^{252}Cf SF decay 2004Lu20

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Lalkovski, J. Timar and Z. Elekes	NDS 161, 1 (2019)	1-Apr-2019

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

2004Lu20: Source: 62 μCi ^{252}Cf, sandwiched between two 10 mg/cm^2 Fe foils and placed inside a 8-cm polyethylene ball: Detectors: GAMMASPHERE, comprising 102 HPGe detectors with anti-Compton shield; Measured: γ-γ-γ- coinc., Eγ, Iγ; Deduced: Ice, ^{105}Tc level scheme; Also, from the same collaboration: 2010Lu02, 1998Hw04.

Others: 1981SeZW, 1974ClZX, 1973Ho22, 1972Ho08, 1971Ho29, and 1970Jo20.

^{105}Tc Levels

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0[d]	(3/2$^-$)		configuration: $\pi 3/2^-[301]$.
76.77[&] *6*	(5/2$^-$)		
85.52 *7*	(5/2$^+$)	20.8 ns *6*	$T_{1/2}$: from the Adopted Levels; Others: 16 ns from FF-γ(t) in 1970Jo20; >6 ns in 1981SeZW. configuration: $\pi 7/2^+[413]$.
147.86[d] *6*	(5/2$^-$)		
149.83[@] *9*	(7/2$^+$)		
237.15[a] *7*	(7/2$^-$)		
278.96[#] *10*	(9/2$^+$)		
303.87[b] *6*	(3/2$^+$)		
322.18[c] *7*	(1/2$^+$)		
346.01[d] *7*	(7/2$^-$)		
441.18[&] *8*	(9/2$^-$)		
491.59[b] *10*	(7/2$^+$)		
530.08[c] *8*	(5/2$^+$)		
593.20[@] *10*	(11/2$^+$)		
672.39[a] *9*	(11/2$^-$)		
750.15[#] *12*	(13/2$^+$)		
810.16[e] *11*	(11/2$^+$)		
839.05[d] *12*	(11/2$^-$)		
841.64[b] *14*	(11/2$^+$)		
891.31[c] *12*	(9/2$^+$)		
951.55[&] *10*	(13/2$^-$)		
1089.36[e] *12*	(13/2$^+$)		
1177.36[@] *12*	(15/2$^+$)		
1236.09[a] *11*	(15/2$^-$)		
1348.92[b] *17*	(15/2$^+$)		
1373.57[#] *13*	(17/2$^+$)		
1396.78[c] *16*	(13/2$^+$)		
1576.67[&] *12*	(17/2$^-$)		
1868.71[@] *14*	(19/2$^+$)		
1898.54[a] *13*	(19/2$^-$)		
2002.47[b] *20*	(19/2$^+$)		
2118.49[#] *15*	(21/2$^+$)		
2282.95[&] *14*	(21/2$^-$)		
2621.75[@] *15*	(23/2$^+$)		
2630.74[a] *15*	(23/2$^-$)		

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^{252}Cf SF decay 2004Lu20 (continued)

^{105}Tc Levels (continued)

E(level)[†]	Jπ[‡]
2759.15[b] *22*	(23/2$^+$)
2931.48[#] *16*	(25/2$^+$)
3251.94[a] *18*	(27/2$^-$)
3347.79[@] *17*	(27/2$^+$)
3715.88[#] *19*	(29/2$^+$)

[†] From a least-squares fit to Eγ.
[‡] From 2004Lu20, based on the observed band structure.
[#] Band(A): π7/2$^+$[413], α=+1/2.
[@] Band(a): π7/2$^+$[413], α=−1/2.
[&] Band(B): π5/2$^-$[303], α=+1/2.
[a] Band(b): π5/2$^-$[303], α=−1/2.
[b] Band(C): π1/2$^+$[431], α=−1/2.
[c] Band(c): π1/2$^+$[431], α=+1/2.
[d] Band(D): π3/2$^-$[301], g.s. band.
[e] Band(E): side band.

