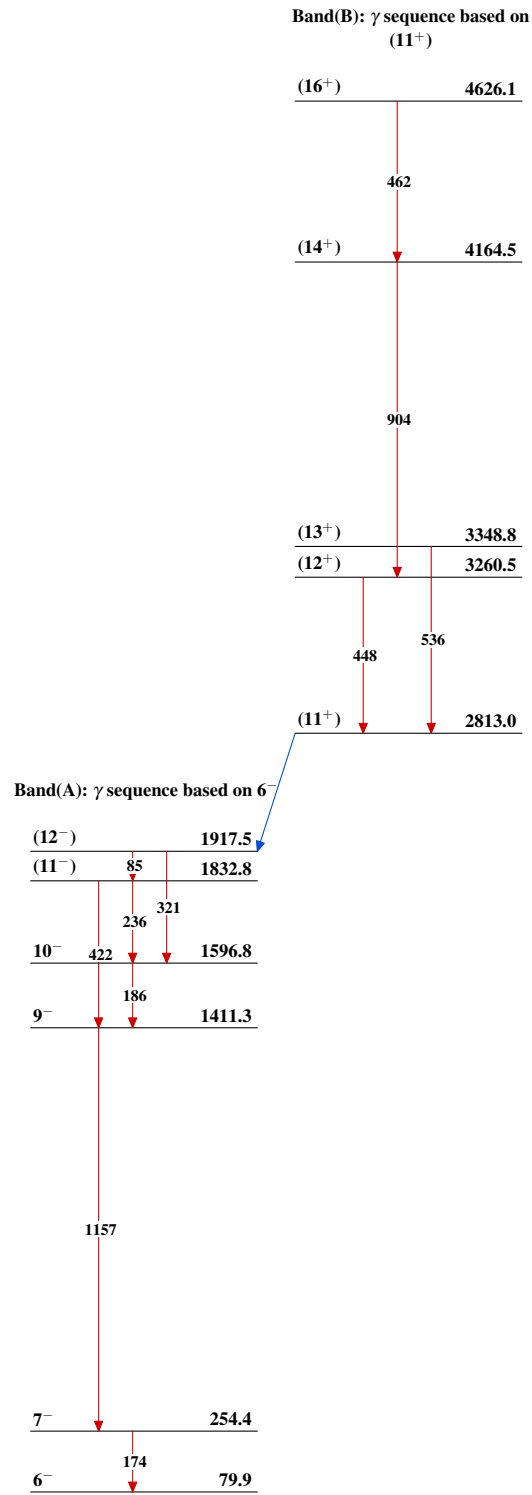
Level Scheme

Intensities: Relative I_γ

Legend

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

 $^{138}_{55}\text{Cs}_{83}$

^{252}Cf SF decay 2007Li21,2010Li03 $^{138}_{55}\text{Cs}_{83}$