

^{252}Cf SF decay [2005Lu21](#),[1998Hw08](#)

Type	History			Literature Cutoff Date
	Author	Citation		
Full Evaluation	Jean Blachot	ENSDF		1-Jul-2006

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

All data are from [2005Lu21](#). The level scheme was less complete in [1998Hw08](#).

Measured γ , $\gamma\gamma\gamma$ using GAMMASPHERE array of 102 Compton-suppressed Ge detectors. In [1998Hw08](#), the GAMMASPHERE array contained 72 Ge detectors.

 ^{101}Nb Levels

E(level) [†]	J^π [‡]	E(level) [†]	J^π [‡]	E(level) [†]	J^π [‡]	E(level) [†]	J^π [‡]
0.0 [#]	(5/2 ⁺)	572.78 ^{&} 9	(9/2 ⁻)	1373.68 ^a 12	(15/2 ⁻)	2547.32 [@] 15	(23/2 ⁺)
119.45 [@] 7	(7/2 ⁺)	729.21 [#] 10	(13/2 ⁺)	1599.37 ^c 13	(15/2 ⁻)	2624.13 ^b 17	(21/2 ⁻)
205.63 ^c 8	(3/2 ⁻)	746.40 ^b 10	(9/2 ⁻)	1692.98 ^{&} 13	(17/2 ⁻)	2810.18 ^a 19	(23/2 ⁻)
208.71 ^{&} 7	(5/2 ⁻)	809.27 ^a 10	(11/2 ⁻)	1772.88 [@] 13	(19/2 ⁺)	2906.47 [#] 15	(25/2 ⁺)
255.46 [#] 8	(9/2 ⁺)	1005.81 ^c 11	(11/2 ⁻)	1924.83 ^b 14	(17/2 ⁻)	3206.88 ^{&} 19	(25/2 ⁻)
346.39 ^b 7	(5/2 ⁻)	1073.08 ^{&} 11	(13/2 ⁻)	2046.18 ^a 16	(19/2 ⁻)	3396.63 [@] 18	(27/2 ⁺)
374.16 ^a 7	(7/2 ⁻)	1093.01 [@] 11	(15/2 ⁺)	2072.61 [#] 14	(21/2 ⁺)		
532.18 [@] 9	(11/2 ⁺)	1280.98 ^b 12	(13/2 ⁻)	2288.9 ^c 10	(19/2 ⁻)		
532.41 ^c 9	(7/2 ⁻)	1339.58 [#] 12	(17/2 ⁺)	2414.78 ^{&} 16	(21/2 ⁻)		

[†] From least-squares fit to E_γ 's (by evaluator).

[‡] As given by the authors based on band assignments.

[#] Band(A): 5/2[422], $\alpha=+1/2$.

[@] Band(a): 5/2[422], $\alpha=-1/2$.

[&] Band(B): 5/2[303], $\alpha=+1/2$.

^a Band(b): 5/2[303], $\alpha=-1/2$.

^b Band(C): 3/2[301], $\alpha=+1/2$.

^c Band(c): 3/2[301], $\alpha=-1/2$.

