

$^{248}\text{Cm}, ^{252}\text{Cf}$ SF decay [2002Lu08,2002Ur04](#)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 187,1 (2023)	12-Oct-2022

Parent: ^{248}Cm : $E=0.0$; $J^\pi=0^+$; $T_{1/2}=3.48\times 10^5$ y 6; %SF decay=8.39 16

Parent: ^{252}Cf : $E=0.0$; $J^\pi=0^+$; $T_{1/2}=2.645$ y 8; %SF decay=3.092 8

[2003Ha49](#), [2002Lu08](#), [2002Ha46](#), [2002LuZW](#), [2001Ha14](#), [1999HaZV](#), and [1997Zh23](#): done by same group using ^{252}Cf SF decay.

[2002Lu08](#) (and [2003Ha49](#), conference paper): measured E_γ , I_γ , $\gamma\gamma$ using the GAMMASPHERE array consisting of 102

Compton-suppressed Ge detectors.

[2001Ha14](#): measured E_γ , I_γ and $\gamma\gamma$ using GAMMASPHERE array comprised of 72 Compton-suppressed Ge detectors.

[1997Zh23](#): measured γ , $\gamma\gamma$, $\gamma\gamma\gamma$ using 20 and 36 Compton-suppressed Ge arrays.

[2002Ur04](#): ^{248}Cm SF decay and measured E_γ , I_γ and $\gamma\gamma$, $\gamma\gamma(\theta)$ using EUROGAM II array consisting of anti-Compton Spectrometers.

[1974CIZX](#): measured: γ , $\gamma(t)$, yield.

Unless mentioned otherwise, all data are from [2002Lu08](#).

 ^{141}Ba Levels

E(level) [†]	J^π [‡]	Comments
0.0	$3/2^-$ [#]	
48.53 ^{&} 2	$(5/2)^-$ [#]	
55.00 [@] 2	$(7/2)^-$ [#]	
610.12 ^{&} 6	$(9/2^-)$	
643.59 [@] 3	$(11/2^-)$	
746.9 3	$(9/2^-)$	From 2002Ur04 only (not observed by 2002Lu08). J^π : from 2002Ur04 based on band assignment.
1187.32 ^{&} 5	$(13/2^-)$	
1256.6 3	$(11/2^+)$	From 2002Ur04 only (not observed by 2002Lu08). J^π : from 2002Ur04 based on syst.
1302.02 [@] 4	$(15/2^-)$	
1341.08 ^a 14	$(13/2^+)$	
1719.62 ^{&} 5	$(17/2^-)$	
1836.23 ^a 7	$(17/2^+)$	
2114.94 [@] 6	$(19/2^-)$	
2172.16 ^c 7	$(19/2^-)$	
2329.12 ^{&} 9	$(21/2^-)$	
2433.25 ^a 8	$(21/2^+)$	
2781.47 ^c 11	$(23/2^-)$	
2943.77 ^b 10	$(23/2^+)$	
2950.38 [@] 14	$(23/2^-)$	
3127.78 ^a 10	$(25/2^+)$	
3175.11 ^{&} 11	$(25/2^-)$	
3472.13 ^c 21	$(27/2^-)$	
3493.23 ^b 11	$(27/2^+)$	
3820.2 [@] 5	$(27/2^-)$	
3834.20 ^a 13	$(29/2^+)$	
3908.48 ^{&} 15	$(29/2^-)$	
4244.24 ^b 15	$(31/2^+)$	
4303.64 ^c 24	$(31/2^-)$	

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$^{248}\text{Cm}, ^{252}\text{Cf}$ SF decay [2002Lu08,2002Ur04](#) (continued) ^{141}Ba Levels (continued)

$E(\text{level})^\dagger$	$J^\pi^\ddagger$
4618.63 ^a 19	(33/2 ⁺)
4931.67 ^b 21	(35/2 ⁺)

[†] From least-squares fit to $E\gamma$'s.[‡] Tentative values established by [2002Lu08](#) based on the fact that fission products are formed with an average of six or more units of angular momentum and only yrast or near-yrast states are observed, and on the interlaced band structure of the level scheme.

From Adopted Levels, Gammas dataset.

