^{248}Cm(^{16}O,^{15}Oγ) 2008Is05

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

2008Is05: E(^{16}O)=162 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, (particle)γ coin, half-lives 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$^\pi$	T$_{1/2}$	Comments
0.0[#]	1/2$^+$		
26.2[‡] *4*	3/2$^+$		
48.06[a] *15*	7/2$^+$		
48.12[#] *14*	5/2$^+$		
108.81[a] *16*	9/2$^+$		
110.153[‡] *10*	7/2$^+$		Additional information 1.
148.32[#] *20*	9/2$^+$		
182.08[a] *21*	11/2$^+$		
208.00[&] *9*	3/2$^+$		
241.6[&] *3*	5/2$^+$		
244.75[‡] *10*	11/2$^+$		
268.1[a] *3*	13/2$^+$		
288.69[&] *16*	7/2$^+$		
298.92[#] *22*	13/2$^+$		
374.55[d] *19*	11/2$^-$	19.4 ns *16*	T$_{1/2}$: Weighted average of 18.7 ns *9* from (particle)(266γ)(t) and 23 ns *2* from (particle)(193γ)(t) (2008Is05).
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[b] *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[c] *5*	9/2$^+$		
1504.7 *6*	17/2$^+$		Configuration=1/2[880].

[†] 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): 3/2[622].
[a] Band(D): 7/2[613].
[b] Band(E): 9/2[615].
[c] Band(F): 9/2[604].
[d] Band(G): 11/2[725].

^{248}Cm(^{16}O,^{15}Oγ) 2008Is05 (continued)

$\gamma(^{249}Cm)$

Measured (K_α)=171 *9* μb and I(K_β)=50 *3* μb. Anisotropies Iγ(in)/Iγ(out)=0.94 *3* and 1.08 *8* for K_α and K_β, respectively.

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[@]	Comments
60.8 *1*	11.2 *11*	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* Mult.: D from Iγ(in)/Iγ(out)=0.43 *9*, (M1) from assignment to rotational band.
73.6 *3*	16.5 *14*	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* Mult.: D from Iγ(in)/Iγ(out)=0.77 *12*, (M1) from assignment to rotational band.
[x]77.8 *2*	9.4 *11*					[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* In $\gamma\gamma$ coin with 266γ. Iγ(in)/Iγ(out)=0.59 *13*.
86.0 *2*	9.3 *10*	268.1	13/2$^+$	182.08	11/2$^+$	(M1)	10.74 *17*	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* Mult.: D from Iγ(in)/Iγ(out)=0.65 *14*, (M1) from assignment to rotational band.
134.6 *1*	18.0 *13*	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* Mult.: Q from Iγ(in)/Iγ(out)=2.3 *3*, (E2) from assignment to rotational band.
150.6 *1*	9.6 *10*	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* Mult.: Q from Iγ(in)/Iγ(out)=1.3 *3*, (E2) from assignment to rotational band.
159.9[&] *2*	5.6 *10*	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*
159.9[&] *2*	5.6 *10*	208.00	3/2$^+$	48.06	7/2$^+$			
185.0 *1*	20.5 *15*	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* Mult.: Q from Iγ(in)/Iγ(out)=2.2 *3*, (E2) from assignment to rotational band.
192.5 *1*	34.9[#] *22*	374.55	11/2$^-$	182.08	11/2$^+$			Mult.: D or Q from Iγ(in)/Iγ(out)=0.99 *8*. Note that the 192.5γ contain intensities from 193.5γ which affects the intensity ratios, and hence the evaluator is unable to deduce the multipolarity.
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*	22.7 *17*	498.5	17/2$^+$	298.92	13/2$^+$	(E2)	0.992 *14*	α(K)=0.1461 *21*; α(L)=0.613 *9*;

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^{248}Cm(^{16}O,^{15}Oγ) 2008Is05 (continued)