 $\gamma(^{101}\text{Nb})$

E_γ [†]	I_γ [‡]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
119.5 I	100	119.45	(7/2 ⁺)	0.0	(5/2 ⁺)	
136.0 I	64	255.46	(9/2 ⁺)	119.45	(7/2 ⁺)	
137.6 I		346.39	(5/2 ⁻)	208.71	(5/2 ⁻)	E γ : from figure 4 of 2005Lu21 , not listed in authors' table 3.
140.8 I	14.1	346.39	(5/2 ⁻)	205.63	(3/2 ⁻)	
165.5 I	29.2	374.16	(7/2 ⁻)	208.71	(5/2 ⁻)	
186.0 I	9.5	532.41	(7/2 ⁻)	346.39	(5/2 ⁻)	
197.1 I	20.7	729.21	(13/2 ⁺)	532.18	(11/2 ⁺)	
198.6 I	17.6	572.78	(9/2 ⁻)	374.16	(7/2 ⁻)	
205.7 I	21.3	205.63	(3/2 ⁻)	0.0	(5/2 ⁺)	
208.7 I	36.4	208.71	(5/2 ⁻)	0.0	(5/2 ⁺)	
214.0 I	5.9	746.40	(9/2 ⁻)	532.41	(7/2 ⁻)	
(226.8)		346.39	(5/2 ⁻)	119.45	(7/2 ⁺)	E γ : from β decay, not seen by 2005Lu21 .
236.5 I	7.2	809.27	(11/2 ⁻)	572.78	(9/2 ⁻)	
246.6 I	7.2	1339.58	(17/2 ⁺)	1093.01	(15/2 ⁺)	
254.7 I		374.16	(7/2 ⁻)	119.45	(7/2 ⁺)	E γ : from figure 4 of 2005Lu21 , not listed in authors' table 3.
255.4 I	6.8	255.46	(9/2 ⁺)	0.0	(5/2 ⁺)	
259.4 I	5.3	1005.81	(11/2 ⁻)	746.40	(9/2 ⁻)	

Continued on next page (footnotes at end of table)

^{252}Cf SF decay [2005Lu21,1998Hw08](#) (continued) $\gamma(^{101}\text{Nb})$ (continued)

E_γ [†]	I_γ [‡]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ [†]	I_γ [‡]	$E_i(\text{level})$	J_i^π	E_f	J_f^π
263.8 <i>I</i>	4.5	1073.08	(13/2 ⁻)	809.27	(11/2 ⁻)	473.7 <i>I</i>	19	729.21	(13/2 ⁺)	255.46	(9/2 ⁺)
275.2 <i>I</i>	3.3	1280.98	(13/2 ⁻)	1005.81	(11/2 ⁻)	474.7 <i>I</i>	1.1	2547.32	(23/2 ⁺)	2072.61	(21/2 ⁺)
276.7 <i>I</i>	30.3	532.18	(11/2 ⁺)	255.46	(9/2 ⁺)	490.3 [#]		3396.63	(27/2 ⁺)	2906.47	(25/2 ⁺)
299.7 <i>I</i>	2.4	2072.61	(21/2 ⁺)	1772.88	(19/2 ⁺)	500.3 <i>I</i>	17.2	1073.08	(13/2 ⁻)	572.78	(9/2 ⁻)
300.6 <i>I</i>	3.6	1373.68	(15/2 ⁻)	1073.08	(13/2 ⁻)	534.6 <i>I</i>	5.3	1280.98	(13/2 ⁻)	746.40	(9/2 ⁻)
