^{248}Cm SF decay 2005Ur02,2006Pi14

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 109, 1383 (2008)	1-Mar-2008

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

2005Ur02: Measured Eγ, Iγ, γγ, γγ(θ), γγ(lin pol), conversion-electron coefficients using EUROGAM2 array with four additional low-energy photon (LEP) detectors.

2006Pi14: ^{107}Mo nuclei produced in thermal-neutron induced fission of ^{241}Pu target. Lohengrin mass spectrometer used to separate fission fragments according to mass/charge ratio. Measured γ(ce) coincidences and lifetime for a 65.4 level.

Gamma cascades are mostly in agreement with those from 2004Hu02: but the spin-parity assignments including that of the ground state, and associated band assignments are all different.

1991Ho16: 6.5E+4 fission/s. Argonne Notre Dame G facility 10 Bi-germinate-suppressed Ge detectors, 2 LEPS, 1 array of 50 Bi-Ge scin used as a multiplicity filter.

All data are from 2005Ur02 unless otherwise stated.

^{107}Mo Levels

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0[b]	5/2$^+$		
65.4	1/2$^+$	420 ns *30*	E(level),J^π,$T_{1/2}$: from 2006Pi14. Half-life measured by time spectrum of the isomer. This level is different from the 66.0, (3/2$^+$) level.
66.00[a] *9*	(3/2$^+$)		
152.10[c] *8*	7/2$^+$		
165.40[&] *9*	(5/2$^+$)		
319.70[a] *10*	(7/2$^+$)		
341.01[b] *10*	9/2$^+$		
348.30[@] *9*	7/2$^-$		
458.50[#] *10*	9/2$^-$		
491.71[&] *13*	(9/2$^+$)		
566.59[c] *13*	11/2$^+$		
581.90[@] *11*	11/2$^-$		
730.48[a] *14*	(11/2$^+$)		
819.81[b] *14*	13/2$^+$		
838.00[#] *12*	13/2$^-$		
969.61[&] *16*	(13/2$^+$)		
987.80[@] *14*	15/2$^-$		
1117.79[c] *16*	15/2$^+$		
1286.5[a] *6*	(15/2$^+$)		
1393.0[#] *3*	17/2$^-$		
1422.6[b] *4*	17/2$^+$		
1545.29[@] *17*	19/2$^-$		
1590.3[&] *4*	(17/2$^+$)		
1796.8[c] *4*	19/2$^+$		
1974.3[a] *8*	(19/2$^+$)		
2102.2[#] *8*	21/2$^-$		
2142.6[b] *11*	(21/2$^+$)		
2244.0[@] *4*	23/2$^-$		
2340.8[&] *6*	(21/2$^+$)		
2586.8[c] *11*	(23/2$^+$)		
3073.0[@] *11*	(27/2$^-$)		

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^{248}Cm SF decay 2005Ur02,2006Pi14 (continued)

^{107}Mo Levels (continued)

† from least-squares fit to Eγ′s (by evaluator) ΔEγ=0.1 keV for strong transitions and up to 0.5 keV for weak γ rays (authors′ note). The evaluator has assigned uncertainties to γ-ray energies based on the following criterion: ΔEγ=0.1 keV for Iγ>20, 0.3 for Iγ=10-20 and 0.5 for Iγ<10. For γ rays quoted to the nearest keV, ΔEγ=1 keV has been assumed.
‡ as given by 2005Ur02,2006Pi14.
# Band(A): ν7/2[523], α=+1/2.
@ Band(a): ν7/2[523], α=−1/2.
& Band(B): ν3/2[411], α=+1/2.
a Band(b): ν3/2[411], α=−1/2.
b Band(C): ν5/2[413], α=+1/2.
c Band(c): ν5/2[413], α=−1/2.