$\gamma(^{249}Cm)$ (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[@]	Comments
								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* Mult.: Q from Iγ(in)/Iγ(out)=1.7 *2*, (E2) from assignment to rotational band.
208.0 *1*	4.5 *9*	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*
233.7 *1*	9.5 *11*	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* Mult.: Q from Iγ(in)/Iγ(out)=1.9 *5*, (E2) from assignment to rotational band.
240.6[a] *1*	3.4[a] *12*	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*
240.6[a] *1*	3.4[a] *12*	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*
265.7 *1*	108 *6*	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* Mult.: D from Iγ(in)/Iγ(out)=0.99 *4*, M1 can be ruled out from RUL.
278.5 *1*	11.7 *12*	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* Mult.: D from Iγ(in)/Iγ(out)=0.8 *2*, (E1) from assignment to rotational band.
353.6 *1*	7.7 *11*	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*
369.7 *1*	14.5 *14*	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* Mult.: D from Iγ(in)/Iγ(out)=0.68 *13*, (E1) from assignment to rotational band.
400.1 *1*	21.1 *17*	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* Mult.: D from Iγ(in)/Iγ(out)=0.66 *9*, (E1) from assignment to rotational band.
417.0 *1*	10.7 *12*	525.77	9/2$^+$	108.81	9/2$^+$			Mult.: Q from Iγ(in)/Iγ(out)=2.6 *7*. δ

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^{248}Cm(^{16}O,^{15}Oγ) 2008Is05 (continued)

γ(^{249}Cm) (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[@]	Comments
								≈0.1 assumed by authors for a significant mixing of E2 (2008Is05).
422.0 *1*	<4	470.12	3/2$^-$	48.12	5/2$^+$			
429.1 *1*	32.3 *22*	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* Mult.: D from Iγ(in)/Iγ(out)=0.63 *6*, (E1) from assignment to rotational band.
[x]441.5 *1*	<3.1							
453.8 *1*	8.3 *11*	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*
468.1 *3*	<0.8	494.30	1/2$^-$	26.2	3/2$^+$			
470.1 *2*	3.2 *13*	470.12	3/2$^-$	0.0	1/2$^+$	[E1]	0.01732 *24*	ce(K)/(γ+ce)=0.01357 *19*; ce(L)/(γ+ce)=0.00260 *4*; ce(M)/(γ+ce)=0.000629 *9* ce(N)/(γ+ce)=0.0001717 *24*; ce(O)/(γ+ce)=4.32×10^{-5} *6*; ce(P)/(γ+ce)=8.22×10^{-6} *12*; ce(Q)/(γ+ce)=5.06×10^{-7} *7* 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)=3 *1*.
477.6 *1*	13.6 *14*	525.77	9/2$^+$	48.06	7/2$^+$			Mult.: D from Iγ(in)/Iγ(out)=0.9 *2*, δ ≈0.1 assumed by authors for a significant mixing of E2 (2008Is05).
494.3 *2*	<0.7	494.30	1/2$^-$	0.0	1/2$^+$			
[x]524.4 *2*	2.1 *10*					[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)=2.2 *10*.
[x]526.1 *2*	6.7 *14*					[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*
636.5 *5*	9.8 *16*	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* Mult.: D from Iγ(in)/Iγ(out)=1.1 *4*.
981.1 *5*	23.1 *28*	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* Mult.: D from Iγ(in)/Iγ(out)=0.50 *14*, (M1) from assignment to rotational band.

[†] 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

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^{248}Cm(^{16}O,^{15}Oγ) 2008Is05 (continued)

γ(^{249}Cm) (continued)