318.4 <i>I</i>	1.9	1599.37	(15/2 ⁻)	1280.98	(13/2 ⁻)	560.8 <i>I</i>	4.4	1093.01	(15/2 ⁺)	532.41	(7/2 ⁻)
319.3 <i>I</i>	1.1	1692.98	(17/2 ⁻)	1373.68	(15/2 ⁻)	564.4 <i>I</i>	10.9	1373.68	(15/2 ⁻)	809.27	(11/2 ⁻)
325.4 <i>I</i>	1.6	1924.83	(17/2 ⁻)	1599.37	(15/2 ⁻)	593.5 <i>I</i>	3.6	1599.37	(15/2 ⁻)	1005.81	(11/2 ⁻)
326.8 <i>I</i>	2.9	532.41	(7/2 ⁻)	205.63	(3/2 ⁻)	610.4 <i>I</i>	9.4	1339.58	(17/2 ⁺)	729.21	(13/2 ⁺)
335.0 [#]		2624.13	(21/2 ⁻)	2288.9	(19/2 ⁻)	619.9 <i>I</i>	9.6	1692.98	(17/2 ⁻)	1073.08	(13/2 ⁻)
346.4 <i>I</i>	3.4	346.39	(5/2 ⁻)	0.0	(5/2 ⁺)	643.9 <i>I</i>	3.1	1924.83	(17/2 ⁻)	1280.98	(13/2 ⁻)
353.2 [#]		2046.18	(19/2 ⁻)	1692.98	(17/2 ⁻)	672.5 <i>I</i>	4.5	2046.18	(19/2 ⁻)	1373.68	(15/2 ⁻)
359.1 <i>I</i>		2906.47	(25/2 ⁺)	2547.32	(23/2 ⁺)	679.8 <i>I</i>	2.4	1772.88	(19/2 ⁺)	1093.01	(15/2 ⁺)
363.8 <i>I</i>	12.8	1093.01	(15/2 ⁺)	729.21	(13/2 ⁺)	689.5 [#]	0.9	2288.9	(19/2 ⁻)	1599.37	(15/2 ⁻)
364.1 <i>I</i>	20.8	572.78	(9/2 ⁻)	208.71	(5/2 ⁻)	699.3 <i>I</i>	1.4	2624.13	(21/2 ⁻)	1924.83	(17/2 ⁻)
364.2 [#]		2288.9	(19/2 ⁻)	1924.83	(17/2 ⁻)	721.8 <i>I</i>	3.4	2414.78	(21/2 ⁻)	1692.98	(17/2 ⁻)
374.1 <i>I</i>	19.5	374.16	(7/2 ⁻)	0.0	(5/2 ⁺)	733.1 <i>I</i>	3.2	2072.61	(21/2 ⁺)	1339.58	(17/2 ⁺)
400.0 <i>I</i>	7.6	746.40	(9/2 ⁻)	346.39	(5/2 ⁻)	764.0 <i>I</i>	1.1	2810.18	(23/2 ⁻)	2046.18	(19/2 ⁻)
412.8 <i>I</i>	5.8	532.18	(11/2 ⁺)	119.45	(7/2 ⁺)	774.4 <i>I</i>	1.1	2547.32	(23/2 ⁺)	1772.88	(19/2 ⁺)
433.3 <i>I</i>	3.7	1772.88	(19/2 ⁺)	1339.58	(17/2 ⁺)	792.1 <i>I</i>	0.9	3206.88	(25/2 ⁻)	2414.78	(21/2 ⁻)
435.1 <i>I</i>	18.8	809.27	(11/2 ⁻)	374.16	(7/2 ⁻)	833.9 <i>I</i>	1.8	2906.47	(25/2 ⁺)	2072.61	(21/2 ⁺)
473.4 <i>I</i>	7.1	1005.81	(11/2 ⁻)	532.41	(7/2 ⁻)	849.3 <i>I</i>	0.6	3396.63	(27/2 ⁺)	2547.32	(23/2 ⁺)