γ(^{105}Tc)

Eγ[†]	Iγ[†]	Ei(level)	Jπi	Ef	Jπf	Mult.[#]	Comments
(18.4[‡] *1*)		322.18	(1/2$^+$)	303.87	(3/2$^+$)		
64.49 *10*	72.5	149.83	(7/2$^+$)	85.52	(5/2$^+$)	M1(+E2)	Mult.: α(exp)=1.13 *10* (2004Lu20).
71.1[‡] *1*		147.86	(5/2$^-$)	76.77	(5/2$^-$)		
76.81 *10*	≈110	76.77	(5/2$^-$)	0.0	(3/2$^-$)		
85.60 *10*	100.0	85.52	(5/2$^+$)	0.0	(3/2$^-$)	E1	Mult.: α(exp)=0.22 *8* (2004Lu20).
89.0[‡] *1*		237.15	(7/2$^-$)	147.86	(5/2$^-$)		
95.1[‡] *1*		441.18	(9/2$^-$)	346.01	(7/2$^-$)		
108.6[‡] *10*		346.01	(7/2$^-$)	237.15	(7/2$^-$)		
129.19 *10*	44.0	278.96	(9/2$^+$)	149.83	(7/2$^+$)	M1+E2	Mult.: α(exp)=0.26 *9* (2004Lu20).
147.72 *10*		147.86	(5/2$^-$)	0.0	(3/2$^-$)		
156.0[‡] *1*		303.87	(3/2$^+$)	147.86	(5/2$^-$)		
157.04 *10*	6.3	750.15	(13/2$^+$)	593.20	(11/2$^+$)	M1(+E2)	Mult.: α(exp)=0.09 *4* (2004Lu20).
160.47 *10*	33.1	237.15	(7/2$^-$)	76.77	(5/2$^-$)		
187.68 *10*	3.1	491.59	(7/2$^+$)	303.87	(3/2$^+$)		
193.30 *10*	1.4	278.96	(9/2$^+$)	85.52	(5/2$^+$)		
196.20 *10*	2.6	1373.57	(17/2$^+$)	1177.36	(15/2$^+$)		
198.34 *10*		346.01	(7/2$^-$)	147.86	(5/2$^-$)		
204.06 *10*	13.9	441.18	(9/2$^-$)	237.15	(7/2$^-$)		
208.0 *1*	2.1	530.08	(5/2$^+$)	322.18	(1/2$^+$)		
218.48 *10*	5.3	303.87	(3/2$^+$)	85.52	(5/2$^+$)		
226.18 *10*	1.3	530.08	(5/2$^+$)	303.87	(3/2$^+$)		
231.24 *10*	5.6	672.39	(11/2$^-$)	441.18	(9/2$^-$)		
237.33 *10*	3.6	237.15	(7/2$^-$)	0.0	(3/2$^-$)		
249.78 *10*	0.9	2118.49	(21/2$^+$)	1868.71	(19/2$^+$)		
269.1[‡] *1*		346.01	(7/2$^-$)	76.77	(5/2$^-$)		
279.14 *10*	3.0	951.55	(13/2$^-$)	672.39	(11/2$^-$)		
279.24 *10*	0.3	1089.36	(13/2$^+$)	810.16	(11/2$^+$)		

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^{252}Cf SF decay 2004Lu20 (continued)