γ(^{107}Mo)

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	α#	Comments
65.4‡		65.4	1/2+	0.0	5/2+	E2	5.56	α(K)=4.14 *6*; α(L)=1.173 *17*; α(M)=0.214 *3*; α(N+..)=0.0300 *5* α(N)=0.0294 *5*; α(O)=0.000554 *8* E_γ,Mult.: from 2006Pi14. Mult.: K/L=3.2 *4* in agreement with theoretical value of 3.56 for E2.
66.0 *1*	31 *3*	66.00	(3/2+)	0.0	5/2+	M1+E2		α(K)exp=1.6 *+7−8* α(K)=2.4 *17*; α(L)=0.6 *6*; α(M)=0.11 *10*; α(N+..)=0.016 *14* α(N)=0.015 *13*; α(O)=0.00033 *21* α(K)exp from ratio of intensities Kα x ray line in Mo and 66γ in a gated spectrum. (66.0γ)(253.7γ)(θ): A_2=−0.03 *2*, A_4=+0.04 *3*.
99.4 *3*	16 *2*	165.40	(5/2+)	66.00	(3/2+)	M1+E2		α(K)=0.6 *4*; α(L)=0.11 *9*; α(M)=0.020 *16*; α(N+..)=0.0029 *22* α(N)=0.0029 *22*; α(O)=9.E−5 *6* Mult.: from Iγ(66)/Iγ(99)=0.95 *15* in a gated mode. Similar photon intensities for the two lines suggest same mult for 66γ and 99γ. (99.4γ)(326.3γ)(θ): A_2=−0.05 *2*, A_4=+0.05 *4*.
110.2‡ *1*	70 *4*	458.50	9/2−	348.30	7/2−	M1+E2		α(exp)=0.22 *4*; α(K)exp=0.9 *+7−4* α(exp) from intensity balance; α(K)exp from ratio of intensities Kα x ray line in Mo and 110γ when gated with 123γ and 406γ. (110.2γ)(379.5γ)(θ): A_2=−0.06 *2*, A_4=+0.04 *3*.
123.4‡ *1*	65 *4*	581.90	11/2−	458.50	9/2−	M1+E2		α(exp)=0.27 *8*; α(K)exp=0.8 *+7−4* α(K)=0.29 *18*; α(L)=0.05 *4*; α(M)=0.009 *6*; α(N+..)=0.0013 *9* α(N)=0.0012 *9*; α(O)=4.5×10^{-5} *24* α(exp) from intensity balance; α(K)exp from ratio of intensities Kα x ray line in Mo and 123γ in a gated spectrum. (123.4γ)(405.9γ)(θ): A_2=−0.07 *2*, A_4=+0.02 *3*.
149.8‡ *5*	7 *1*	987.80	15/2−	838.00	13/2−	D		(149.8γ)(379.5γ)(θ): A_2=−0.01 *2*, A_4=+0.01 *3*.
152	3 *1*	1545.29	19/2−	1393.0	17/2−			
152.1‡ *1*	96 *5*	152.10	7/2+	0.0	5/2+	M1+E2		α(exp)=0.34 *7* α(K)=0.15 *8*; α(L)=0.021 *14*; α(M)=0.0039 *24*; α(N+..)=0.0006 *4* α(N)=0.0006 *4*; α(O)=2.3×10^{-5} *11*

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^{248}Cm SF decay 2005Ur02,2006Pi14 (continued)

$\gamma(^{107}Mo)$ (continued)

