^{248}Cm SF decay 2010Ur03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Kumar(a), J. Chen(b) and F. G. Kondev	NDS 137, 1 (2016)	31-May-2016

Parent: ^{248}Cm: E=0.0; $J^\pi=0^+$; $T_{1/2}=3.48\times10^5$ y *6*; %SF decay=8.39 *16*

2010Ur03: ^{248}Cm(SF) source (5 mg of curium oxide, embedded uniformly in a pellet of potassium chloride). Detectors: EUROGAM2 array with four LEPS. Measured: Eγ, Iγ, $\gamma\gamma$-coin., $\gamma\gamma(\theta)$. Deduced: levels, J^π, configurations, particle-rotor model calculations.

Others: 1997Bh06, ^{248}Cm(SF) source with EUROGAM II array. The 137γ-437γ double gate shows several γ rays of ^{109}Tc.

^{109}Tc Levels

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0[#]	(5/2$^+$)	0.91 s *3*	$T_{1/2}$: From Adopted Levels.
7.0[a] *3*	(5/2$^-$)		Additional information 1.
			E(level): From Adopted Levels. 2010Ur03 suggests x<30 keV.
69.14[#] *8*	(7/2$^+$)		
172.00[a] *10*	(7/2$^-$)		
206.15[#] *10*	(9/2$^+$)		
387.80[a] *10*	(9/2$^-$)		
494.55[@] *8*	(9/2$^+$)		
504.19[#] *12*	(11/2$^+$)		
605.70[a] *14*	(11/2$^-$)		
632.32[@] *13*	(11/2$^+$)		
643.68[#] *13*	(13/2$^+$)		
915.20[a] *22*	(13/2$^-$)		
964.63[@] *17*	(13/2$^+$)		
1083.97[#] *17*	(15/2$^+$)		
1171.70[a] *25*	(15/2$^-$)		
1231.34[#] *15*	(17/2$^+$)		
1262.17[@] *19*	(15/2$^+$)		
1440.69 *15*	(13/2$^+$)		
1575.2[a] *4*			
1635.6[@] *6*	(17/2$^+$)		
1749.54[&] *16*	(15/2$^-$)		
1796.1[#] *3*	(19/2$^+$)		
1861.3[a] *4*	(19/2$^-$)		
1930.59[&] *17*	(17/2$^-$)		
1951.05[#] *18*	(21/2$^+$)		
2136.83[&] *17*	(19/2$^-$)		
2346.2[a] *6*			
2375.49[&] *21*	(21/2$^-$)		
2642.60[&] *25*	(23/2$^-$)		
2660.2[a] *5*			
2753.3[#] *3*	(25/2$^+$)		
2940.2[&] *3*	(25/2$^-$)		
3438.9[#] *4*	(29/2$^+$)		
4072.1[#] *5*	(33/2$^+$)		
4833.1[#] *7*	(37/2$^+$)		

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^{248}Cm SF decay 2010Ur03 (continued)

^{109}Tc Levels (continued)

† From a least-squares fit to Eγ.
‡ From 2010Ur03, based on deduced transition multipolarities, using α(exp) and γγ(θ), and the assigned band structure.
# Band(A): $K^\pi=5/2^+$, π5/2[422] band.
@ Band(B): $K^\pi=(9/2^+)$, π5/2[422]⊗2^+ γ-vibrational band.
& Band(C): $K^\pi=(15/2^-)$ band. Possible configuration=π5/2[422]⊗ν(1/2[420],9/2[514]).
a Band(D): $K^\pi=5/2^-$, π5/2[303] band.