[†] [2005Lu21](#) state 0.1 keV as the systematic uncertainty in energy determination.

[‡] Uncertainty varies from 3% for strong transitions to 20% for weaker ones. When no intensity is listed, the peak has very small intensity or overlapped by other transitions.

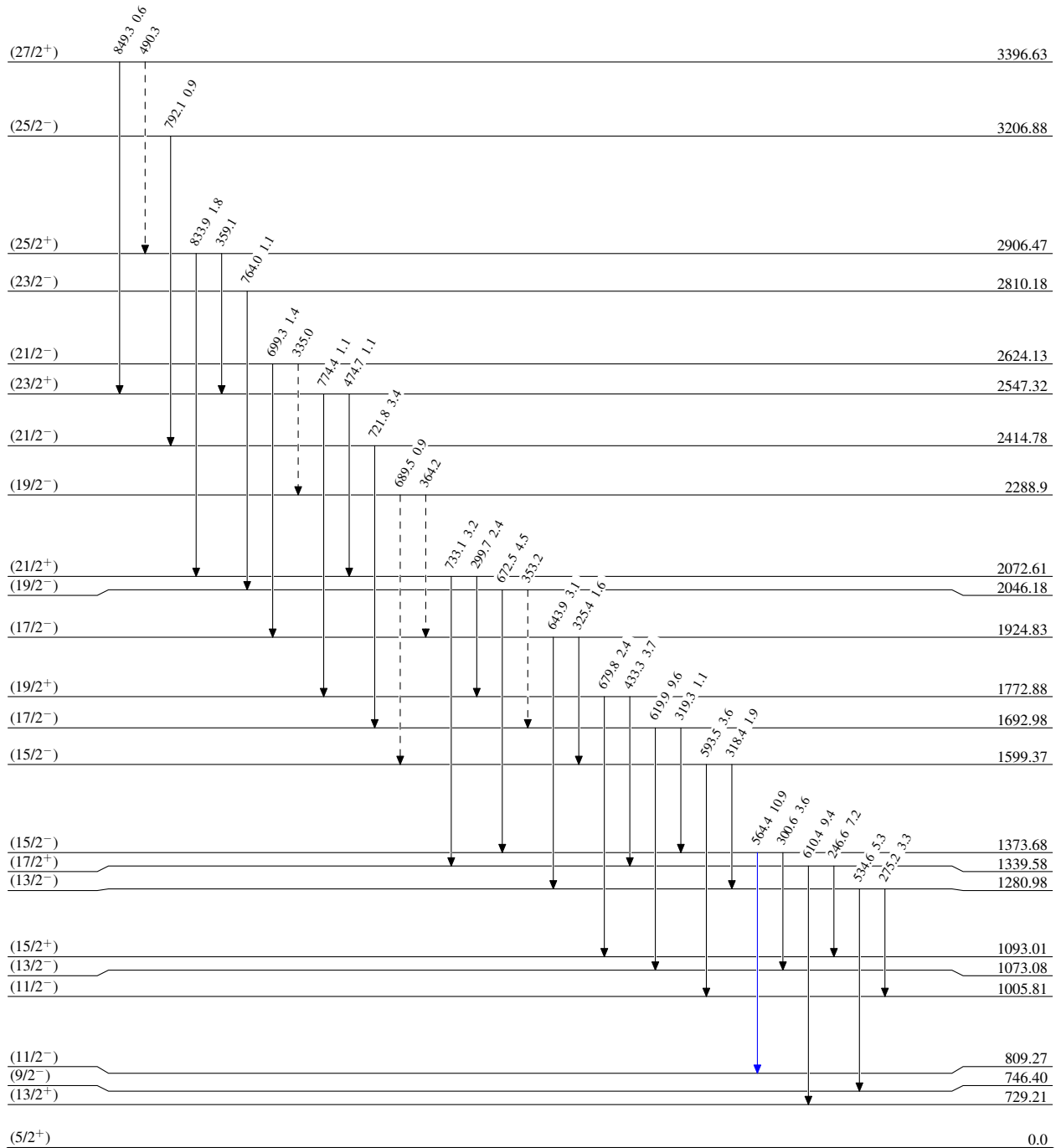
[#] Placement of transition in the level scheme is uncertain.

