

<sup>248</sup>Cm(<sup>18</sup>O,<sup>17</sup>Oγ) 2008Is05

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

**2008Is05:** E(<sup>13</sup>C)=162 MeV from the JAEA-Tokai tandem accelerator bombarded a 0.8 mg/cm<sup>2</sup> thick <sup>248</sup>Cm target to study the one-neutron stripping reaction. Measured Eγ, Iγ, γγ, γ(θ), particles, (particle) γ coin, half-life using six Ge detectors for γ rays and four sets of Si ΔE-E detectors for particles. Comparison with deformed shell model predictions.

<sup>249</sup>Cm Levels

E(level) <sup>†</sup>	J <sup>π</sup>	T <sub>1/2</sub>	Comments
0.0 <sup>#</sup>	1/2 <sup>+</sup>		
26.2 <sup>‡</sup> 4	3/2 <sup>+</sup>		
48.06 <sup>b</sup> 15	7/2 <sup>+</sup>		
48.12 <sup>#</sup> 14	5/2 <sup>+</sup>		
108.81 <sup>b</sup> 16	9/2 <sup>+</sup>		
110.153 <sup>‡</sup> 10	7/2 <sup>+</sup>		Additional information 1.
148.32 <sup>#</sup> 20	9/2 <sup>+</sup>		
182.08 <sup>b</sup> 21	11/2 <sup>+</sup>		
208.00 <sup>a</sup> 9	3/2 <sup>+</sup>		
241.6 <sup>a</sup> 3	5/2 <sup>+</sup>		
244.75 <sup>‡</sup> 10	11/2 <sup>+</sup>		
268.1 <sup>b</sup> 3	13/2 <sup>+</sup>		
288.69 <sup>a</sup> 16	7/2 <sup>+</sup>		
298.92 <sup>#</sup> 22	13/2 <sup>+</sup>		
374.55 <sup>e</sup> 19	11/2 <sup>-</sup>		
429.75 <sup>‡</sup> 14	15/2 <sup>+</sup>		
470.12 <sup>@</sup> 14	3/2 <sup>-</sup>		
494.30 20	1/2 <sup>-</sup>		
498.5 <sup>#</sup> 3	17/2 <sup>+</sup>		
501.92 <sup>@</sup> 17	7/2 <sup>-</sup>		
525.77 <sup>c</sup> 16	9/2 <sup>+</sup>		
577.42 <sup>@</sup> 22	11/2 <sup>-</sup>		
663.45 <sup>‡</sup> 17	19/2 <sup>+</sup>		
699.02 <sup>@</sup> 24	15/2 <sup>-</sup>		
868.2 <sup>@</sup> 3	19/2 <sup>-</sup>		
1029.2 <sup>d</sup> 5	(9/2 <sup>+</sup> )	<1.4 ps	T <sub>1/2</sub> : From estimated lifetime by 2008Is05 to be much shorter than 2 ps stopping time of the Doppler-shifted 981γ in the thick target backing.
1504.7 <sup>&amp;</sup> 6	17/2 <sup>+</sup>		

<sup>†</sup> From least-squares fit to Eγ data by the evaluator. Energy of 110.153 keV level is taken from <sup>248</sup>Cm(n,γ) in 1982Ho07 and kept fixed in the fitting procedure.

<sup>‡</sup> Band(A): 1/2[620], α=-1/2.

<sup>#</sup> Band(a): 1/2[620], α=+1/2.

<sup>@</sup> Band(B): 1/2[750].

<sup>&</sup> Band(C): 1/2[880].

<sup>a</sup> Band(D): 3/2[622].

<sup>b</sup> Band(E): 7/2[613].

<sup>c</sup> Band(F): 9/2[615].

<sup>248</sup>Cm(<sup>18</sup>O,<sup>17</sup>Oγ) **2008Is05 (continued)**

<sup>249</sup>Cm Levels (continued)

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

γ(<sup>249</sup>Cm)

Measured I(K<sub>α</sub>)= 830 μb 40 and I(K<sub>β</sub>)=240 12 μb.  
 γ asymmetry=I<sub>γ</sub> in the reaction plane/I<sub>γ</sub> out of the reaction plane.