γ(^{109}Tc)

E_γ†	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ	α#	Comments
69.1 *1*	192 *12*	69.14	(7/2+)	0.0	(5/2+)	M1+E2	1.9 *9*	3.9 *12*	Mult.,δ: using α(K)exp=2.9 *8* (2010Ur03).
137.0 *1*	220 *4*	206.15	(9/2+)	69.14	(7/2+)	M1+E2			Mult.: (437.5γ)(137.0γ)(θ); band assignment (2010Ur03).
139.4 *2*	29 *2*	643.68	(13/2+)	504.19	(11/2+)				
147.2 *3*	8 *1*	1231.34	(17/2+)	1083.97	(15/2+)	M1+E2			Mult.: from (719.7γ)(147.2γ)(θ); band assignment (2010Ur03).
165.0 *1*	76 *4*	172.00	(7/2−)	7.0	(5/2−)				Mult.: α(K)exp=2.2 *7* (2010Ur03) from comparison of Iγ(165γ) and Iγ(Kα x rays), but the value is too large for either Mult=E1, M1 or E2. (433γ)(165γ)(θ) data are also inconclusive.
181.1 *1*	8.7 *6*	1930.59	(17/2−)	1749.54	(15/2−)				
206.1 *2*	4.1 *9*	206.15	(9/2+)	0.0	(5/2+)				
206.3 *1*	7 *1*	2136.83	(19/2−)	1930.59	(17/2−)				
215.8 *2*	21 *1*	387.80	(9/2−)	172.00	(7/2−)				
238.6 *2*	12 *3*	2375.49	(21/2−)	2136.83	(19/2−)				
267.0 *2*	7 *2*	2642.60	(23/2−)	2375.49	(21/2−)				
297.5 *3*	3 *1*	2940.2	(25/2−)	2642.60	(23/2−)				
297.6 *2*	7 *1*	1262.17	(15/2+)	964.63	(13/2+)				
298.0 *1*	100 *3*	504.19	(11/2+)	206.15	(9/2+)				
308.9 *1*	19.2 *14*	1749.54	(15/2−)	1440.69	(13/2+)	D			Mult.: from (946.3γ)(308.9γ)(θ) (2010Ur03).
332.4 *2*	20 *4*	964.63	(13/2+)	632.32	(11/2+)				
374.0@ *5*	4 *1*	1635.6	(17/2+)	1262.17	(15/2+)				
380.8 *1*	44 *3*	387.80	(9/2−)	7.0	(5/2−)	E2			Mult.: (380.8γ)(527.4γ)(θ); band assignment (2010Ur03).
387.3 *1*	3.8 *7*	2136.83	(19/2−)	1749.54	(15/2−)				
425.4 *1*	9 *1*	494.55	(9/2+)	69.14	(7/2+)	D			Mult.: from (946.3γ)(425.4γ)(θ) (2010Ur03).
426.2 *1*	37 *4*	632.32	(11/2+)	206.15	(9/2+)				
433.7 *1*	67 *5*	605.70	(11/2−)	172.00	(7/2−)	E2			Mult.: from (566.0γ)(433.7γ)(θ); band assignment (2010Ur03).
435.0 *2*	25 *2*	504.19	(11/2+)	69.14	(7/2+)				
437.5 *1*	90 *3*	643.68	(13/2+)	206.15	(9/2+)	E2			Mult.: from (437.5γ)(587.6γ)(θ); band assignment (2010Ur03).
440.3 *2*	22 *2*	1083.97	(15/2+)	643.68	(13/2+)				
444.9 *2*	5 *1*	2375.49	(21/2−)	1930.59	(17/2−)				
460.4 *2*	11 *2*	964.63	(13/2+)	504.19	(11/2+)				
494.6 *1*	24 *2*	494.55	(9/2+)	0.0	(5/2+)	Q			Mult.: from (946.3γ)(494.6γ)(θ) (2010Ur03).
505.9 *3*	18 *4*	2642.60	(23/2−)	2136.83	(19/2−)				
527.4 *2*	30 *2*	915.20	(13/2−)	387.80	(9/2−)	E2			Mult.: from (380.8γ)(527.4γ)(θ); band assignment (2010Ur03).

