^{248}Cm(^{13}C,^{12}Cγ) 2008Is05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 195,718 (2024)	12-Oct-2023

2008Is05: E(^{13}C)=120 MeV from the JAEA-Tokai tandem accelerator bombarded a 0.8 mg/cm^2 thick ^{248}Cm target to study the the one-neutron stripping reaction. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, particles, and (particle)γ coinc using six Ge detectors for γ rays and four sets of Si ΔE-E detectors for particles. Comparison with deformed shell model predictions.

^{249}Cm Levels

E(level)[†]	J$^\pi$	Comments
0.0[#]	1/2$^+$	
26.2[‡] *4*	3/2$^+$	
48.06[b] *15*	7/2$^+$	
48.12[#] *14*	5/2$^+$	
108.81[b] *16*	9/2$^+$	
110.153[‡] *10*	7/2$^+$	Additional information 1.
148.32[#] *20*	9/2$^+$	
182.08[b] *21*	11/2$^+$	
208.00[a] *9*	3/2$^+$	
241.6[a] *3*	5/2$^+$	
244.75[‡] *10*	11/2$^+$	
268.1[b] *3*	13/2$^+$	
288.69[a] *16*	7/2$^+$	
298.92[#] *22*	13/2$^+$	
374.55[e] *19*	11/2$^-$	
429.75[‡] *14*	15/2$^+$	
470.12[@] *14*	3/2$^-$	
494.30 *20*	1/2$^-$	
498.5[#] *3*	17/2$^+$	
501.92[@] *17*	7/2$^-$	
525.77[c] *16*	9/2$^+$	
577.42[@] *22*	11/2$^-$	
663.45[‡] *17*	19/2$^+$	
699.02[@] *24*	15/2$^-$	
868.2[@] *3*	19/2$^-$	
1029.2[d] *5*	9/2$^+$	
1504.7[&] *6*	17/2$^+$	

† From least-squares fit to Eγ data by the evaluator. Energy of 110.153 keV level is taken from ^{248}Cm(n,γ) in 1982Ho07 and kept fixed in the fitting procedure.
‡ Band(A): 1/2[620], α=−1/2.
# Band(a): 1/2[620], α=+1/2.
@ Band(B): 1/2[750].
& Band(C): 1/2[880].
a Band(D): 3/2[622].
b Band(E): 7/2[613].
c Band(F): 9/2[615].

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^{248}Cm(^{13}C,^{12}Cγ) 2008Is05 (continued)

^{249}Cm Levels (continued)

[d] Band(G): 9/2[604].
[e] Band(H): 11/2[725].

γ(^{249}Cm)

Measured I(K_α)=1100 μb *60* and I(K_β)=320 *20* μb.
γ asymmetry=Iγ in the reaction plane/Iγ out of the reaction plane. These ratios are listed as Iγ(in)/Iγ(out), expected values are >1 for ΔJ=2, quadrupole and <1 for ΔJ=1, dipole.