@ Band(A): simplex $s=+i$, $\alpha=-1/2$.& Band(a): simplex $s=-i$, $\alpha=+1/2$.^a Band(B): Band based on (13/2⁺); simplex $s=+i$, $\alpha=+1/2$.^b Band(C): Band based on (23/2⁺); simplex $s=-i$, $\alpha=-1/2$.^c Band(D): Band based on (19/2⁻), $\alpha=-1/2$. $\gamma(^{141}\text{Ba})$

$E_\gamma^\dagger$	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [#]	Comments
6.47 [@] 5		55.00	(7/2) ⁻	48.53	(5/2) ⁻		
48.53 [@] 2		48.53	(5/2) ⁻	0.0	3/2 ⁻		
54.997 [@] 23		55.00	(7/2) ⁻	0.0	3/2 ⁻		
214.3 3	1.0	2329.12	(21/2) ⁻	2114.94	(19/2) ⁻		
231.42 14	0.6	3175.11	(25/2) ⁻	2943.77	(23/2) ⁺		Additional information 1.
261.08 16	1.2	2433.25	(21/2) ⁺	2172.16	(19/2) ⁻	[E1]	$B(E1)/B(E2)(596\gamma)=0.33\times 10^{-6}$ 4 fm ⁻² (2002Lu08).
278.79 17	1.4	2114.94	(19/2) ⁻	1836.23	(17/2) ⁺	[E1]	$B(E1)/B(E2)(813\gamma)=1.54\times 10^{-6}$ 8 fm ⁻² (2002Lu08).
318.14 9	3.4	3493.23	(27/2) ⁺	3175.11	(25/2) ⁻	[E1]	$B(E1)/B(E2)(549\gamma)=1.63\times 10^{-6}$ 8 fm ⁻² (2002Lu08).
318.34 6	4.2	2433.25	(21/2) ⁺	2114.94	(19/2) ⁻	[E1]	$B(E1)/B(E2)(596\gamma)=0.63\times 10^{-6}$ 5 fm ⁻² (2002Lu08).
335.64 22	0.8	4244.24	(31/2) ⁺	3908.48	(29/2) ⁻	[E1]	$B(E1)/B(E2)(549\gamma)=2.43\times 10^{-6}$ 9 fm ⁻² (2002Lu08).
335.96 16	2.8	2172.16	(19/2) ⁻	1836.23	(17/2) ⁺		
346.3 ^{&}		3127.78	(25/2) ⁺	2781.47	(23/2) ⁻		E_γ : from fig. 3 of 2002Lu08 .
348.44 22		2781.47	(23/2) ⁻	2433.25	(21/2) ⁺		
395.17 22	0.6	2114.94	(19/2) ⁻	1719.62	(17/2) ⁻		
415.2 2		3908.48	(29/2) ⁻	3493.23	(27/2) ⁺		
417.58 4	22	1719.62	(17/2) ⁻	1302.02	(15/2) ⁻	D	Mult.: $\Delta J=1$, D transition from (418 γ)(658 γ)(θ): $A_2=-0.06$ 2, $A_4=+0.01$ 3 (2002Ur04).
452.2 ^{&} 3		2781.47	(23/2) ⁻	2329.12	(21/2) ⁻		
452.5 1	3.9	2172.16	(19/2) ⁻	1719.62	(17/2) ⁻		
495.17 15	1.6	1836.23	(17/2) ⁺	1341.08	(13/2) ⁺	[E2]	
509.8 [‡]	1.5 5	1256.6	(11/2) ⁺	746.9	(9/2) ⁻		
517.1 ^{&}	0.9	2950.38	(23/2) ⁻	2433.25	(21/2) ⁺	[E1]	E_γ, I_γ : from fig. 3 of 2002Lu08 . $B(E1)/B(E2)(835\gamma)=0.73\times 10^{-6}$ 6 fm ⁻² (2002Lu08).
532.34 14	23	1719.62	(17/2) ⁻	1187.32	(13/2) ⁻		
534.22 8	15	1836.23	(17/2) ⁺	1302.02	(15/2) ⁻	D	Mult.: $\Delta J=1$, D transition from (534 γ)(589 γ +658 γ)(θ): $A_2=-0.05$ 2, $A_4=+0.01$ 2 (2002Ur04).
543.72 4	26	1187.32	(13/2) ⁻	643.59	(11/2) ⁻	D	$B(E1)/B(E2)(495\gamma)=1.41\times 10^{-6}$ 8 fm ⁻² (2002Lu08). Mult.: $\Delta J=1$, D transition from (544 γ)(589 γ)(θ): $A_2=-0.03$ 2, $A_4=+0.02$ 3 (2002Ur04).
549.44 8	2.5	3493.23	(27/2) ⁺	2943.77	(23/2) ⁺	[E2]	
555.14 11	12	610.12	(9/2) ⁻	55.00	(7/2) ⁻		
561.63 9	18	610.12	(9/2) ⁻	48.53	(5/2) ⁻		