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^{248}Cm SF decay 2010Ur03 (continued)

$\gamma(^{109}Tc)$ (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
564.7 *3*	7.9 *14*	1796.1	$(19/2^+)$	1231.34	$(17/2^+)$		
564.8 *3*	3 *1*	2940.2	$(25/2^-)$	2375.49	$(21/2^-)$		
566.0 *2*	39 *3*	1171.70	$(15/2^-)$	605.70	$(11/2^-)$	E2	Mult.: from (566.0γ)(433.7γ)(θ); band assignment (2010Ur03).
579.7 *2*	6.0 *15*	1083.97	$(15/2^+)$	504.19	$(11/2^+)$		
587.6 *1*	70 *2*	1231.34	$(17/2^+)$	643.68	$(13/2^+)$	E2	Mult.: from (719.7γ)(587.6γ)(θ); band assignment (2010Ur03).
629.9 *3*	8 *1*	1262.17	$(15/2^+)$	632.32	$(11/2^+)$		
633.2 *3*	4 *1*	4072.1	$(33/2^+)$	3438.9	$(29/2^+)$	E2	Mult.: from (685.5γ)(633.2γ)(θ); band assignment (2010Ur03).
660.0 *3*	8.9 *19*	1575.2		915.20	$(13/2^-)$		
668.5 *2*	7 *1*	1930.59	$(17/2^-)$	1262.17	$(15/2^+)$		
671.0 *5*	5 *1*	1635.6	$(17/2^+)$	964.63	$(13/2^+)$		
685.5 *2*	8 *1*	3438.9	$(29/2^+)$	2753.3	$(25/2^+)$	E2	Mult.: from (685.5γ)(802.3γ)(θ); band assignment (2010Ur03).
689.6 *2*	16 *2*	1861.3	$(19/2^-)$	1171.70	$(15/2^-)$	Q	Mult.: from (566.0γ)(689.6γ)(θ) (2010Ur03).
712.2 *3*	2.3 *6*	1796.1	$(19/2^+)$	1083.97	$(15/2^+)$		
719.7 *1*	31 *1*	1951.05	$(21/2^+)$	1231.34	$(17/2^+)$	E2	Mult.: from (719.7γ)(802.3γ)(θ); band assignment (2010Ur03).
761.0 *5*	2 *1*	4833.1	$(37/2^+)$	4072.1	$(33/2^+)$		
771.0 *4*	4.1 *17*	2346.2		1575.2			
798.9 *3*	3.6 *18*	2660.2		1861.3	$(19/2^-)$		
802.3 *2*	12 *1*	2753.3	$(25/2^+)$	1951.05	$(21/2^+)$	E2	Mult.: from (719.7γ)(802.3γ)(θ); band assignment (2010Ur03).
808.4 *2*	1.8 *4*	1440.69	$(13/2^+)$	632.32	$(11/2^+)$		
905.2 *2*	6.7 *5*	2136.83	$(19/2^-)$	1231.34	$(17/2^+)$		
946.3 *2*	6.7 *6*	1440.69	$(13/2^+)$	494.55	$(9/2^+)$	E2	Mult.: from (946.3γ)(494.6γ)(θ); band assignment (2010Ur03).

[†] From 2010Ur03.
[‡] From α(exp) and $\gamma\gamma(\theta)$ data in 2010Ur03.
[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[@] Placement of transition in the level scheme is uncertain.