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	Comments
							α(exp) from intensity balance. (152.1γ)(414.5γ)(θ): A_2=−0.04 *2*, A_4=−0.07 *4*. (152.1γ)(306.4γ)(θ): A_2=+0.10 *3*, A_4=−0.06 *4*.
154.3 *1*	31 *3*	319.70	(7/2$^+$)	165.40	(5/2$^+$)	D	(154.3γ)(410.8γ)(θ): A_2=−0.07 *3*, A_4=−0.01 *4*.
165.4 *1*	26 *3*	165.40	(5/2$^+$)	0.0	5/2$^+$		Mult.: ΔJ=0 transition from γγ(θ). (165.4γ)(336.4γ)(θ): A_2=+0.04 *2*, A_4=+0.01 *3*.
171.9 *3*	12 *2*	491.71	(9/2$^+$)	319.70	(7/2$^+$)	D	(171.9γ)(253.7γ)(θ): A_2=−0.02 *1*, A_4=+0.09 *4*.
188.9 *3*	15 *2*	341.01	9/2$^+$	152.10	7/2$^+$	D	(188.9γ)(152.1γ)(θ): A_2=+0.06 *3*, A_4=+0.04 *4*.
225.6 *5*	8 *2*	566.59	11/2$^+$	341.01	9/2$^+$		
233.6‡ *1*	32 *3*	581.90	11/2$^-$	348.30	7/2$^-$	Q	(233.6γ)(405.9γ)(θ): A_2=+0.09 *2*, A_4=−0.04 *2*.
238.3 *5*	9 *3*	730.48	(11/2$^+$)	491.71	(9/2$^+$)		
239@		969.61	(13/2$^+$)	730.48	(11/2$^+$)		
240.9 *5*	5 *1*	581.90	11/2$^-$	341.01	9/2$^+$		
253.4 *5*	2 *1*	819.81	13/2$^+$	566.59	11/2$^+$		
253.7‡ *1*	35 *3*	319.70	(7/2$^+$)	66.00	(3/2$^+$)	Q	
256.1‡ *1*	23 *3*	838.00	13/2$^-$	581.90	11/2$^-$	D	(256.1γ)(233.6γ)(θ): A_2=−0.05 *2*, A_4=−0.01 *3*.
306.4‡ *1*	39 *4*	458.50	9/2$^-$	152.10	7/2$^+$	D	(306.4γ)(379.5γ)(θ): A_2=−0.06 *2*, A_4=+0.02 *3*.
326.3 *1*	39 *3*	491.71	(9/2$^+$)	165.40	(5/2$^+$)	Q	(326.3γ)(477.9γ)(θ): A_2=+0.06 *3*, A_4=−0.02 *4*.
341.0 *1*	53 *3*	341.01	9/2$^+$	0.0	5/2$^+$	Q	(341.0γ)(478.8γ)(θ): A_2=+0.07 *3*, A_4=−0.02 *5*.
348.3‡ *1*	100 *5*	348.30	7/2$^-$	0.0	5/2$^+$	E1	α(K)=0.00325 *5*; α(L)=0.000366 *6*; α(M)=6.51×10^{-5} *10*; α(N+..)=1.040×10^{-5} *15* α(N)=9.86×10^{-6} *14*; α(O)=5.42×10^{-7} *8* (348.3γ)(233.6γ)(θ): A_2=−0.10 *2*, A_4=+0.01 *3*. POL=+0.30 *14*.
379.5‡ *1*	29 *3*	838.00	13/2$^-$	458.50	9/2$^-$	Q	(379.5γ)(555.0γ)(θ): A_2=+0.05 *2*, A_4=−0.02 *4*.
405.2‡ *5*	5 *2*	1393.0	17/2$^-$	987.80	15/2$^-$		
405.9‡ *1*	50 *3*	987.80	15/2$^-$	581.90	11/2$^-$	Q	(405.9γ)(557.6γ)(θ): A_2=+0.10 *3*, A_4=−0.01 *4*.
410.8‡ *1*	22 *2*	730.48	(11/2$^+$)	319.70	(7/2$^+$)	Q	(410.8γ)(253.7γ)(θ): A_2=+0.07 *3*, A_4=−0.01 *4*.
414.5‡ *1*	55 *4*	566.59	11/2$^+$	152.10	7/2$^+$	Q	
477.9‡ *1*	25 *2*	969.61	(13/2$^+$)	491.71	(9/2$^+$)	Q	
478.8 *1*	31 *3*	819.81	13/2$^+$	341.01	9/2$^+$	Q	(478.8γ)(602.8γ)(θ): A_2=+0.04 *1*, A_4=−0.04 *5*.
551.2‡ *1*	29 *4*	1117.79	15/2$^+$	566.59	11/2$^+$	Q	(551.2γ)(414.5γ)(θ): A_2=+0.09 *3*, A_4=+0.01 *4*.
555.0‡ *3*	15 *3*	1393.0	17/2$^-$	838.00	13/2$^-$	Q	
556.0‡ *5*	9 *2*	1286.5	(15/2$^+$)	730.48	(11/2$^+$)		
557@		2102.2	21/2$^-$	1545.29	19/2$^-$		
557.5‡ *1*	32 *3*	1545.29	19/2$^-$	987.80	15/2$^-$	Q	(557.5γ)(698.7γ)(θ): A_2=+0.07 *3*, A_4=−0.01 *4*.
602.8 *3*	18 *4*	1422.6	17/2$^+$	819.81	13/2$^+$	Q	
620.7 *3*	15 *2*	1590.3	(17/2$^+$)	969.61	(13/2$^+$)		
679.0 *3*	12 *4*	1796.8	19/2$^+$	1117.79	15/2$^+$	Q	(679.0γ)(551.2γ)(θ): A_2=+0.05 *3*, A_4=0.00 *4*.
687.8 *5*	4 *1*	1974.3	(19/2$^+$)	1286.5	(15/2$^+$)		
698.7 *3*	17 *3*	2244.0	23/2$^-$	1545.29	19/2$^-$	Q	
709	5 *2*	2102.2	21/2$^-$	1393.0	17/2$^-$		
720	6 *2*	2142.6	(21/2$^+$)	1422.6	17/2$^+$		
750.5 *5*	8 *3*	2340.8	(21/2$^+$)	1590.3	(17/2$^+$)		
790@		2586.8	(23/2$^+$)	1796.8	19/2$^+$		
829	9 *3*	3073.0	(27/2$^-$)	2244.0	23/2$^-$		