Eγ	Iγ[†]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.[#]	α[@]	Comments
60.8 *1*	33.3 *32*	108.81	9/2+	48.06	7/2+	(M1)	29.5 *4*	α(L)=22.15 *33*; α(M)=5.43 *8* α(N)=1.491 *22*; α(O)=0.380 *6*; α(P)=0.0748 *11*; α(Q)=0.00539 *8* I(γ+ce)=1.10E3 *10*.
73.6 *3*	<62	182.08	11/2+	108.81	9/2+	(M1)	16.89 *31*	α(L)=12.68 *23*; α(M)=3.10 *6* α(N)=0.853 *16*; α(O)=0.217 *4*; α(P)=0.0428 *8*; α(Q)=0.00308 *6* I(γ+ce)<1200.
[x]77.8 *2*	<37					[M1]	14.37 *23*	α(L)=10.78 *17*; α(M)=2.64 *4* α(N)=0.725 *12*; α(O)=0.1848 *29*; α(P)=0.0364 *6*; α(Q)=0.00262 *4* I(γ+ce)<610.
86.0 *2*	<32.4	268.1	13/2+	182.08	11/2+	(M1)	10.74 *17*	ce(L)/(γ+ce)=0.686 *7*; ce(M)/(γ+ce)=0.1680 *32* ce(N)/(γ+ce)=0.0462 *9*; ce(O)/(γ+ce)=0.01176 *25*; ce(P)/(γ+ce)=0.00232 *5*; ce(Q)/(γ+ce)=0.0001664 *35* α(L)=8.06 *13*; α(M)=1.971 *31* α(N)=0.542 *8*; α(O)=0.1380 *21*; α(P)=0.0272 *4*; α(Q)=0.001953 *30* I(γ+ce)<380.
134.6 *1*	58 *4*	244.75	11/2+	110.153	7/2+	(E2)	4.94 *7*	α(K)=0.1530 *22*; α(L)=3.46 *5*; α(M)=0.978 *14* α(N)=0.272 *4*; α(O)=0.0660 *10*; α(P)=0.01106 *16*; α(Q)=6.08×10^{-5} *9* I(γ+ce)=350 *20*.
150.6 *1*	28.6 *3*	298.92	13/2+	148.32	9/2+	(E2)	3.07 *4*	α(K)=0.1733 *24*; α(L)=2.094 *30*; α(M)=0.590 *8* α(N)=0.1642 *23*; α(O)=0.0399 *6*; α(P)=0.00670 *10*; α(Q)=4.20×10^{-5} *6* I(γ+ce)=118 *11*.
159.9[&] *2*	18.6 *20*	208.00	3/2+	48.12	5/2+	[M1]	8.33 *12*	α(K)=6.53 *9*; α(L)=1.349 *19*; α(M)=0.330 *5* α(N)=0.0906 *13*; α(O)=0.02308 *33*; α(P)=0.00454 *7*; α(Q)=0.000325 *5* I(γ+ce)=190 *20*. Iγ(in)/Iγ(out)=0.7 *2*.
159.9[&] *2*		208.00	3/2+	48.06	7/2+			
185.0 *1*	41 *3*	429.75	15/2+	244.75	11/2+	(E2)	1.331 *19*	α(K)=0.1585 *22*; α(L)=0.849 *12*; α(M)=0.2384 *34* α(N)=0.0663 *9*; α(O)=0.01612 *23*; α(P)=0.00273 *4*; α(Q)=2.228×10^{-5} *31* I(γ+ce)=97 *8*.
192.5 *1*	116[‡] *7*	374.55	11/2−	182.08	11/2+			I(γ+ce)=130 *8*.

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^{248}Cm(^{13}C,^{12}Cγ) 2008Is05 (continued)

γ(^{249}Cm) (continued)

