^{252}Cf SF decay 2009Di12,2008Di11,1995Bu14

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: ^{252}Cf: E=0.0; $J^\pi=0^+$; $T_{1/2}$=2.645 y *8*; %SF decay=3.086 *8*

2009Di12,2008Di11: ^{252}Cf source ≈62 μCi sandwiched between two Fe foils with a thickness of 10 mg/cm^2 at Lawrence Berkeley National Laboratory, USA. Detectors: Gammasphere array (consisting of 102 Compton-suppressed Ge detectors). Measured: Eγ, Iγ, γγγ, γγ(θ). A total of 5.7×10^{11} triple-γ or higher coincident events were collected. Deduced: level scheme, band structure. Comparison with Triaxial-rotor-plus-particle Model, TRS calculations.

1995Bu14: ^{252}Cf source, two experiments, first experiment with 32 Ge Detector array (earlier GAMMASPHERE), second experiments with three Ge detector and two LEPS detector. Measured: Eγ, Iγ, γγγ, γγ(θ).

Others:1998Hw02,1998Zh39,1976ChZD,1974ClZX,1973Ho22,1970Jo20,1969WiZX.

^{109}Ru Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0#	5/2+	657.9# *4*	11/2+	1677.1@ *5*	17/2+	2773.4# *9*	23/2+
96.4& *4*	5/2−	679.5& *6*	15/2−	1891.2& *8*	21/2−	2994.8@ *7*	25/2+
132.1& *4*	7/2−	777.3@ *4*	11/2+	1912.1& *8*	23/2−	3179.4# *8*	25/2+
185.1# *4*	7/2+	948.5# *5*	13/2+	1966.0# *7*	19/2+	3391.0@ *8*	27/2+
230.6& *5*	9/2−	1056.1@ *5*	13/2+	2011.9@ *6*	19/2+	3636.5& *10*	29/2−
304.8& *6*	11/2−	1184.6& *7*	17/2−	2328.7@ *6*	21/2+	3662.4# *10*	27/2+
332.5@ *4*	7/2+	1221.1& *7*	19/2−	2364.4# *6*	21/2+	3667.2& *11*	31/2−
407.8# *4*	9/2+	1256.3# *5*	15/2+	2693.2@ *7*	23/2+	4022.6# *10*	29/2+
553.6@ *5*	9/2+	1350.7@ *5*	15/2+	2715.6& *8*	25/2−	4167.3@ *10*	31/2+
619.5& *6*	13/2−	1600.2# *5*	17/2+	2734.1& *10*	27/2−		

† From a least-squares fit to Eγ.

‡ From 2009Di12 based on the deduced transition multipolarities and the observed band structures, unless otherwise stated.

Band(A): $K^\pi=5/2^+$ band, a mixture between $\nu 5/2^+[413]$ and $\nu 5/2^+[402]$ Nilsson configurations.

@ Band(B): $\nu 7/2[404]$ band.

& Band(C): $\nu 5/2[532]$ band.

γ(^{109}Ru)

Eγ†	Iγ†	Ei(level)	Jiπ	Ef	Jfπ	Mult.‡	α#	Comments
35.7 *5*		132.1	7/2−	96.4	5/2−			
36.5 *5*		1221.1	19/2−	1184.6	17/2−			
60.0 *5*		679.5	15/2−	619.5	13/2−			
74.2 *5*		304.8	11/2−	230.6	9/2−			Eγ: Others: 74.2 keV (1973Ho22) and 74 keV (1969WiZX),
96.4 *5*		96.4	5/2−	0.0	5/2+			Eγ: Other: 96.1 keV (1974ClZX).
98.5 *5*	100	230.6	9/2−	132.1	7/2−			Eγ: Other: 98.2 keV (1974ClZX).
132.1 *5*	19	132.1	7/2−	0.0	5/2+	(E1)	0.0623 *11*	α(K)=0.0546 *10*; α(L)=0.00638 *12*; α(M)=0.001164 *21* α(N)=0.000185 *4*; α(O)=8.84×10^{-6} *16* Eγ: Other: 132.0 keV (1974ClZX) and 131.8 keV (1973Ho22). Mult.: $A_2/A_0=-0.14$ *4*, $A_4/A_0=0.06$ *4* for (172γ)(132γ)(θ) (1995Bu14).
134.2 *5*	7.0	230.6	9/2−	96.4	5/2−			

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^{252}Cf SF decay 2009Di12,2008Di11,1995Bu14 (continued)

