^{248}Cm SF decay 2019Ur01,2004Du10,1996Sm04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, Balraj Singh	NDS 164, 1 (2020)	15-Feb-2020

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

^{248}Cm-$T_{1/2}$: From ^{248}Cm Adopted Levels in the ENSDF database.

^{248}Cm-%SF decay: %SF=8.39 *16* from the Adopted Levels of ^{248}Cm in the ENSDF database.

2019Ur01: measured Eγ, Iγ, γγ-coin, γγ(θ), γγ(θ) using the Euroball 2 and Gammasphere arrays, the latter for γγ(θ) data. Deduced levels, J, π, band structures based on 0^+ states, configurations. The γγ(θ) data were obtained using ^{252}Cf SF decay and Gammasphere array at Argonne National Laboratory.

2004Du10: measured Eγ, Iγ, γγ-coin, γγ(θ), γγ(lin pol) using the Euroball and Gammasphere arrays. Deduced levels, J, π, band structures, configurations.

1996Sm04 (also 2012Sm02, 2001Ur01): measured Eγ, Iγ, γγ-coin, Doppler-broadened line shape using Eurogam-2 array. Deduced lifetimes using Doppler-profile method (DPM), intrinsic quadrupole moment of the g.s. band. 2001Ur01 reported measurement of quadrupole moment.

1991Ho16: measured Eγ, Iγ, γγ-coin using Argonne-Notre Dame BGO γ-ray facility consisting of Ge and LEPS detectors. Deduced levels.

2019Ur01, 2004Du10, 1996Sm04 (also 2012Sm02), 2001Ur01 are from the same group.

Others: 1972Ho08, 1970Jo20.

^{98}Sr Levels

E(level)[†]	J^{π}[#]	$T_{1/2}$[@]	Comments
0.0[&]	0^+		
144.70[&] *5*	2^+		
215.4[‡a] *3*	0^+		
434.10[&] *7*	4^+		
867.40[&] *9*	6^+		
871.17[‡a] *19*	(2^+)		Level and γ rays reported by 2019Ur01.
1433.68[&] *13*	8^+	2.97 ps *48*	$T_{1/2}$: from lifetime=4.28 ps *54*(stat) *43*(syst) in 1996Sm04.
1681.44[‡a] *20*	(4^+)		Level and γ rays reported by 2019Ur01.
1837.7[b] *10*	(3^+)		
1977.7[b] *13*	(4^+)		
2043.1 *10*			
2123.18[&] *24*	(10^+)	1.07 ps *17*	E(level): 2133.0 from 1991Ho16. $T_{1/2}$: from lifetime=1.55 ps *19*(stat) *15*(syst) in 1996Sm04.
2152.7[b] *13*	(5^+)		
2182.1 *15*			
2360.7[b] *14*	(6^+)		
2432.24[‡a] *15*	(6^+)		
2533.4[c] *10*	(6^+)		
2574.8 *8*			
2601.7[b] *15*	(7^+)		
2770.4[c] *14*			
2818.29[‡] *18*	(7^+)		Level and γ rays reported by 2019Ur01.
2873.7[b] *16*	(8^+)		
2898.4[d] *14*			
2927.7[&] *17*	(12^+)	0.46 ps *7*	E(level),J^{π}: level from 1996Sm04. $T_{1/2}$: from lifetime=0.67 ps *8*(stat) *7*(syst) in 1996Sm04.
3039.4[c] *17*			
3161.4[d] *15*			

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^{248}Cm SF decay 2019Ur01,2004Du10,1996Sm04 (continued)

^{98}Sr Levels (continued)

E(level)[†]	Jπ[#]
3177.7[b] *16*	(9+)
3339.4[c] *20*	
3444.4[d] *18*	
3668.4[c] *22*	

† From a least-squares fit to γ-ray energies, assuming ΔEγ=1 keV when not stated.
‡ Level from 2019Ur01.
# From 2004Du10, unless otherwise stated based on γγ(θ,pol) for high-spin states, although no numerical data are quoted in this work.
@ From Doppler-profile method (1996Sm04). Uncertainty is deduced by evaluators by combining in quadrature statistical and systematic uncertainties.
& Band(A): g.s. band Q(intrinsic)=3.40 *15* (2001Ur01). Other: 3.17 *20* (1996Sm04). Q_0 deduced from lifetime data for 8^+, 10^+ and 12^+ states. Proposed configuration=$\nu h^2_{11/2}\otimes\nu 9/2[404]^{-2}$, prolate structure (2019Ur01).
[a] Band(B): Band based on 215.4, 0^+. Proposed configuration=$\nu 11/2[505]^2\otimes\nu 9/2[404]^{-2}$, oblate structure (2019Ur01).
[b] Band(C): $\nu 9/2[404]-3/2[411]$, $K^\pi=(3^+)$. Band assignment from 2004Du10.
[c] Band(D): $\nu 9/2[404]+3/2[411]$, $K^\pi=(6^+)$. Band assignment from 2004Du10.
[d] Seq.(E): γ cascade.