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$^{248}\text{Cm}, ^{252}\text{Cf}$ SF decay [2002Lu08,2002Ur04](#) (continued) $\gamma(^{141}\text{Ba})$ (continued)

$E_\gamma^\dagger$	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [#]	Comments
577.26 9	3	1187.32	(13/2 ⁻)	610.12	(9/2 ⁻)		
588.59 2	100	643.59	(11/2 ⁻)	55.00	(7/2 ⁻)	[E2]	
596.96 14	12	2433.25	(21/2 ⁺)	1836.23	(17/2 ⁺)	[E2]	
609.28 11	6.2	2781.47	(23/2 ⁻)	2172.16	(19/2 ⁻)		
609.49 7	17	2329.12	(21/2 ⁻)	1719.62	(17/2 ⁻)		
613.0 [‡]	0.8 4	1256.6	(11/2 ⁺)	643.59	(11/2 ⁻)		
614.66 5	3.2	2943.77	(23/2 ⁺)	2329.12	(21/2 ⁻)		
646.7 [‡]	1.5 5	1256.6	(11/2 ⁺)	610.12	(9/2 ⁻)		
658.42 2	62.0	1302.02	(15/2 ⁻)	643.59	(11/2 ⁻)	Q	Mult.: $\Delta J=2$, Q transition from (658 γ)(589 γ)(θ): $A_2=+0.12$ 3, $A_4=-0.01$ 2 (2002Ur04).
687.43 14	0.9	4931.67	(35/2 ⁺)	4244.24	(31/2 ⁺)		
690.66 17	3.5	3472.13	(27/2 ⁻)	2781.47	(23/2 ⁻)		
692.0 [‡]	4 1	746.9	(9/2 ⁻)	55.00	(7/2 ⁻)		
694.53 6	7	3127.78	(25/2 ⁺)	2433.25	(21/2 ⁺)		
697.54 24	3	1341.08	(13/2 ⁺)	643.59	(11/2 ⁻)		
698.5 [‡]	1.0 5	746.9	(9/2 ⁻)	48.53	(5/2 ⁻)		
706.42 9	5	3834.20	(29/2 ⁺)	3127.78	(25/2 ⁺)		
733.34 15	1.4	3908.48	(29/2 ⁻)	3175.11	(25/2 ⁻)		
751.04 11	1.6	4244.24	(31/2 ⁺)	3493.23	(27/2 ⁺)	[E2]	
784.43 14	1.5	4618.63	(33/2 ⁺)	3834.20	(29/2 ⁺)		
812.94 5	11.5	2114.94	(19/2 ⁻)	1302.02	(15/2 ⁻)	Q	Mult.: $\Delta J=2$, Q transition from (813 γ)(658 γ)(θ): $A_2=+0.09$ 4, $A_4=-0.03$ 4 (2002Ur04).
831.50 12	1.1	4303.64	(31/2 ⁻)	3472.13	(27/2 ⁻)		
835.44 13	2.8	2950.38	(23/2 ⁻)	2114.94	(19/2 ⁻)	[E2]	
845.97 9	7.4	3175.11	(25/2 ⁻)	2329.12	(21/2 ⁻)	[E2]	
869.8 ^{&} 4		3820.2	(27/2 ⁻)	2950.38	(23/2 ⁻)		
870.14 8	6.6	2172.16	(19/2 ⁻)	1302.02	(15/2 ⁻)		

[†] From table I of [2002Lu08](#). The values given in figure 3 of [2002Lu08](#) are level-energy differences.

[‡] From [2002Ur04](#) only (not observed by [2002Lu08](#)).