† From γγ(θ), mult=Q corresponds to ΔJ=2 and mult=D to ΔJ=1 transition. In some cases mult is also from conversion coefficients.

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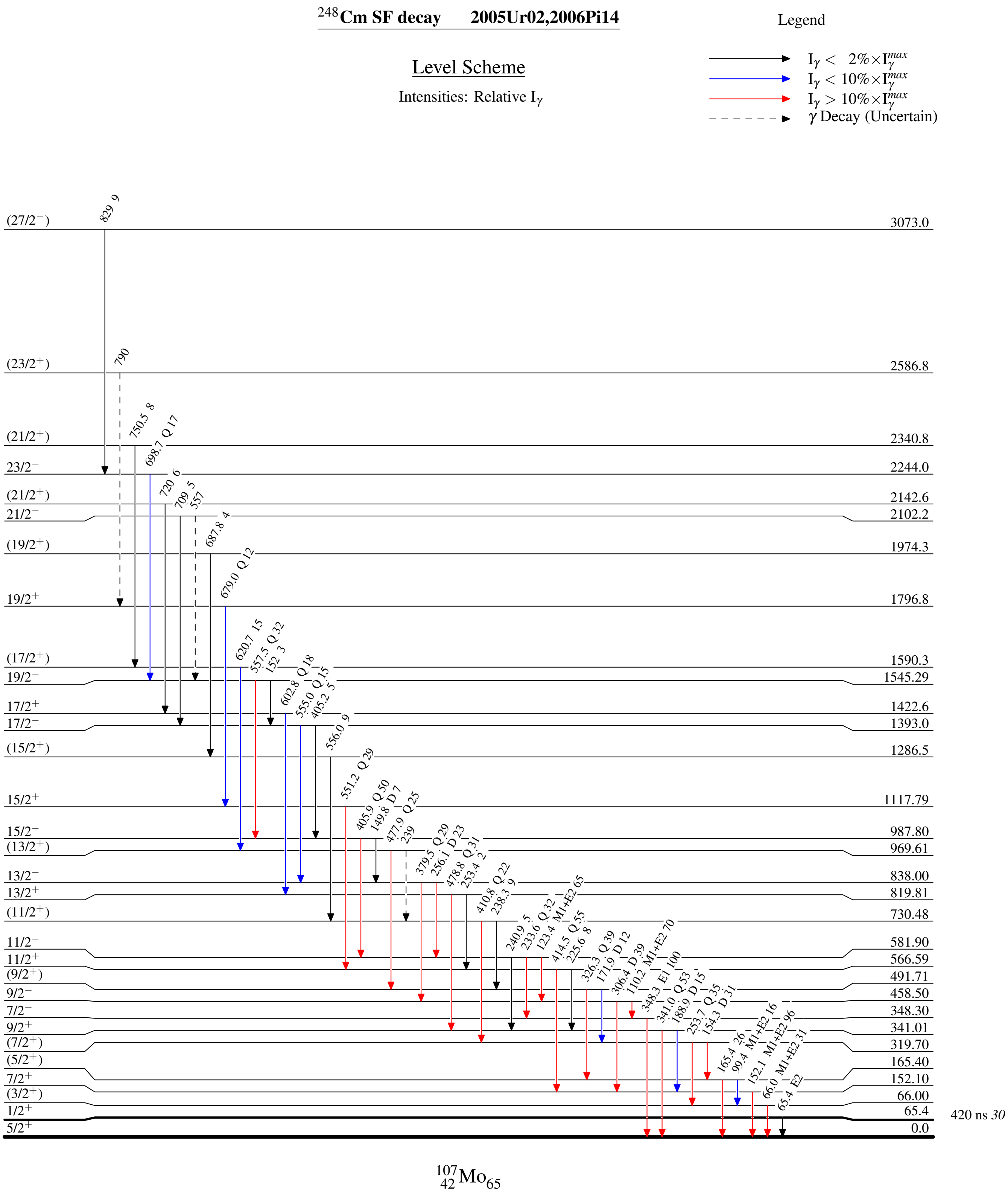
^{248}Cm SF decay 2005Ur02,2006Pi14 (continued)