γ(^{109}Ru) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[‡]	α[#]	Comments
147.4 *5*	1.8	332.5	7/2$^+$	185.1	7/2$^+$				
172.7 *5*	19	304.8	11/2$^-$	132.1	7/2$^-$	(E2)		0.183 *4*	α(K)=0.154 *3*; α(L)=0.0242 *5*; α(M)=0.00450 *9* α(N)=0.000694 *13*; α(O)=2.43×10^{-5} *5* E$_\gamma$: other: 172.3 keV (1973Ho22) and 172 keV (1969WiZX), Mult.: A$_2$/A$_0$=0.12 *3*, A$_4$/A$_0$=0.03 *3* for (374γ)(172γ)(θ) (1995Bu14).
185.1 *5*	126	185.1	7/2$^+$	0.0	5/2$^+$	M1+E2	−0.25 *6*	0.062 *3*	α(K)=0.0543 *22*; α(L)=0.0067 *4*; α(M)=0.00124 *7* α(N)=0.000198 *11*; α(O)=9.9×10^{-6} *4* Mult.,δ: from A$_2$/A$_0$=−0.16 *2*, A$_4$/A$_0$=0.01 *3* for (473γ)(185γ)(θ) (2008Go18). Other value: δ(E2/M1)=−2.0 *4* (2008Go18).
222.7 *5*	49	407.8	9/2$^+$	185.1	7/2$^+$	M1+E2	−0.35 *6*	0.0396 *15*	α(K)=0.0344 *13*; α(L)=0.00425 *21*; α(M)=0.00078 *4* α(N)=0.000125 *6*; α(O)=6.19×10^{-6} *19* Mult.,δ: A$_2$/A$_0$=−0.20 *3*,A$_4$/A$_0$=−0.03 *2* for (540.7γ)(222.7γ)(θ) (2008Go18). Other value: δ(E2/M1)=−1.8 *4* (2008Go18).
223.7 *5*	2.3	777.3	11/2$^+$	553.6	9/2$^+$				
250.1 *5*	17	657.9	11/2$^+$	407.8	9/2$^+$				
290.6 *5*	9.0	948.5	13/2$^+$	657.9	11/2$^+$				
307.8 *5*	2.3	1256.3	15/2$^+$	948.5	13/2$^+$				
314.7 *5*	14	619.5	13/2$^-$	304.8	11/2$^-$				E$_\gamma$: other: 314.2 keV (1973Ho22).
328.8 *5*	2.0	2693.2	23/2$^+$	2364.4	21/2$^+$				
332.5 *5*	17.9	332.5	7/2$^+$	0.0	5/2$^+$				
343.9 *5*	0.8	1600.2	17/2$^+$	1256.3	15/2$^+$				
368.5 *5*	31.1	553.6	9/2$^+$	185.1	7/2$^+$				
369.5 *5*	14.1	777.3	11/2$^+$	407.8	9/2$^+$	(M1)		0.00971	α(K)=0.00851 *13*; α(L)=0.000991 *15*; α(M)=0.000182 *3* α(N)=2.94×10^{-5} *5*; α(O)=1.559×10^{-6} *23* Mult.: A$_2$/A$_0$=−0.08 *7*, A$_4$/A$_0$=−0.06 *11* for 369.5γ)(407.8γ)(θ) (2008Di11).
374.7 *5*	36	679.5	15/2$^-$	304.8	11/2$^-$	(E2)		0.01295	α(K)=0.01120 *17*; α(L)=0.001440 *22*; α(M)=0.000265 *4* α(N)=4.21×10^{-5} *7*; α(O)=1.91×10^{-6} *3* E$_\gamma$: others: 374.2 keV (1973Ho22) and 374 keV (1969WiZX), Mult.: A$_2$/A$_0$=0.12 *3*, A$_4$/A$_0$=0.03 *3* for (374γ)(172γ)(θ) and A$_2$/A$_0$=0.12 *2*, A$_4$/A$_0$=−0.01 *2* (541γ)(374γ)(θ) (1995Bu14).
388.9 *5*	8.8	619.5	13/2$^-$	230.6	9/2$^-$				
398.2 *5*	6.6	1056.1	13/2$^+$	657.9	11/2$^+$				
402.2 *5*	3.0	1350.7	15/2$^+$	948.5	13/2$^+$				
407.8 *5*	144	407.8	9/2$^+$	0.0	5/2$^+$	(E2)		0.00991	α(K)=0.00859 *13*; α(L)=0.001089 *16*; α(M)=0.000200 *3* α(N)=3.19×10^{-5} *5*; α(O)=1.476×10^{-6} *22* Mult.: A$_2$/A$_0$=−0.08 *7*, A$_4$/A$_0$=−0.06 *11* for 369.5γ)(407.8γ)(θ) (2008Di11).
411.7 *5*	1.0	2011.9	19/2$^+$	1600.2	17/2$^+$				
420.8 *5*	1.4	1677.1	17/2$^+$	1256.3	15/2$^+$				
444.8 *5*	10.4	777.3	11/2$^+$	332.5	7/2$^+$				