[#] All Q transitions deduced from angular correlations are E2 based on their prompt character ([2002Ur04](#)).

@ From Adopted Levels, Gammas dataset.

& Placement of transition in the level scheme is uncertain.

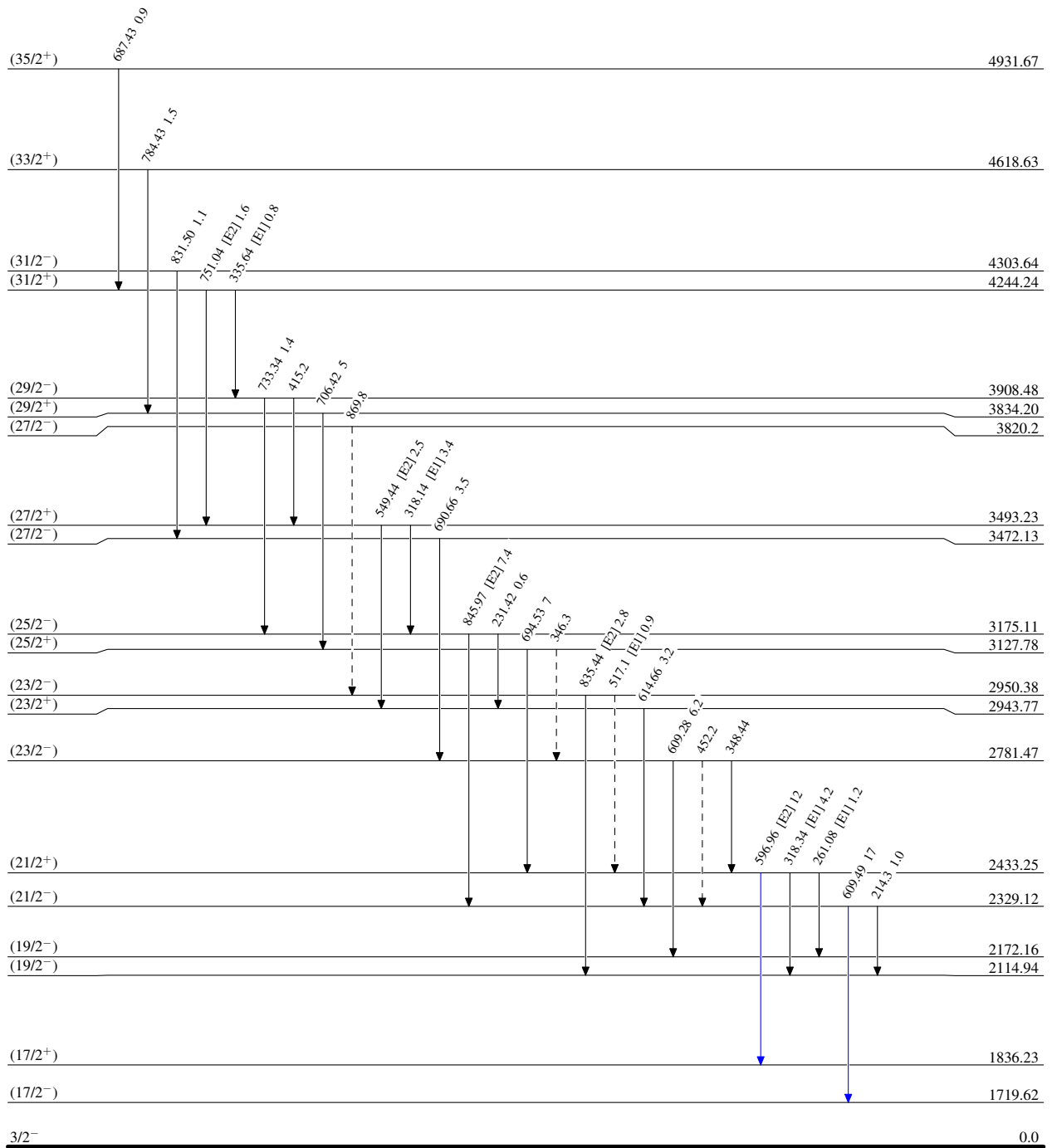
$^{248}\text{Cm}, ^{252}\text{Cf}$ SF decay 2002Lu08,2002Ur04