$\gamma(^{105}Tc)$ (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π
284.48 *10*	2.6	1236.09	$(15/2^-)$	951.55	$(13/2^-)$	496.13 *10*		1089.36	$(13/2^+)$	593.20	$(11/2^+)$
303.8[‡] *1*		303.87	$(3/2^+)$	0.0	$(3/2^-)$	503.27 *10*	0.5	2621.75	$(23/2^+)$	2118.49	$(21/2^+)$
309.72 *10*	0.3	2931.48	$(25/2^+)$	2621.75	$(23/2^+)$	505.46 *10*	0.3	1396.78	$(13/2^+)$	891.31	$(9/2^+)$
314.34 *10*	14.8	593.20	$(11/2^+)$	278.96	$(9/2^+)$	507.28 *10*	0.6	1348.92	$(15/2^+)$	841.64	$(11/2^+)$
321.94 *10*	1.7	1898.54	$(19/2^-)$	1576.67	$(17/2^-)$	510.4 *1*		951.55	$(13/2^-)$	441.18	$(9/2^-)$
322.19 *10*	5.1	322.18	$(1/2^+)$	0.0	$(3/2^-)$	531.14 *10*	1.8	810.16	$(11/2^+)$	278.96	$(9/2^+)$
340.56 *10*	2.4	1576.67	$(17/2^-)$	1236.09	$(15/2^-)$	563.69 *10*	7.2	1236.09	$(15/2^-)$	672.39	$(11/2^-)$
341.84 *10*		491.59	$(7/2^+)$	149.83	$(7/2^+)$	584.19 *10*	1.2	1177.36	$(15/2^+)$	593.20	$(11/2^+)$
345.9[‡] *1*		346.01	$(7/2^-)$	0.0	$(3/2^-)$	621.20 *10*	0.4	3251.94	$(27/2^-)$	2630.74	$(23/2^-)$
347.74 *10*	0.6	2630.74	$(23/2^-)$	2282.95	$(21/2^-)$	623.43 *10*	5.5	1373.57	$(17/2^+)$	750.15	$(13/2^+)$
350.05 *10*	1.7	841.64	$(11/2^+)$	491.59	$(7/2^+)$	625.18 *10*	4.6	1576.67	$(17/2^-)$	951.55	$(13/2^-)$
361.19 *10*	1.2	891.31	$(9/2^+)$	530.08	$(5/2^+)$	653.54 *10*	0.4	2002.47	$(19/2^+)$	1348.92	$(15/2^+)$
364.50 *10*	13.9	441.18	$(9/2^-)$	76.77	$(5/2^-)$	660.42 *10*	0.2	810.16	$(11/2^+)$	149.83	$(7/2^+)$
380.20 *10*		530.08	$(5/2^+)$	149.83	$(7/2^+)$	662.41 *10*	4.3	1898.54	$(19/2^-)$	1236.09	$(15/2^-)$
384.40 *10*	1.2	2282.95	$(21/2^-)$	1898.54	$(19/2^-)$	691.35 *10*	0.8	1868.71	$(19/2^+)$	1177.36	$(15/2^+)$
400.1[‡] *3*		891.31	$(9/2^+)$	491.59	$(7/2^+)$	706.25 *10*	1.4	2282.95	$(21/2^-)$	1576.67	$(17/2^-)$
416.3 *1*		3347.79	$(27/2^+)$	2931.48	$(25/2^+)$	726.05 *10*	0.1	3347.79	$(27/2^+)$	2621.75	$(23/2^+)$
427.16 *10*	4.3	1177.36	$(15/2^+)$	750.15	$(13/2^+)$	732.24 *10*	1.6	2630.74	$(23/2^-)$	1898.54	$(19/2^-)$
435.18 *10*	14.1	672.39	$(11/2^-)$	237.15	$(7/2^-)$	744.95 *10*	2.8	2118.49	$(21/2^+)$	1373.57	$(17/2^+)$
443.35 *10*	1.7	593.20	$(11/2^+)$	149.83	$(7/2^+)$	753.01 *10*	0.3	2621.75	$(23/2^+)$	1868.71	$(19/2^+)$
444.5[‡] *1*		530.08	$(5/2^+)$	85.52	$(5/2^+)$	756.68 *10*		2759.15	$(23/2^+)$	2002.47	$(19/2^+)$
471.07 *10*	12.3	750.15	$(13/2^+)$	278.96	$(9/2^+)$	784.4 *1*	0.1	3715.88	$(29/2^+)$	2931.48	$(25/2^+)$
493.04 *10*		839.05	$(11/2^-)$	346.01	$(7/2^-)$	812.99 *10*	0.8	2931.48	$(25/2^+)$	2118.49	$(21/2^+)$
495.11 *10*	1.4	1868.71	$(19/2^+)$	1373.57	$(17/2^+)$						

[†] From 2004Lu20.
[‡] Transition appears only in level scheme of figure 2 in 2004Lu20;
[#] From 2004Lu20, based on α(exp) determined from intensity balances.