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^{252}Cf SF decay 2009Di12,2008Di11,1995Bu14 (continued)

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

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[#]	Comments
472.8 *5*	31	657.9	$11/2^+$	185.1	$7/2^+$			
502.5 *5*	7.4	1056.1	$13/2^+$	553.6	$9/2^+$			
505.1 *5*	3.6	1184.6	$17/2^-$	679.5	$15/2^-$			
540.7 *5*	22	948.5	$13/2^+$	407.8	$9/2^+$			
541.6 *5*	14	1221.1	$19/2^-$	679.5	$15/2^-$	(E2)	0.00424	α(K)=0.00369 *6*; α(L)=0.000451 *7*; α(M)=8.27×10^{-5} *12* α(N)=1.324×10^{-5} *19*; α(O)=6.45×10^{-7} *10* Mult.: A_2/A_0=0.19 *5*, A_4/A_0=−0.05 *5* for (691γ)(541γ)(θ) and A_2/A_0=0.12 *2*, A_4/A_0=−0.01 *2* for (541γ)(374γ)(θ) (1995Bu14).
565.1 *5*	6.7	1184.6	$17/2^-$	619.5	$13/2^-$			
573.4 *5*	11.8	1350.7	$15/2^+$	777.3	$11/2^+$			
598.4 *5*	16	1256.3	$15/2^+$	657.9	$11/2^+$			
621.0 *5*	4.8	1677.1	$17/2^+$	1056.1	$13/2^+$			
630.4 *5*	1.7	2994.8	$25/2^+$	2364.4	$21/2^+$			
648.3 *5*	4.7	1056.1	$13/2^+$	407.8	$9/2^+$			
651.6 *5*	1.7	2328.7	$21/2^+$	1677.1	$17/2^+$			
651.7 *5*	14	1600.2	$17/2^+$	948.5	$13/2^+$			
661.2 *5*	4.7	2011.9	$19/2^+$	1350.7	$15/2^+$			
666.1 *5*	0.7	2994.8	$25/2^+$	2328.7	$21/2^+$			
670.1 *5*	0.5	1891.2	$21/2^-$	1221.1	$19/2^-$			
681.3 *5*	1.5	2693.2	$23/2^+$	2011.9	$19/2^+$			
691.0 *5*	5.2	1912.1	$23/2^-$	1221.1	$19/2^-$	(E2)	0.00218	α(K)=0.00190 *3*; α(L)=0.000226 *4*; α(M)=4.15×10^{-5} *6* α(N)=6.67×10^{-6} *10*; α(O)=3.35×10^{-7} *5* Mult.: A_2/A_0=0.19 *5*, A_4/A_0=−0.05 *5* for (691γ)(541γ)(θ) (1995Bu14).
692.8 *5*	1.8	1350.7	$15/2^+$	657.9	$11/2^+$			
697.8 *5*	0.7	3391.0	$27/2^+$	2693.2	$23/2^+$			
706.6 *5*	6.0	1891.2	$21/2^-$	1184.6	$17/2^-$			
709.7 *5*	5.1	1966.0	$19/2^+$	1256.3	$15/2^+$			
728.5 *5*	5.5	2328.7	$21/2^+$	1600.2	$17/2^+$			
728.6 *5*	5.7	1677.1	$17/2^+$	948.5	$13/2^+$			
755.6 *5*	0.7	2011.9	$19/2^+$	1256.3	$15/2^+$			
764.2 *5*	4.9	2364.4	$21/2^+$	1600.2	$17/2^+$			
776.3 *5*	0.3	4167.3	$31/2^+$	3391.0	$27/2^+$			
803.5 *5*	0.1	2715.6	$25/2^-$	1912.1	$23/2^-$			
807.4 *5*	1.5	2773.4	$23/2^+$	1966.0	$19/2^+$			
815.0 *5*	1.1	3179.4	$25/2^+$	2364.4	$21/2^+$			
822.0 *5*	2.4	2734.1	$27/2^-$	1912.1	$23/2^-$			
824.4 *5*	2.0	2715.6	$25/2^-$	1891.2	$21/2^-$			
843.2 *5*	0.3	4022.6	$29/2^+$	3179.4	$25/2^+$			
889.0 *5*	0.1	3662.4	$27/2^+$	2773.4	$23/2^+$			
920.9 *5*	0.5	3636.5	$29/2^-$	2715.6	$25/2^-$			
933.1 *5*	1.5	3667.2	$31/2^-$	2734.1	$27/2^-$			