γ(^{98}Sr)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[#]	Comments
70.7 *3*	1.5 *7*	215.4	0^+	144.70	2^+	[E2]	3.61 *8*	
139[‡]		2182.1		2043.1				
140[‡]		1977.7	(4^+)	1837.7	(3^+)			
143[‡]		2574.8		2432.24	(6^+)			
144.70 *5*	100 *4*	144.70	2^+	0.0	0^+	E2	0.262	
175[‡]		2152.7	(5^+)	1977.7	(4^+)			
208[‡]		2360.7	(6^+)	2152.7	(5^+)			
237[‡]		2770.4		2533.4	(6^+)			
241[‡]		2601.7	(7^+)	2360.7	(6^+)			
263[‡]		3161.4		2898.4				
269[‡]		3039.4		2770.4				
272[‡]		2873.7	(8^+)	2601.7	(7^+)			
283[‡]		3444.4		3161.4				
289.40 *5*	111 *4*	434.10	4^+	144.70	2^+	E2	0.0218	(289.4γ)(144.7γ)(θ): A_2=+0.092 *9*, A_4=+0.015 *15*, consistent with 4 → 2 → 0 cascade (2019Ur01).
300[‡]		3339.4		3039.4				
304[‡]		3177.7	(9^+)	2873.7	(8^+)			
315[‡]		2152.7	(5^+)	1837.7	(3^+)			
329[‡]		3668.4		3339.4				
365[‡]		2898.4		2533.4	(6^+)			
383[‡]		2360.7	(6^+)	1977.7	(4^+)			
385.9 *3*	0.6 *3*	2818.29	(7^+)	2432.24	(6^+)			
391[‡]		3161.4		2770.4				

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^{248}Cm SF decay 2019Ur01,2004Du10,1996Sm04 (continued)

γ(^{98}Sr) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[#]	Comments
433.30 *5*	95 *5*	867.40	6^+	434.10	4^+	E2	0.0057	(433.3γ)(289.4γ)(θ): A_2=+0.101 *10*, A_4=+0.019 *15*, consistent with 6 → 4 → 2 cascade (2019Ur01).
449[‡]		2601.7	(7^+)	2152.7	(5^+)			
513[‡]		2873.7	(8^+)	2360.7	(6^+)			
566.3 *1*	38 *5*	1433.68	8^+	867.40	6^+	E2		(566.3γ)(433.3γ)(θ): A_2=+0.121 *17*, A_4=−0.019 *27*, consistent with 8 → 6 → 4 cascade (2019Ur01).
576[‡]		3177.7	(9^+)	2601.7	(7^+)			
655.8 *4*	1.0 *5*	871.17	(2^+)	215.4	0^+			
689.5 *2*	8 *1*	2123.18	(10^+)	1433.68	8^+	E2		(689.5γ)(433.3γ+289.4γ+144.7γ)(θ): A_2=+0.090 *18*, A_4=+0.024 *26*, consistent with 10 → 8 → 6 cascade (2019Ur01).
726.7 *3*	0.9 *3*	871.17	(2^+)	144.70	2^+			
751.0[@] *5*	0.5 *3*	2432.24	(6^+)	1681.44	(4^+)			
804.5 *3*	4 *2*	2927.7	(12^+)	2123.18	(10^+)			E_γ: from ^{248}Cf SF decay (2019Ur01). Others: 812.5 (1996Sm04), 810.0 (2001Ur01) in ^{248}Cm SF decay; 805.6 (2004Li66) in ^{252}Cf SF decay. The spread in the available Eγ values makes the precise energy of this transition uncertain. This may be the reason 2019Ur01, in Fig. 2 of their paper place Eγ value and the corresponding level energy in parentheses.
810.4 *4*	1.0 *5*	1681.44	(4^+)	871.17	(2^+)			
871.0 *3*	2 *1*	871.17	(2^+)	0.0	0^+			
1247.3 *2*	0.7 *3*	1681.44	(4^+)	434.10	4^+			
1384.7 *2*	0.9 *3*	2818.29	(7^+)	1433.68	8^+			
1493[‡@]		2360.7	(6^+)	867.40	6^+			
1537.0[@] *5*	0.5 *3*	1681.44	(4^+)	144.70	2^+			
1564.7 *2*	2.2 *4*	2432.24	(6^+)	867.40	6^+			
1609[‡]		2043.1		434.10	4^+			
1666[‡]		2533.4	(6^+)	867.40	6^+			
1693[‡]		1837.7	(3^+)	144.70	2^+			
1707[‡]		2574.8		867.40	6^+			
1719[‡@]		2152.7	(5^+)	434.10	4^+			
1950.8 *3*	1.1 *3*	2818.29	(7^+)	867.40	6^+			
1998.2 *2*	1.2 *3*	2432.24	(6^+)	434.10	4^+			
2099[‡@]		2533.4	(6^+)	434.10	4^+			