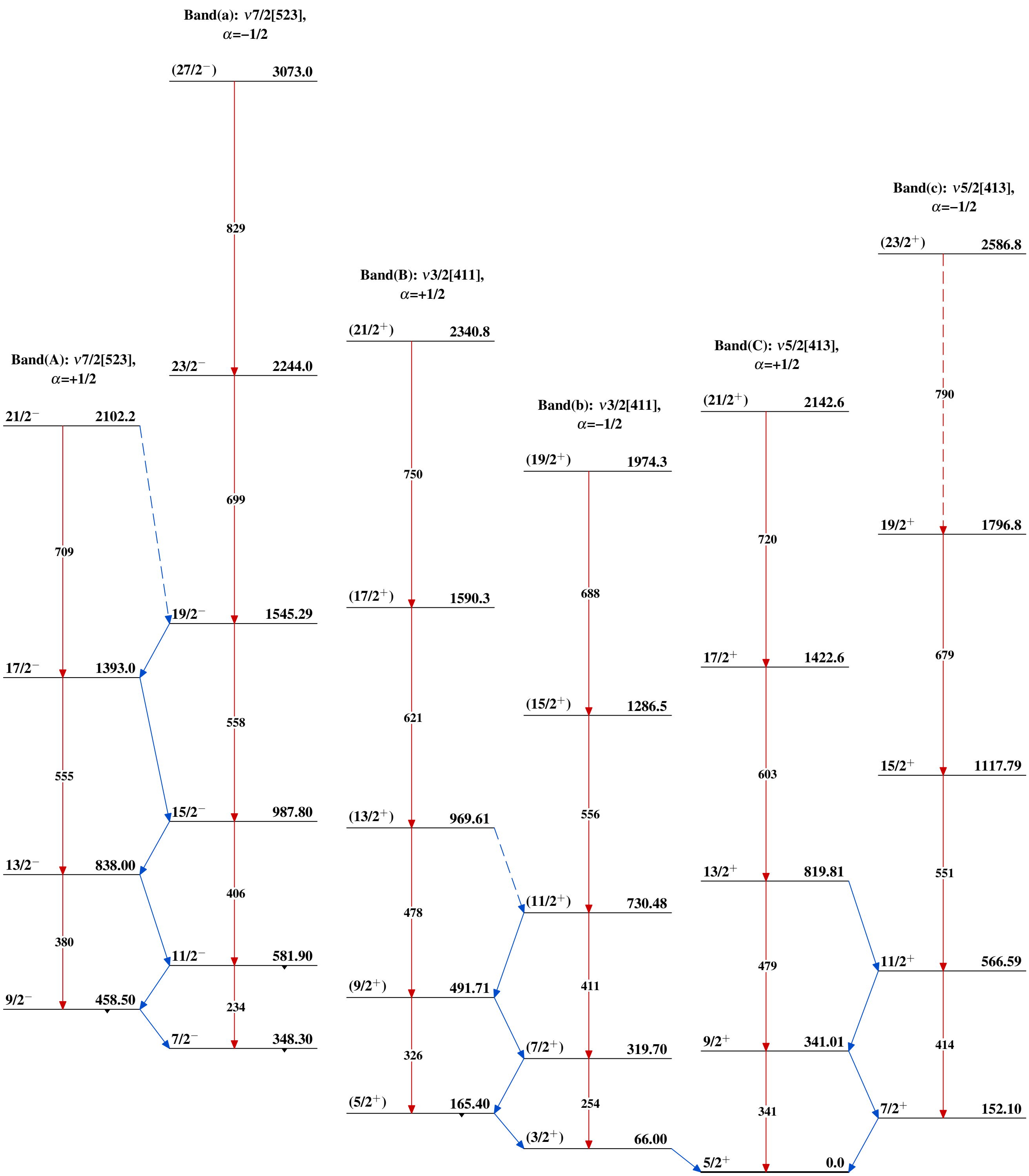
$\gamma(^{107}Mo)$ (continued)