Eγ	Iγ[†]	Ei(level)	J^π_i	Ef	J^π_f	Mult.[#]	α[@]	Comments
193.5[&] *3*	[‡]	241.6	5/2+	48.06	7/2+			
193.5[&] *3*	[‡]	241.6	5/2+	48.12	5/2+			
199.6 *2*	53 *5*	498.5	17/2+	298.92	13/2+	(E2)	0.992 *14*	α(K)=0.1461 *21*; α(L)=0.613 *9*; α(M)=0.1718 *25* α(N)=0.0478 *7*; α(O)=0.01162 *17*; α(P)=0.001978 *29*; α(Q)=1.788×10^{-5} *26* I(γ+ce)=107 *9*.
208.0 *1*	52 *4*	208.00	3/2+	0.0	1/2+	[M1]	3.97 *6*	α(K)=3.11 *4*; α(L)=0.639 *9*; α(M)=0.1563 *22* α(N)=0.0429 *6*; α(O)=0.01093 *15*; α(P)=0.002151 *30*; α(Q)=0.0001537 *22* I(γ+ce)=280 *20*. Iγ(in)/Iγ(out)=1.3 *2*.
233.7 *1*	11 *3*	663.45	19/2+	429.75	15/2+	(E2)	0.554 *8*	α(K)=0.1183 *17*; α(L)=0.316 *4*; α(M)=0.0882 *12* α(N)=0.02452 *35*; α(O)=0.00598 *8*; α(P)=0.001025 *14*; α(Q)=1.156×10^{-5} *16* I(γ+ce)=17 *5*.
240.6[a] *1*	26[a] *4*	288.69	7/2+	48.06	7/2+	[M1]	2.64 *4*	α(K)=2.072 *29*; α(L)=0.424 *6*; α(M)=0.1037 *15* α(N)=0.0285 *4*; α(O)=0.00725 *10*; α(P)=0.001426 *20*; α(Q)=0.0001018 *14* I(γ+ce)=100 *14*. Iγ(in)/Iγ(out)=0.8 *2*.
240.6[a] *1*	26[a] *4*	288.69	7/2+	48.12	5/2+	[M1]	2.64 *4*	α(K)=2.072 *29*; α(L)=0.424 *6*; α(M)=0.1037 *15* α(N)=0.0285 *4*; α(O)=0.00725 *10*; α(P)=0.001426 *20*; α(Q)=0.0001018 *14* I(γ+ce)=100 *14*.
265.7 *1*	247 *13*	374.55	11/2−	108.81	9/2+	E1	0.0566 *8*	α(K)=0.0443 *6*; α(L)=0.00928 *13*; α(M)=0.002267 *32* α(N)=0.000618 *9*; α(O)=0.0001543 *22*; α(P)=2.86×10^{-5} *4*; α(Q)=1.561×10^{-6} *22* I(γ+ce)=261 *14*.
278.5 *1*	36 *4*	577.42	11/2−	298.92	13/2+	(E1)	0.0511 *7*	α(K)=0.0400 *6*; α(L)=0.00832 *12*; α(M)=0.002031 *28* α(N)=0.000554 *8*; α(O)=0.0001383 *19*; α(P)=2.57×10^{-5} *4*; α(Q)=1.419×10^{-6} *20* I(γ+ce)=38 *4*.
353.6 *1*	134 *8*	501.92	7/2−	148.32	9/2+	[E1]	0.0308 *4*	α(K)=0.02430 *34*; α(L)=0.00486 *7*; α(M)=0.001181 *17* α(N)=0.000322 *5*; α(O)=8.08×10^{-5} *11*; α(P)=1.519×10^{-5} *21*; α(Q)=8.83×10^{-7} *12* I(γ+ce)=138 *8*. Iγ(in)/Iγ(out)=0.92 *6*.
369.7 *1*	<14.6	868.2	19/2−	498.5	17/2+	(E1)	0.0281 *4*	α(K)=0.02220 *31*; α(L)=0.00441 *6*; α(M)=0.001071 *15* α(N)=0.000292 *4*; α(O)=7.33×10^{-5} *10*; α(P)=1.380×10^{-5} *19*; α(Q)=8.10×10^{-7} *11* I(γ+ce)< 15.
400.1 *1*	40 *4*	699.02	15/2−	298.92	13/2+	(E1)	0.02387 *33*	α(K)=0.01894 *27*; α(L)=0.00371 *5*; α(M)=0.000901 *13* α(N)=0.0002459 *34*; α(O)=6.17×10^{-5} *9*; α(P)=1.167×10^{-5} *16*; α(Q)=6.96×10^{-7} *10* I(γ+ce)=41 *4*.

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^{248}Cm(^{13}C,^{12}Cγ) 2008Is05 (continued)

γ(^{249}Cm) (continued)