[†] From 2009Di12, $\Delta E\gamma$=0.5 keV assigned by evaluators.
[‡] From angular correlation data in 2008Di11, 2008Go18 and 1995Bu14.
[#] Additional information 1.

^{252}Cf SF decay 2009Di12,2008Di11,1995Bu14

Level Scheme

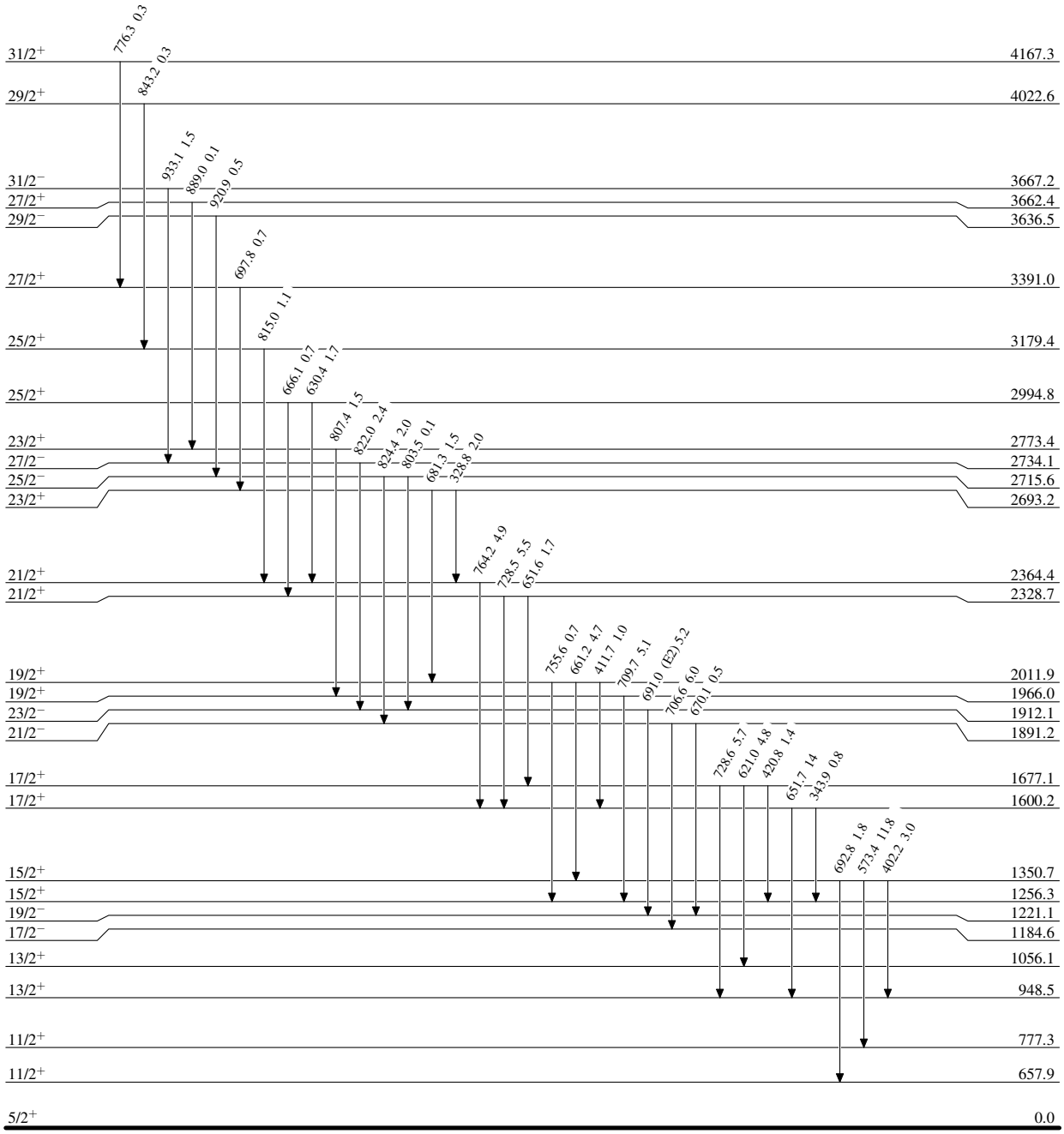
Intensities: Relative I_γ

Legend

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

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

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



$^{109}_{44}Ru_{65}$

^{252}Cf SF decay 2009Di12,2008Di11,1995Bu14

Level Scheme (continued)