‡ Already seen by 1991Ho16.
# 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.



^{248}Cm SF decay 2005Ur02,2006Pi14
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)
(27/2−) 3073.0
(23/2+) 2586.8
(21/2+) 2340.8
23/2− 2244.0
(21/2+) 2142.6
21/2− 2102.2
(19/2+) 1974.3
19/2+ 1796.8
(17/2+) 1590.3
19/2− 1545.29
17/2+ 1422.6
17/2− 1393.0
(15/2+) 1286.5
15/2+ 1117.79
15/2− 987.80
(13/2+) 969.61
13/2− 838.00
13/2+ 819.81
(11/2+) 730.48
11/2− 581.90
11/2+ 566.59
(9/2+) 491.71
9/2− 458.50
7/2− 348.30
9/2+ 341.01
(7/2+) 319.70
(5/2+) 165.40
7/2+ 152.10
(3/2+) 66.00
1/2+ 65.4 420 ns 30
5/2+ 0.0
829 9
790
750.5 8
698.7 Q 17
720 6
709 5
557
687.8 4
679.0 Q 12
620.7 15
557.5 Q 32
152 3
602.8 Q 18
555.0 Q 15
405.2 5
556.0 9
551.2 Q 29
405.9 Q 50
149.8 D 7
477.9 Q 25
239
379.5 Q 29
256.1 D 23
478.8 Q 31
253.4 2
410.8 Q 22
238.3 9
240.9 5
233.6 Q 32
123.4 M1+E2 65
414.5 Q 55
225.6 8
326.3 Q 39
171.9 D 12
306.4 D 39
110.2 M1+E2 70
348.3 E1 100
341.0 Q 53
188.9 D 15
253.7 Q 35
154.3 D 31
165.4 26
99.4 M1+E2 16
152.1 M1+E2 96
66.0 M1+E2 31
65.4 E2
$^{107}_{42}Mo_{65}$

^{248}Cm SF decay 2005Ur02,2006Pi14



$^{107}_{42}Mo_{65}$