Legend

Level Scheme

Intensities: Relative I_γ

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 $\cdots$ γ Decay (Uncertain)

 $^{141}_{56}\text{Ba}_{85}$

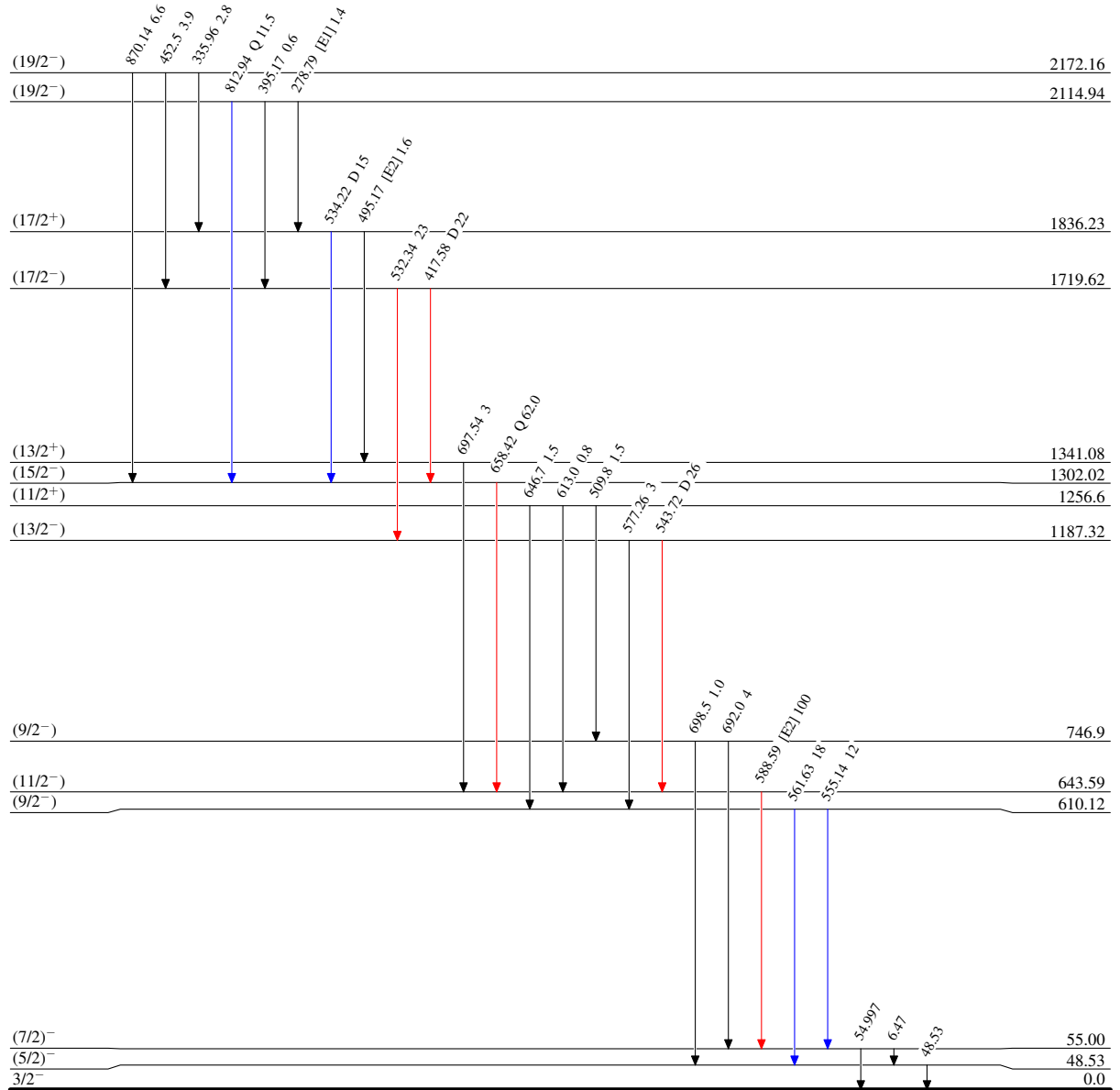
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Level Scheme (continued)

Intensities: Relative I_γ

Legend

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



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