E_γ	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[@]	Comments
417.0 *1*	30.6 *25*	525.77	9/2$^+$	108.81	9/2$^+$			I(γ+ce)=50 *4*. Mult.: Q from Iγ(in)/Iγ(out)=2.6 *7*. $\delta\approx$0.1 assumed by authors for a significant mixing of E2 (2008Is05).
422.0 *1*		470.12	3/2$^-$	48.12	5/2$^+$			I(γ+ce)=138 *8*. Iγ(in)/Iγ(out)=0.80 *6*.
429.1 *1*	99 *6*	577.42	11/2$^-$	148.32	9/2$^+$	(E1)	0.02074 *29*	α(K)=0.01649 *23*; α(L)=0.00320 *4*; α(M)=0.000776 *11* α(N)=0.0002117 *30*; α(O)=5.32×10^{-5} *7*; α(P)=1.008×10^{-5} *14*; α(Q)=6.10×10^{-7} *9* I(γ+ce)=101 *6*.
^{x}441.5 *1*								I(γ+ce)= 42 *4*. Iγ(in)/Iγ(out)=0.8 *2*.
453.8 *1*	158 *9*	501.92	7/2$^-$	48.12	5/2$^+$	[E1]	0.01856 *26*	α(K)=0.01478 *21*; α(L)=0.00285 *4*; α(M)=0.000689 *10* α(N)=0.0001881 *26*; α(O)=4.73×10^{-5} *7*; α(P)=8.98×10^{-6} *13*; α(Q)=5.49×10^{-7} *8* I(γ+ce)=161 *9*. Iγ(in)/Iγ(out)=0.75 *5*.
468.1 *3*		494.30	1/2$^-$	26.2	3/2$^+$			I(γ+ce)=46 *13*. Iγ(in)/Iγ(out)=0.89 *9*.
470.1 *2*	59 *20*	470.12	3/2$^-$	0.0	1/2$^+$	(E1)	0.01732 *24*	α(K)=0.01381 *19*; α(L)=0.00265 *4*; α(M)=0.000640 *9* α(N)=0.0001747 *25*; α(O)=4.40×10^{-5} *6*; α(P)=8.36×10^{-6} *12*; α(Q)=5.14×10^{-7} *7* I(γ+ce)=60 *20*. Iγ(in)/Iγ(out)=0.89 *9*.
477.6 *1*	57 *4*	525.77	9/2$^+$	48.06	7/2$^+$			I(γ+ce)=82 *6*. Mult.: D from Iγ(in)/Iγ(out)=0.9 *2*, $\delta\approx$0.1 assumed by authors for a significant mixing of E2 (2008Is05).
494.3 *2*		494.30	1/2$^-$	0.0	1/2$^+$			I(γ+ce)=60 *5*. Iγ(in)/Iγ(out)=1.1 *2*.
^{x}524.4 *2*	88 *9*					[E2]	0.0526 *7*	α(K)=0.0305 *4*; α(L)=0.01621 *23*; α(M)=0.00432 *6* α(N)=0.001194 *17*; α(O)=0.000295 *4*; α(P)=5.36×10^{-5} *8*; α(Q)=1.729×10^{-6} *24* I(γ+ce)= 93 *10*.
^{x}526.1 *2*	63 *9*					[E1]	0.01394 *20*	α(K)=0.01114 *16*; α(L)=0.002103 *29*; α(M)=0.000508 *7* α(N)=0.0001386 *19*; α(O)=3.49×10^{-5} *5*; α(P)=6.67×10^{-6} *9*; α(Q)=4.19×10^{-7} *6* I(γ+ce)= 64 *9*. Iγ(in)/Iγ(out)=0.65 *5*.
636.5 *5*	<3.96	1504.7	17/2$^+$	868.2	19/2$^-$	[E1]	0.00975 *14*	α(K)=0.00784 *11*; α(L)=0.001444 *20*; α(M)=0.000348 *5* α(N)=9.50×10^{-5} *13*; α(O)=2.397×10^{-5} *34*; α(P)=4.60×10^{-6} *6*; α(Q)=2.98×10^{-7} *4* I(γ+ce)< 4.
981.1 *5*	115 *10*	1029.2	9/2$^+$	48.06	7/2$^+$	(M1)	0.0575 *8*	α(K)=0.0454 *6*; α(L)=0.00904 *13*; α(M)=0.002200 *31* α(N)=0.000603 *8*; α(O)=0.0001537 *22*; α(P)=3.02×10^{-5} *4*; α(Q)=2.163×10^{-6} *30* I(γ+ce)=122 *11*.

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^{248}Cm(^{13}C,^{12}Cγ) 2008Is05 (continued)

γ(^{249}Cm) (continued)

† In units of μb deduced by the evaluator from α and I(γ+ce). I(γ+ce) given in comments in units of μb were obtained by 2008Is05 from their measured Iγ's and theoretical conversion coefficients taken from Rosel *et.al* (1978Ro21).

‡ Combined intensity for 192.5+193.5 γ rays. 2008Is05 give the total intensity only with 192.5γ which may imply that the intensity of the 193.5γ is weak.

From ^{248}Cm(^{16}O,^{15}Onγ) measurement by the same group (2008Is05).

@ Additional information 2.

& Multiply placed.

^{a} Multiply placed with undivided intensity.