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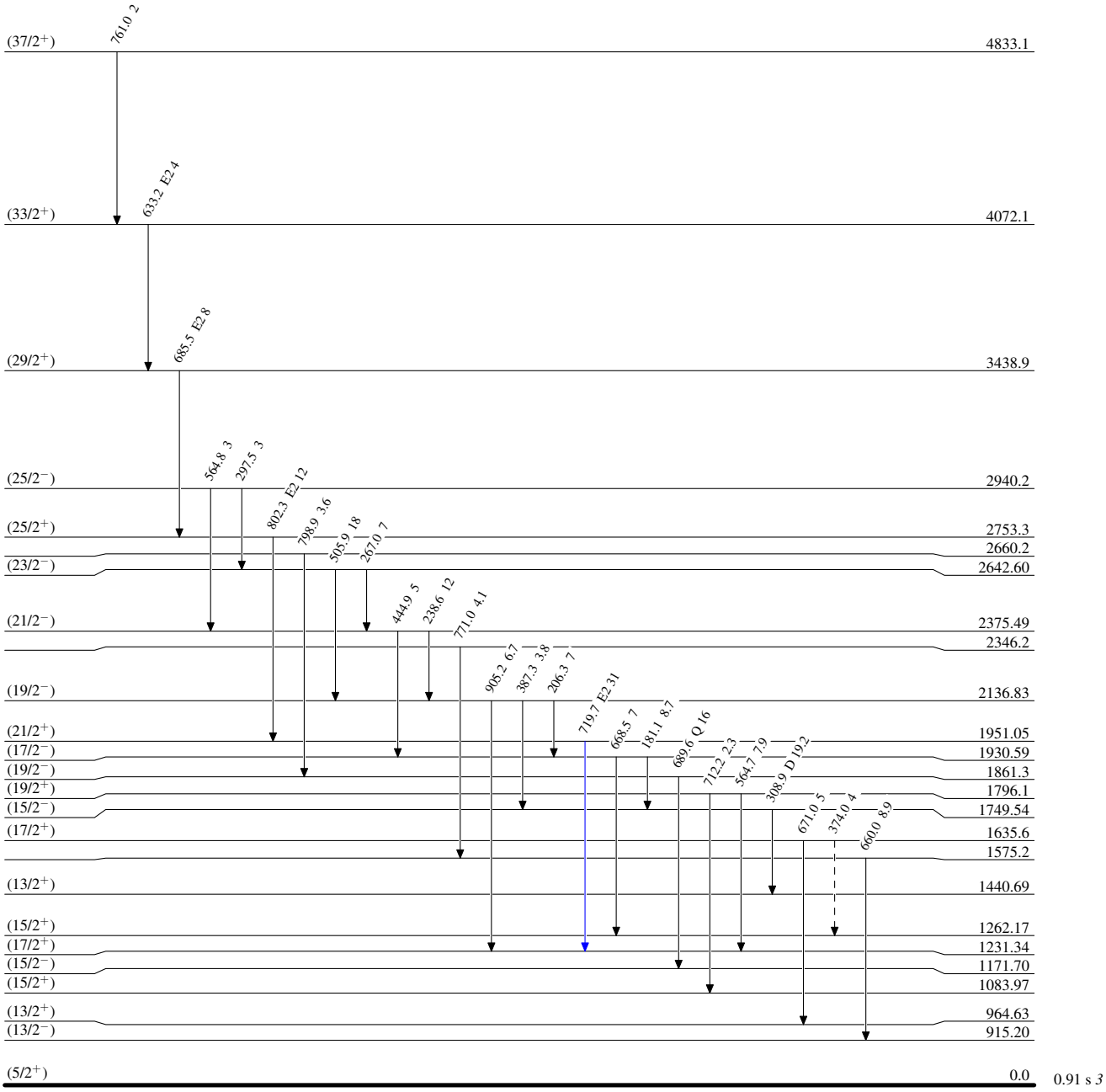
Level Scheme

Intensities: Relative I_γ

Legend

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



$^{109}_{43}Tc_{66}$

^{248}Cm SF decay 2010Ur03

Level Scheme (continued)