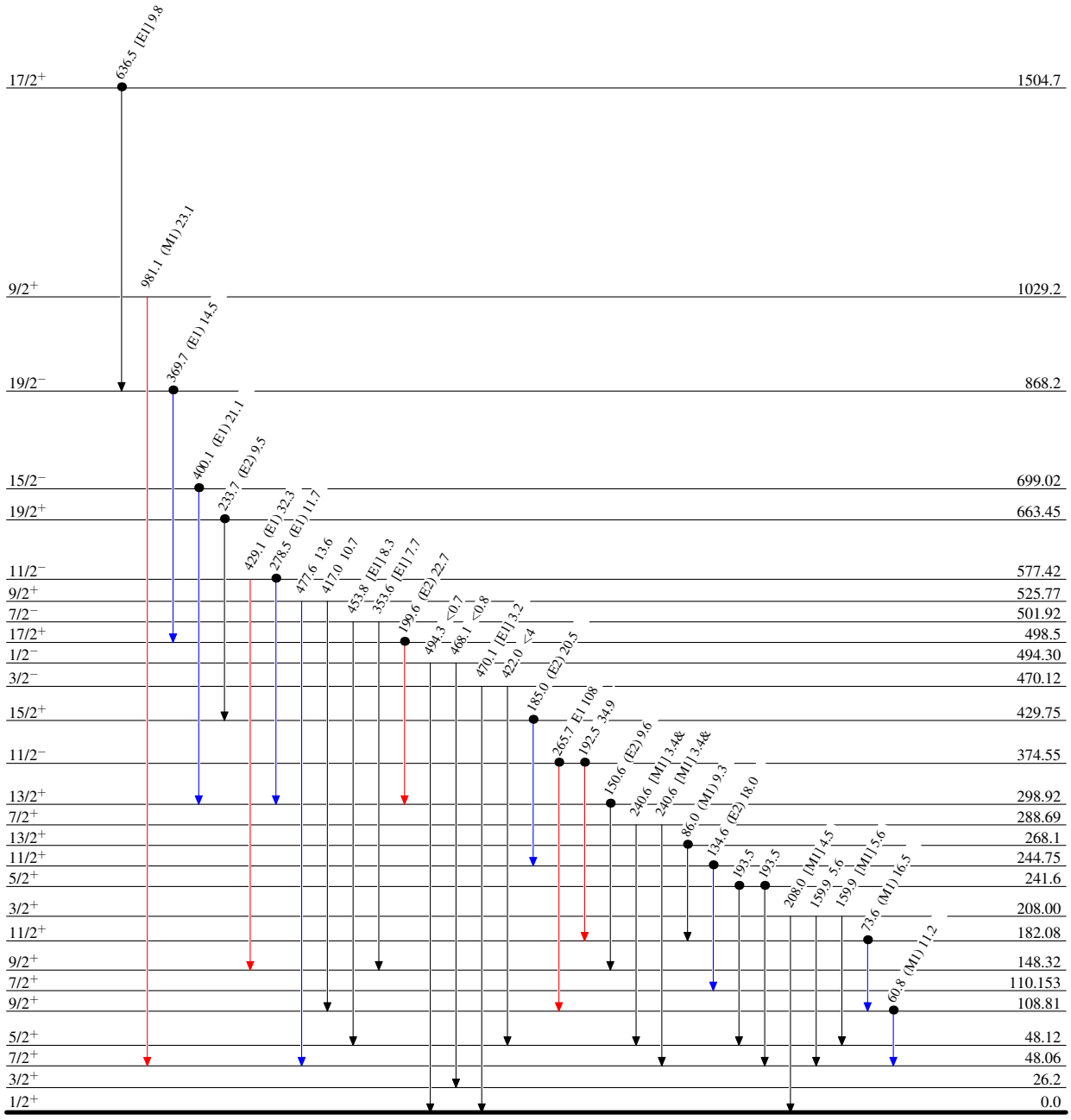
>1 for ΔJ=2, quadrupole and <1 for ΔJ=1, dipole.
‡ In units of μb from 2008Is05.
# Combined intensity for 192.5+193.5 γ rays. 2008Is05 give the total intensity only with 192.5γ which may imply that the intensity of the 193.5γ is weak.
@ Additional information 2.
& Multiply placed.
a Multiply placed with undivided intensity.
x γ ray not placed in level scheme.