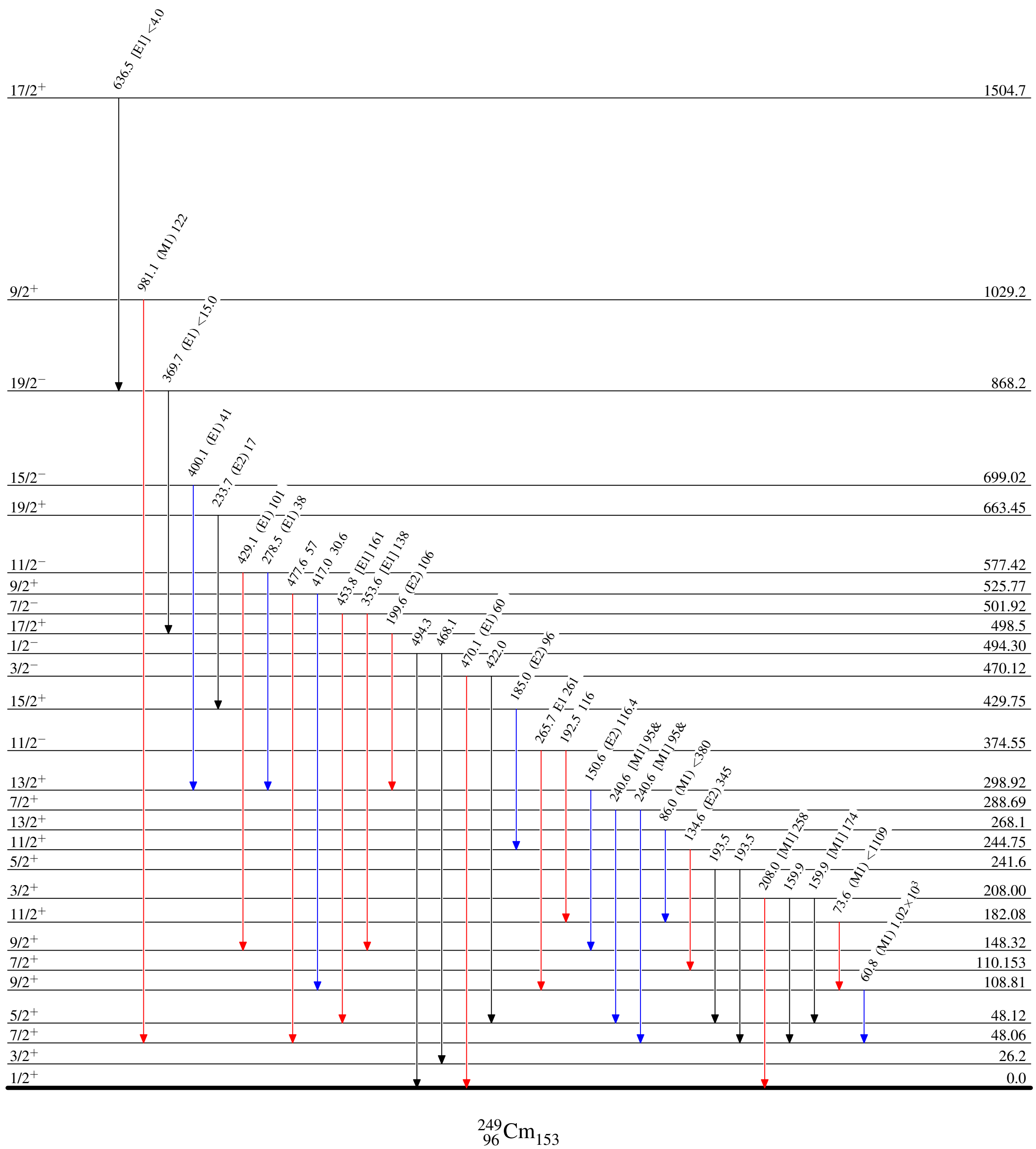
^{x} γ ray not placed in level scheme.