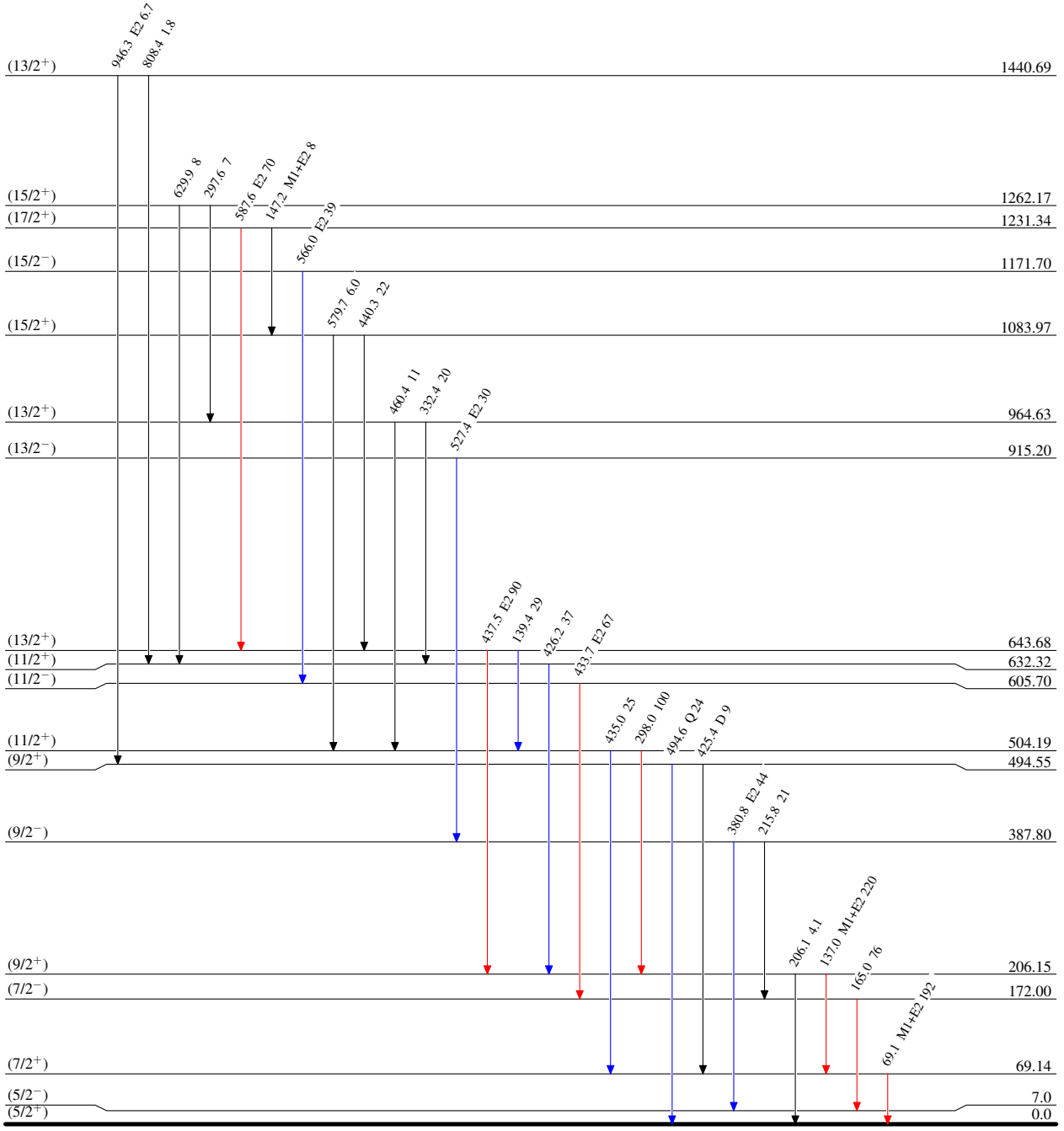
Intensities: Relative I_γ

Legend

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

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