^{252}Cf SF decay 2004Lu20

Level Scheme

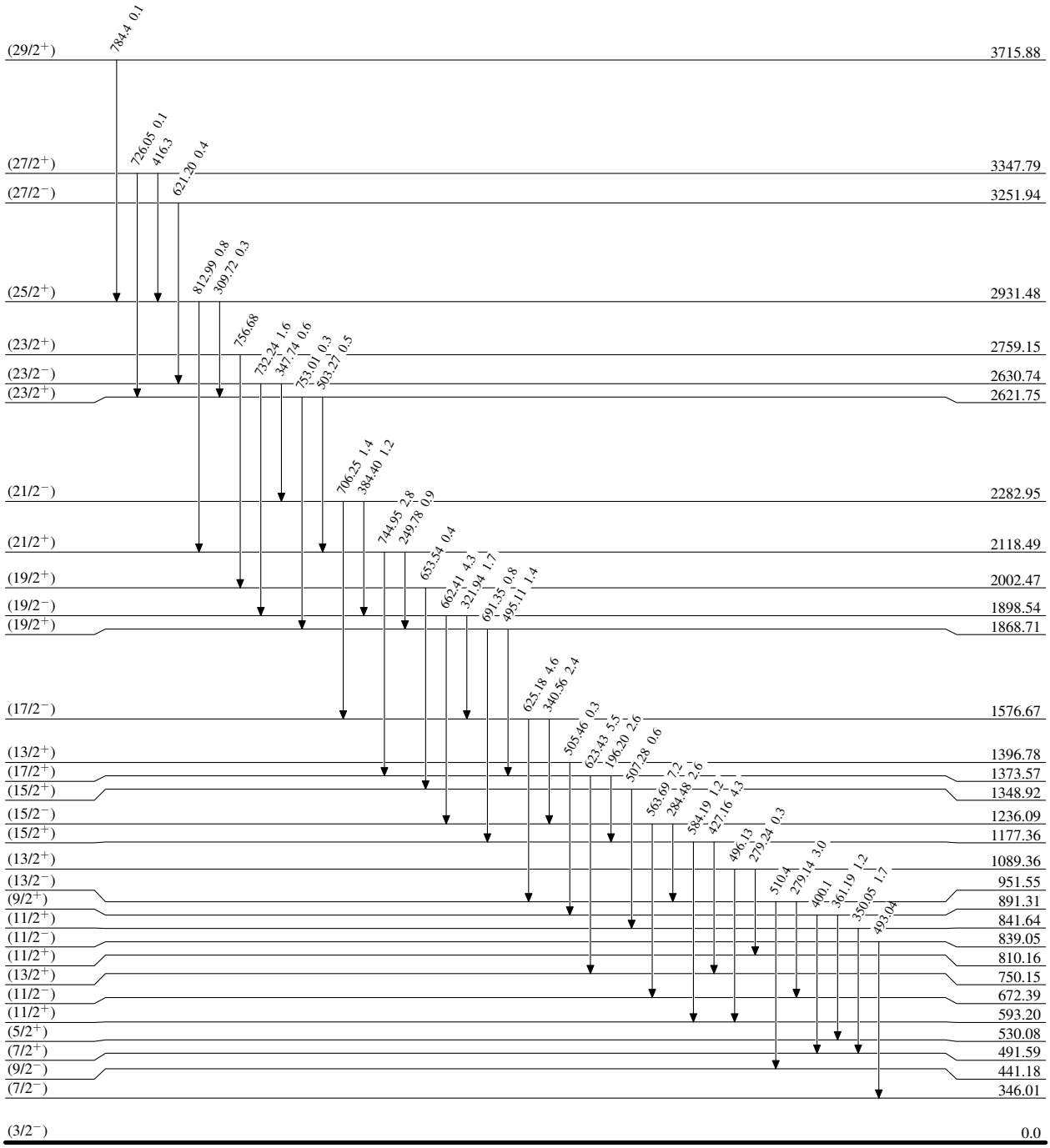
Intensities: Type not specified

Legend

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