[†] From 2019Ur01, unless otherwise stated.
[‡] From 2004Du10.
[#] 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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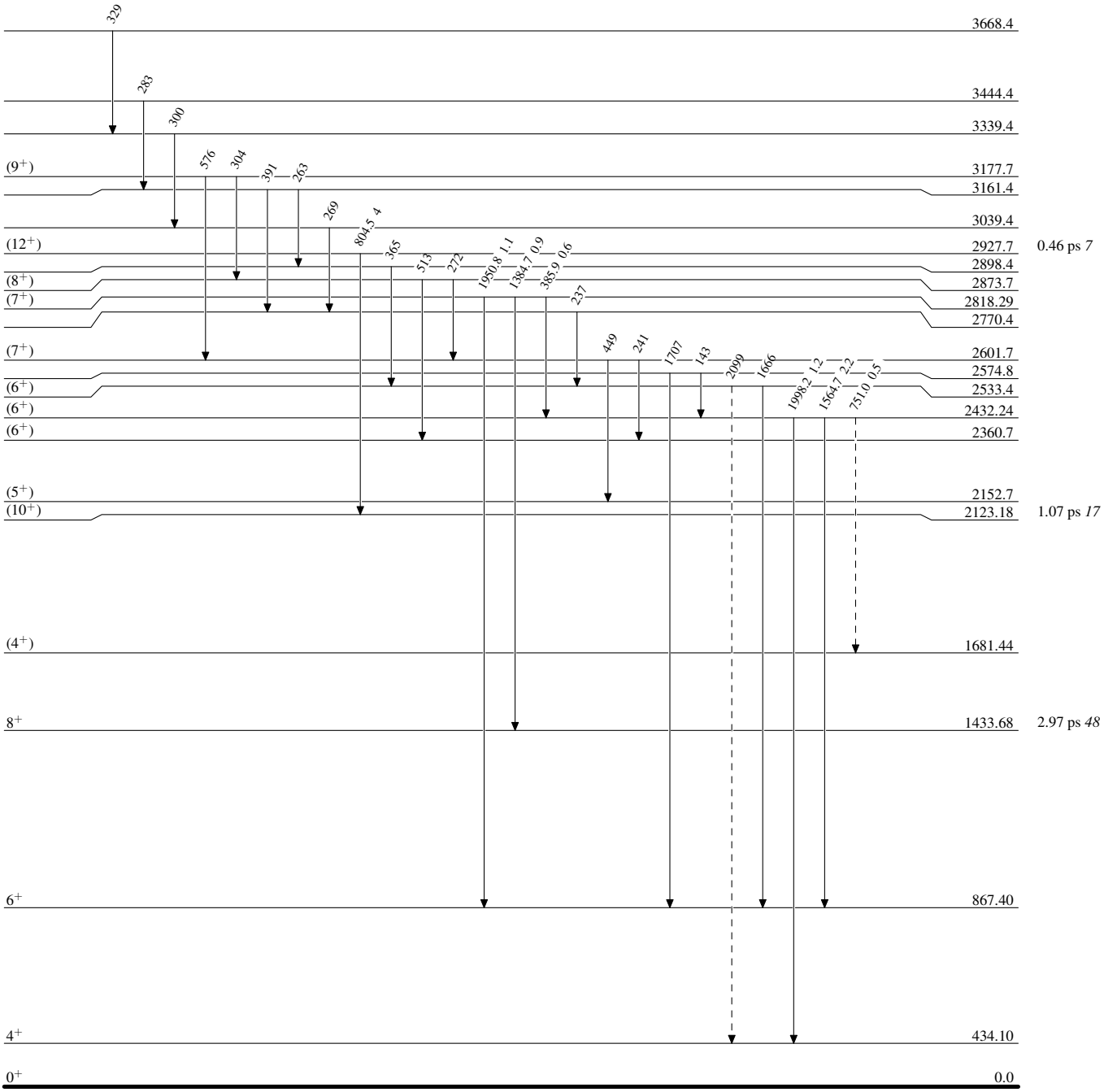
Legend