^{248}Cm(^{16}O,^{15}Oγ) 2008Is05

Level Scheme

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

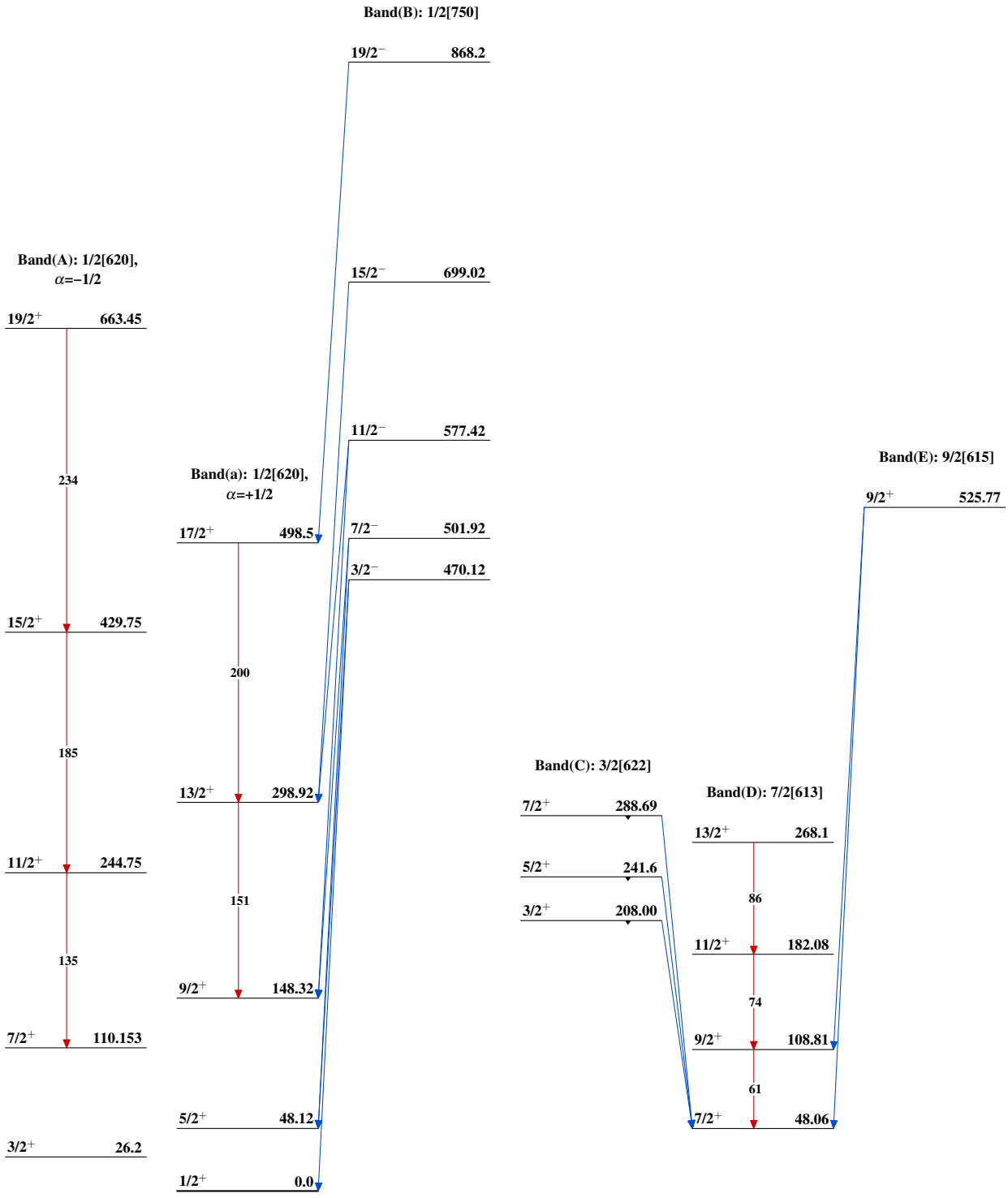
Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
Coincidence



19.4 ns *16*

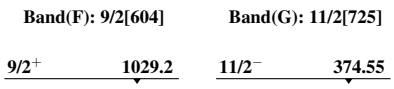
$^{249}_{96}Cm_{153}$

$^{248}Cm(^{16}O,^{15}O\gamma)$ **2008Is05**



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

^{248}Cm(^{16}O,^{15}Oγ) 2008Is05 (continued)



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