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



$^{109}_{43}Tc_{66}$

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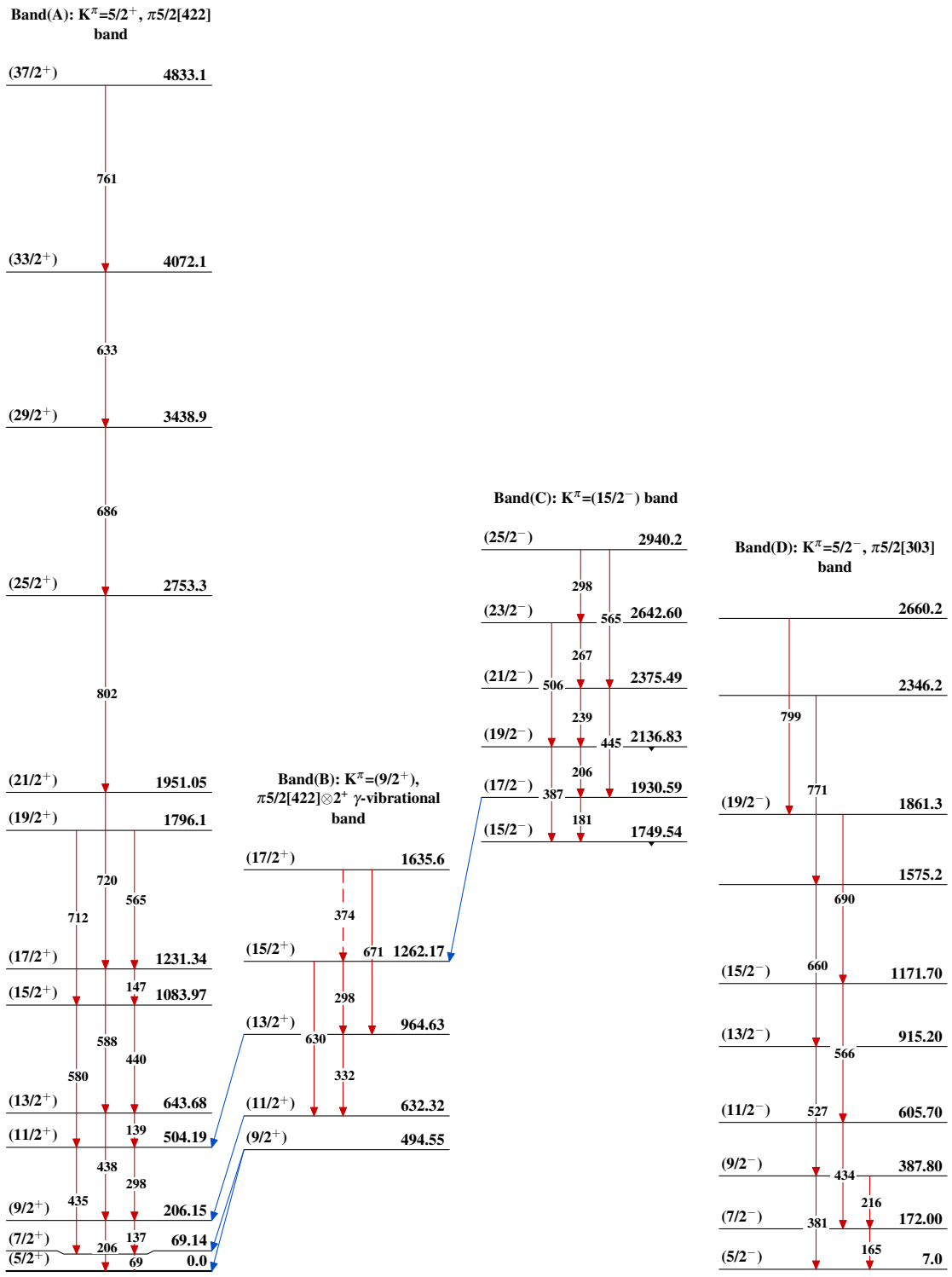

$^{109}_{43}Tc_{66}$