$^{248}Cm(^{13}C,^{12}C\gamma)$ 2008Is05

Level Scheme

Intensities: Relative $I_{(\gamma+ce)}$

& Multiply placed: undivided intensity given



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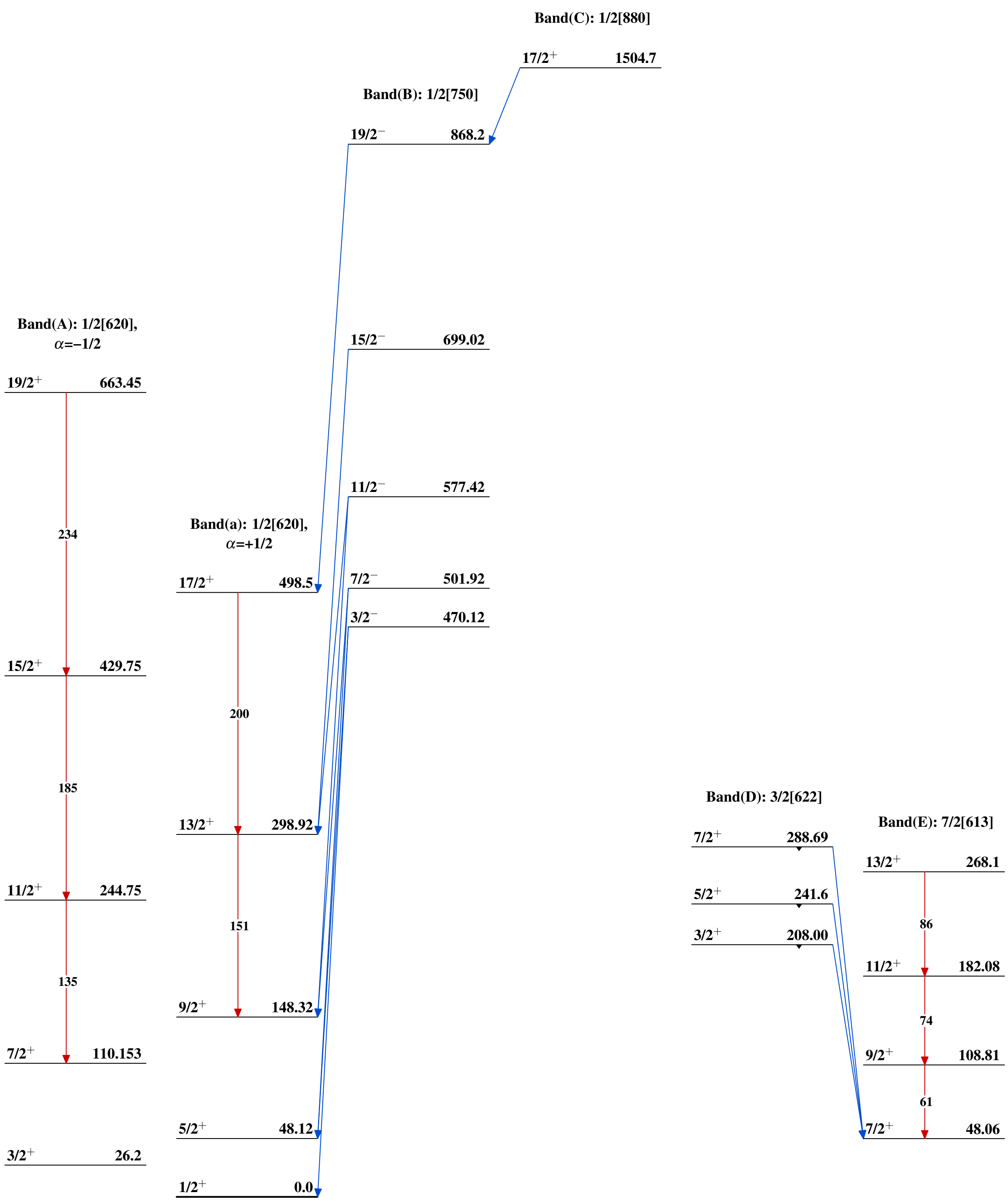

$^{249}_{96}Cm_{153}$

^{248}Cm(^{13}C,^{12}Cγ) 2008Is05 (continued)

Band(F): 9/2[615]

9/2$^+$ 525.77

Band(G): 9/2[604]

9/2$^+$ 1029.2

Band(H): 11/2[725]

11/2$^-$ 374.55

$^{249}_{96}Cm_{153}$