E <sub>γ</sub>	I <sub>γ</sub>	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult. <sup>‡</sup>	α <sup>#</sup>	Comments
60.8 1	40 3	108.81	9/2 <sup>+</sup>	48.06	7/2 <sup>+</sup>	(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)= 1210 90.
73.6 3	<62	182.08	11/2 <sup>+</sup>	108.81	9/2 <sup>+</sup>	(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.
<sup>x</sup> 77.8 2	<30					[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)< 470.
86.0 2	<28	268.1	13/2 <sup>+</sup>	182.08	11/2 <sup>+</sup>	(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 I(γ+ce)< 350.
134.6 1	70 4	244.75	11/2 <sup>+</sup>	110.153	7/2 <sup>+</sup>	(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 <sup>-5</sup> 9 I(γ+ce)= 420 20.
150.6 1	29 2	298.92	13/2 <sup>+</sup>	148.32	9/2 <sup>+</sup>	(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 <sup>-5</sup> 6 I(γ+ce)= 119 9.
159.9 <sup>@</sup> 2	15 2	208.00	3/2 <sup>+</sup>	48.12	5/2 <sup>+</sup>	[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)= 150 20.
159.9 <sup>@</sup> 2 185.0 1	44 3	208.00 429.75	3/2 <sup>+</sup> 15/2 <sup>+</sup>	48.06 244.75	7/2 <sup>+</sup> 11/2 <sup>+</sup>	(E2)	1.331 19	I(γ+ce)= 150 20. 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 <sup>-5</sup> 31 I(γ+ce)= 103 7.
192.5 1	103 <sup>†</sup> 5	374.55	11/2 <sup>-</sup>	182.08	11/2 <sup>+</sup>			I(γ+ce)= 115 6.
193.5 <sup>@</sup> 3	<sup>†</sup>	241.6	5/2 <sup>+</sup>	48.06	7/2 <sup>+</sup>			
193.5 <sup>@</sup> 3	<sup>†</sup>	241.6	5/2 <sup>+</sup>	48.12	5/2 <sup>+</sup>			
199.6 2	58 4	498.5	17/2 <sup>+</sup>	298.92	13/2 <sup>+</sup>	(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 <sup>-5</sup> 26 I(γ+ce)= 116 8.

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$^{248}\text{Cm}(^{18}\text{O}, ^{17}\text{O}\gamma)$  **2008Is05** (continued) $\gamma(^{249}\text{Cm})$  (continued)