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

Level Scheme

Intensities: Relative I_γ



$^{98}_{38}Sr_{60}$

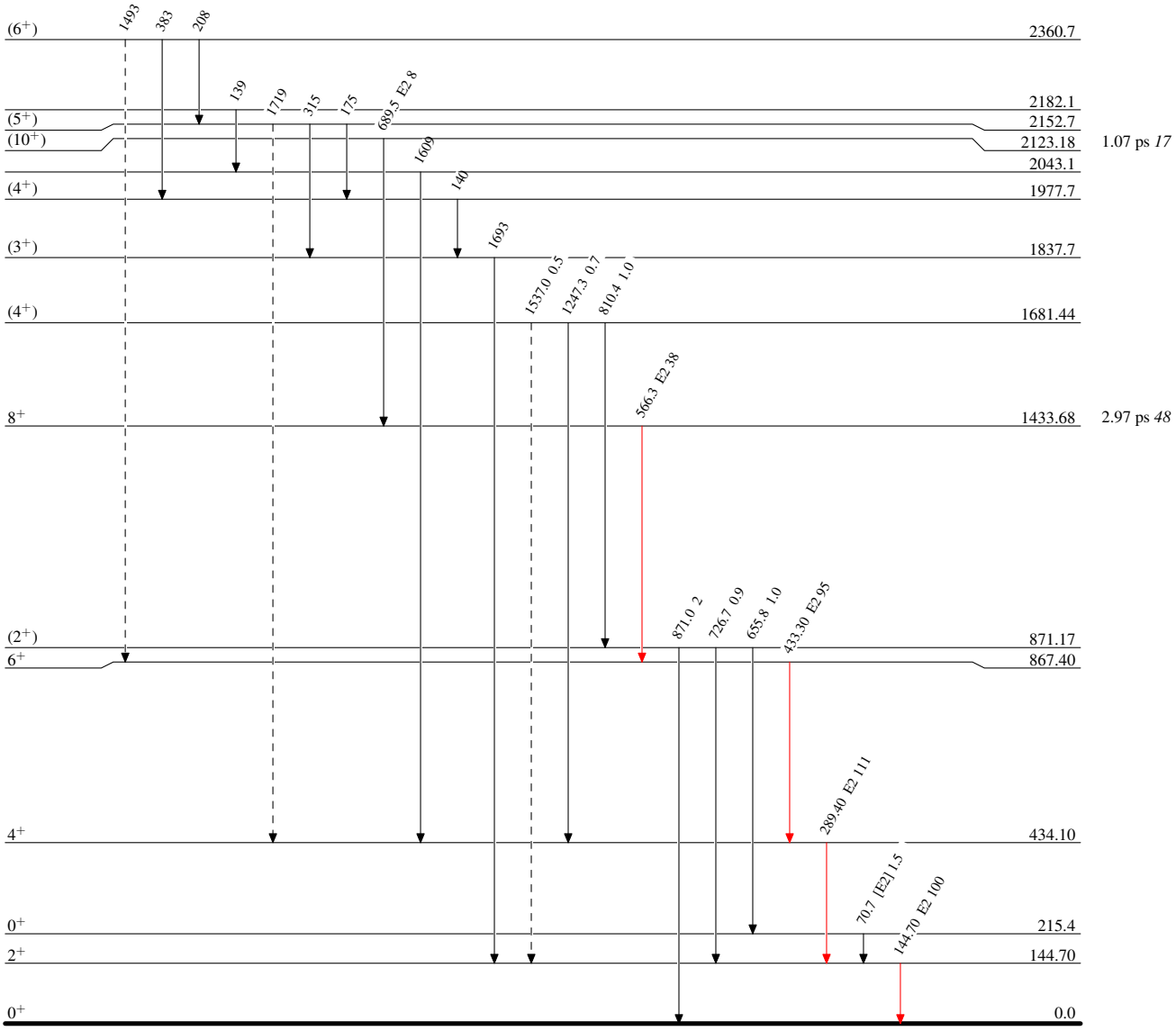
^{248}Cm SF decay 2019Ur01,2004Du10,1996Sm04