^{252}Cf SF decay 2005Lu21,1998Hw08

Legend

Level SchemeIntensities: Relative I_γ

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

 $^{101}_{41}\text{Nb}_{60}$

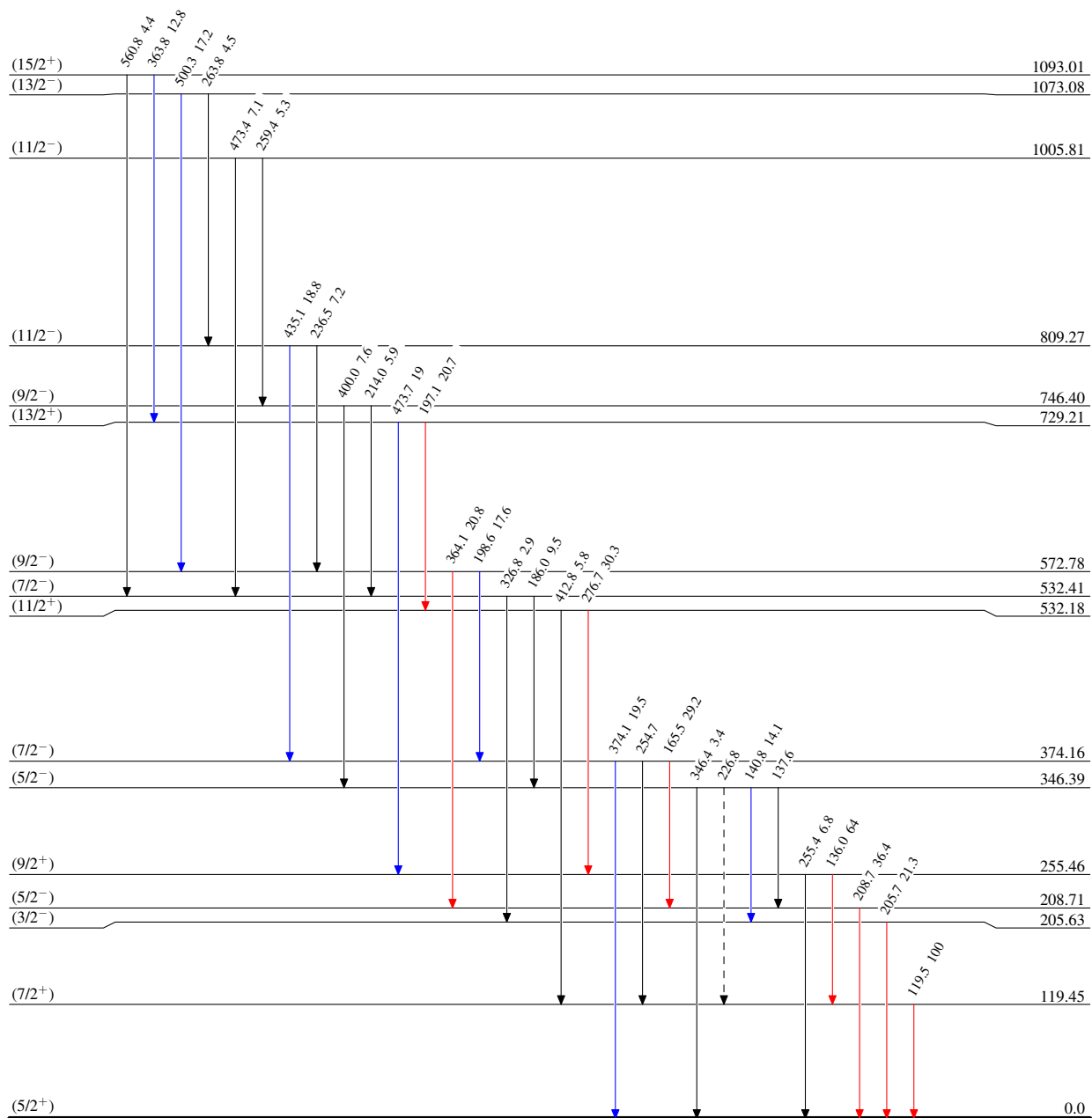
^{252}Cf SF decay 2005Lu21,1998Hw08

Legend

Level Scheme (continued)

Intensities: Relative I_γ

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



Band(B): 5/2[303], $\alpha=+1/2$

Band(b): 5/2[303], $\alpha=-1/2$

Band(C): 3/2[301], $\alpha=+1/2$

Band(c): 3/2[301], $\alpha=-1/2$

Energy levels (cm⁻¹) and transitions (cm⁻¹):

- Band(B):** (25/2⁻) 3206.88, (21/2⁻) 2414.78, (17/2⁻) 1692.98, (13/2⁻) 1073.08, (9/2⁻) 572.78, (5/2⁻) 208.71.
- Band(b):** (23/2⁻) 2810.18, (19/2⁻) 2046.18, (15/2⁻) 1373.68, (11/2⁻) 809.27, (7/2⁻) 374.16.
- Band(C):** (21/2⁻) 2624.13, (17/2⁻) 1924.83, (13/2⁻) 1280.98, (9/2⁻) 746.40, (5/2⁻) 346.39.
- Band(c):** (19/2⁻) 2288.9, (15/2⁻) 1599.37, (11/2⁻) 1005.81, (7/2⁻) 532.41, (3/2⁻) 205.63.

Transitions (cm⁻¹):

- Band(B) to Band(b):** 792, 722, 620, 500, 364.
- Band(B) to Band(C):** 644, 535, 400.
- Band(b) to Band(C):** 672, 564, 435.
- Band(C) to Band(c):** 699, 690, 594, 473, 327.

 $^{101}_{41}\text{Nb}_{60}$