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

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



$^{105}_{43}Tc_{62}$

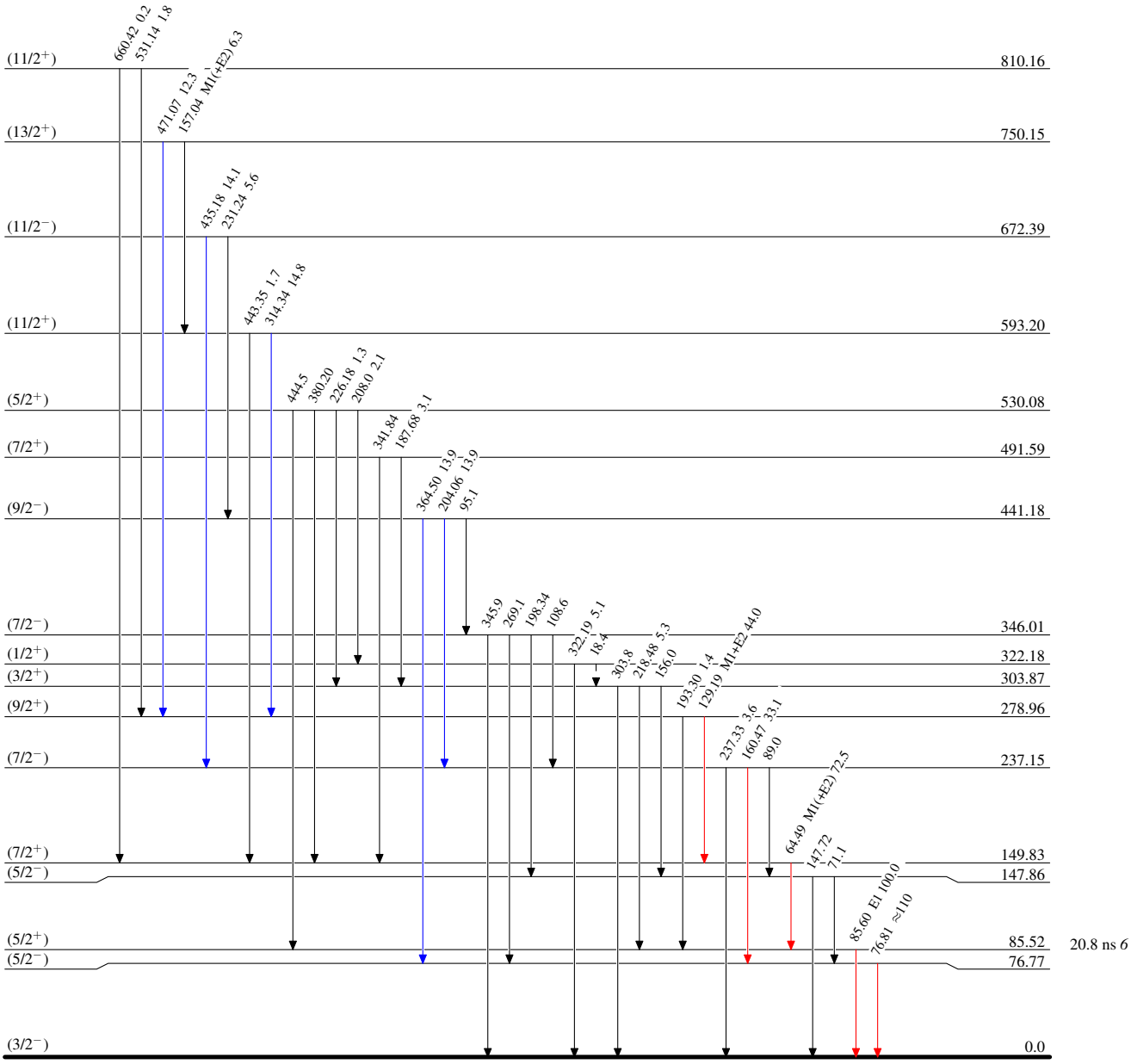
^{252}Cf SF decay 2004Lu20

Level Scheme (continued)