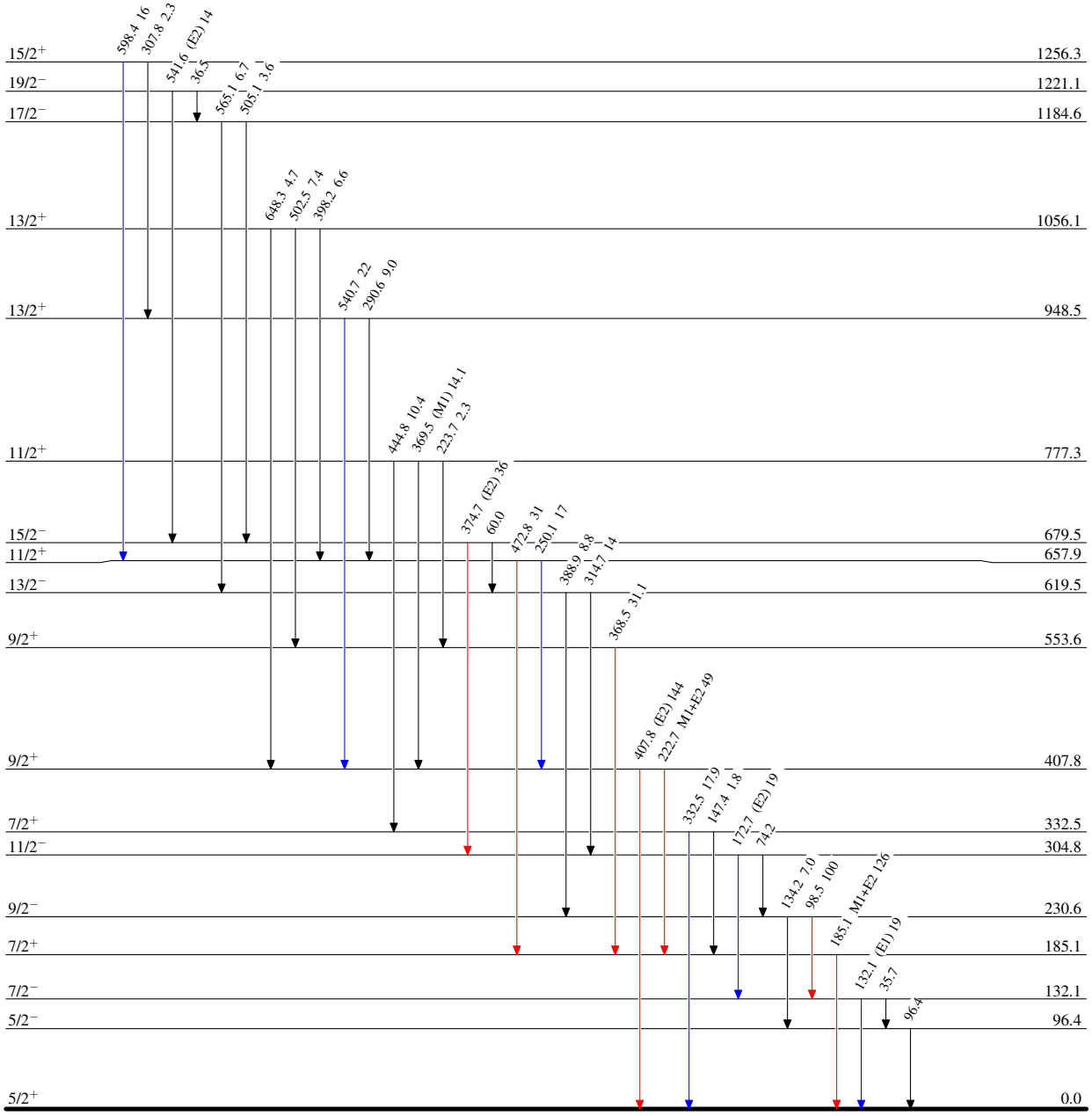
Intensities: Relative I_γ

Legend

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

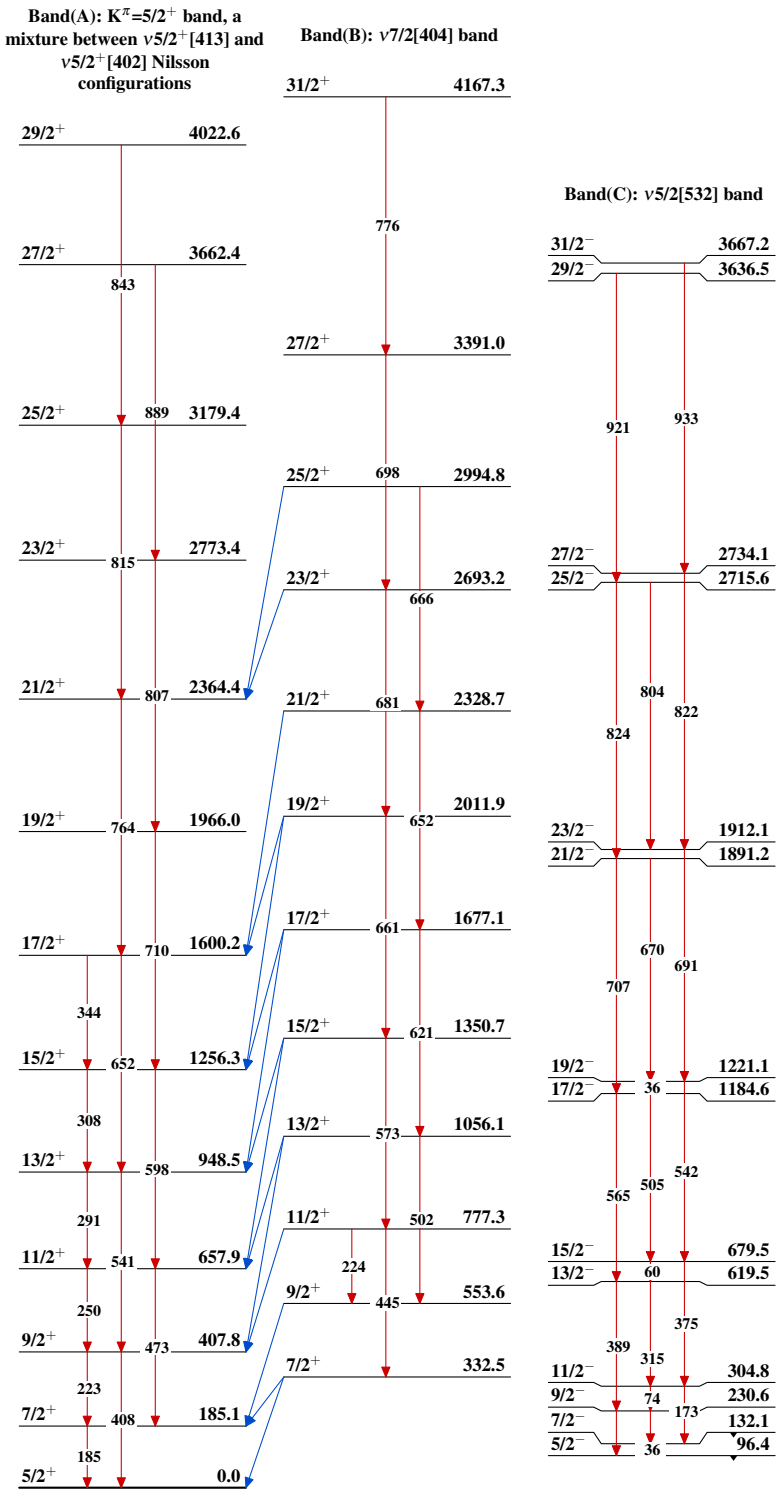
$I_\gamma < 10\% \times I_\gamma^{max}$

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



$^{109}_{44}Ru_{65}$

^{252}Cf SF decay 2009Di12,2008Di11,1995Bu14



$^{109}_{44}Ru_{65}$