Level Scheme (continued)

Intensities: Relative I_γ

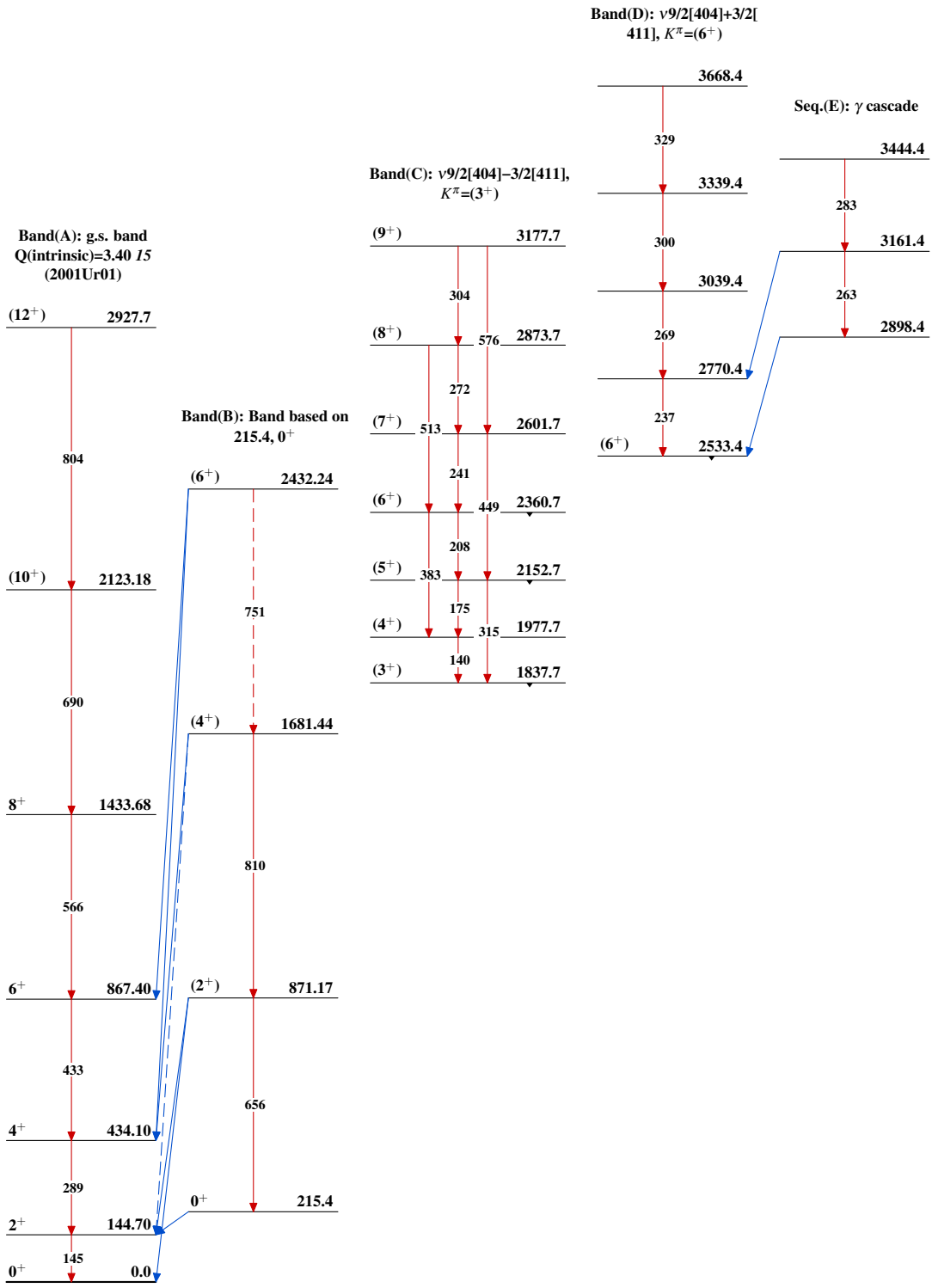
Legend

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



$^{98}_{38}Sr_{60}$

^{248}Cm SF decay 2019Ur01,2004Du10,1996Sm04



$^{98}_{38}Sr_{60}$