Intensities: Type not specified

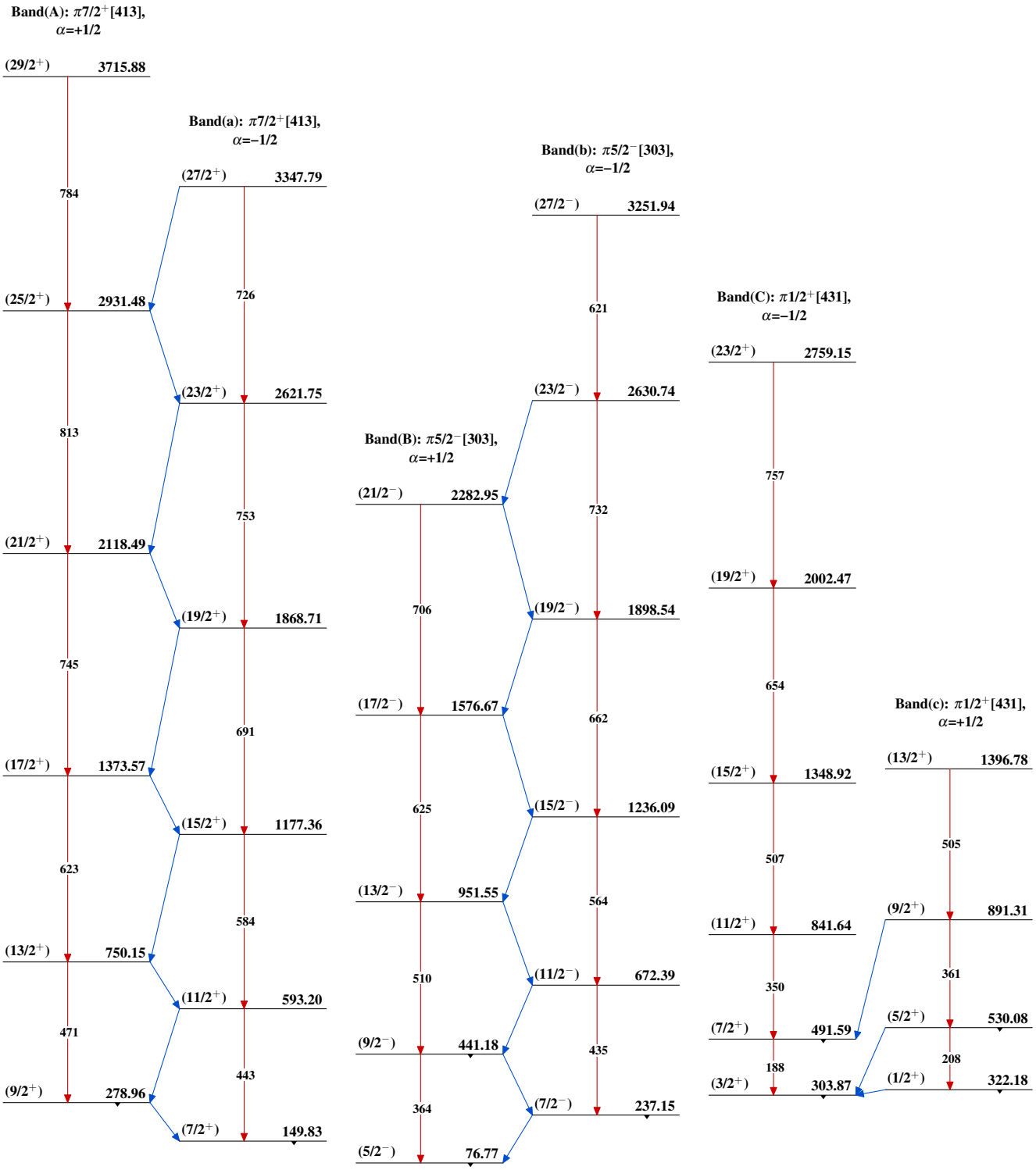
Legend

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



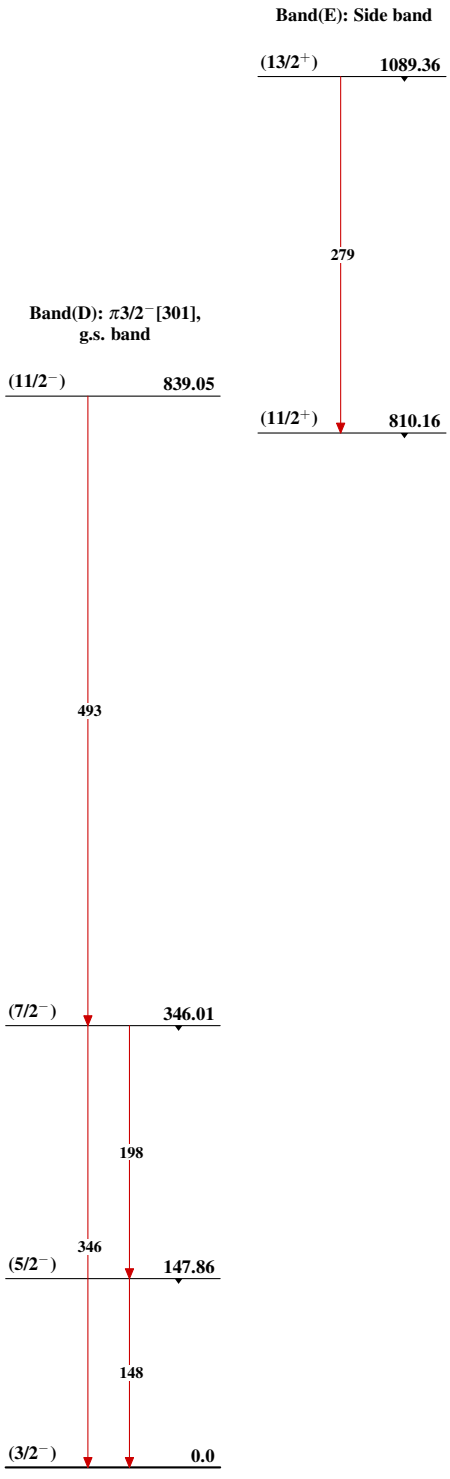
$^{105}_{43}Tc_{62}$

^{252}Cf SF decay 2004Lu20



$^{105}_{43}Tc_{62}$

^{252}Cf SF decay 2004Lu20 (continued)



$^{105}_{43}Tc_{62}$