$E_\gamma$	$I_\gamma$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. <sup>‡</sup>	$\alpha^\#$	Comments
208.0 1	35 3	208.00	3/2 <sup>+</sup>	0.0	1/2 <sup>+</sup>	[M1]	3.97 6	$\alpha(\text{K})=3.11$ 4; $\alpha(\text{L})=0.639$ 9; $\alpha(\text{M})=0.1563$ 22 $\alpha(\text{N})=0.0429$ 6; $\alpha(\text{O})=0.01093$ 15; $\alpha(\text{P})=0.002151$ 30; $\alpha(\text{Q})=0.0001537$ 22 $I(\gamma+\text{ce})= 186$ 14.
233.7 1	19.2 26	663.45	19/2 <sup>+</sup>	429.75	15/2 <sup>+</sup>	(E2)	0.554 8	$\alpha(\text{K})=0.1183$ 17; $\alpha(\text{L})=0.316$ 4; $\alpha(\text{M})=0.0882$ 12 $\alpha(\text{N})=0.02452$ 35; $\alpha(\text{O})=0.00598$ 8; $\alpha(\text{P})=0.001025$ 14; $\alpha(\text{Q})=1.156\times 10^{-5}$ 16 $I(\gamma+\text{ce})= 30$ 4.
240.6& 1	19& 3	288.69	7/2 <sup>+</sup>	48.06	7/2 <sup>+</sup>	[M1]	2.64 4	$\alpha(\text{K})=2.072$ 29; $\alpha(\text{L})=0.424$ 6; $\alpha(\text{M})=0.1037$ 15 $\alpha(\text{N})=0.0285$ 4; $\alpha(\text{O})=0.00725$ 10; $\alpha(\text{P})=0.001426$ 20; $\alpha(\text{Q})=0.0001018$ 14 $I(\gamma+\text{ce})= 73$ 10.
240.6& 1	19& 3	288.69	7/2 <sup>+</sup>	48.12	5/2 <sup>+</sup>	[M1]	2.64 4	$\alpha(\text{K})=2.072$ 29; $\alpha(\text{L})=0.424$ 6; $\alpha(\text{M})=0.1037$ 15 $\alpha(\text{N})=0.0285$ 4; $\alpha(\text{O})=0.00725$ 10; $\alpha(\text{P})=0.001426$ 20; $\alpha(\text{Q})=0.0001018$ 14 $I(\gamma+\text{ce})= 73$ 10.
265.7 1	256 13	374.55	11/2 <sup>-</sup>	108.81	9/2 <sup>+</sup>	E1	0.0566 8	$\alpha(\text{K})=0.0443$ 6; $\alpha(\text{L})=0.00928$ 13; $\alpha(\text{M})=0.002267$ 32 $\alpha(\text{N})=0.000618$ 9; $\alpha(\text{O})=0.0001543$ 22; $\alpha(\text{P})=2.86\times 10^{-5}$ 4; $\alpha(\text{Q})=1.561\times 10^{-6}$ 22 $I(\gamma+\text{ce})= 271$ 14.
278.5 1	40 3	577.42	11/2 <sup>-</sup>	298.92	13/2 <sup>+</sup>	(E1)	0.0511 7	$\alpha(\text{K})=0.0400$ 6; $\alpha(\text{L})=0.00832$ 12; $\alpha(\text{M})=0.002031$ 28 $\alpha(\text{N})=0.000554$ 8; $\alpha(\text{O})=0.0001383$ 19; $\alpha(\text{P})=2.57\times 10^{-5}$ 4; $\alpha(\text{Q})=1.419\times 10^{-6}$ 20 $I(\gamma+\text{ce})= 42$ 3.
353.6 1	93 6	501.92	7/2 <sup>-</sup>	148.32	9/2 <sup>+</sup>	[E1]	0.0308 4	$\alpha(\text{K})=0.02430$ 34; $\alpha(\text{L})=0.00486$ 7; $\alpha(\text{M})=0.001181$ 17 $\alpha(\text{N})=0.000322$ 5; $\alpha(\text{O})=8.08\times 10^{-5}$ 11; $\alpha(\text{P})=1.519\times 10^{-5}$ 21; $\alpha(\text{Q})=8.83\times 10^{-7}$ 12 $I(\gamma+\text{ce})= 96$ 6.
369.7 1	19 3	868.2	19/2 <sup>-</sup>	498.5	17/2 <sup>+</sup>	(E1)	0.0281 4	$\alpha(\text{K})=0.02220$ 31; $\alpha(\text{L})=0.00441$ 6; $\alpha(\text{M})=0.001071$ 15 $\alpha(\text{N})=0.000292$ 4; $\alpha(\text{O})=7.33\times 10^{-5}$ 10; $\alpha(\text{P})=1.380\times 10^{-5}$ 19; $\alpha(\text{Q})=8.10\times 10^{-7}$ 11 $I(\gamma+\text{ce})= 19$ 3.
400.1 1	51 4	699.02	15/2 <sup>-</sup>	298.92	13/2 <sup>+</sup>	(E1)	0.02387 33	$\alpha(\text{K})=0.01894$ 27; $\alpha(\text{L})=0.00371$ 5; $\alpha(\text{M})=0.000901$ 13 $\alpha(\text{N})=0.0002459$ 34; $\alpha(\text{O})=6.17\times 10^{-5}$ 9; $\alpha(\text{P})=1.167\times 10^{-5}$ 16; $\alpha(\text{Q})=6.96\times 10^{-7}$ 10 $I(\gamma+\text{ce})= 52$ 4.
417.0 1	31.8 25	525.77	9/2 <sup>+</sup>	108.81	9/2 <sup>+</sup>			$I(\gamma+\text{ce})= 52$ 4. Mult.: Q from $I_\gamma(\text{in})/I_\gamma(\text{out})=2.6$ 7. $\delta \approx 0.1$ assumed by authors for a significant mixing of E2 (2008Is05).
422.0 1		470.12	3/2 <sup>-</sup>	48.12	5/2 <sup>+</sup>			$I(\gamma+\text{ce})= 494$ .
429.1 1	111 6	577.42	11/2 <sup>-</sup>	148.32	9/2 <sup>+</sup>	(E1)	0.02074 29	$\alpha(\text{K})=0.01649$ 23; $\alpha(\text{L})=0.00320$ 4; $\alpha(\text{M})=0.000776$ 11 $\alpha(\text{N})=0.0002117$ 30; $\alpha(\text{O})=5.32\times 10^{-5}$ 7; $\alpha(\text{P})=1.008\times 10^{-5}$ 14; $\alpha(\text{Q})=6.10\times 10^{-7}$ 9 $I(\gamma+\text{ce})= 113$ 6.

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<sup>248</sup>Cm(<sup>18</sup>O,<sup>17</sup>Oγ) **2008Is05** (continued)

<u>γ(<sup>249</sup>Cm) (continued)</u>								
<u>E<sub>γ</sub></u>	<u>I<sub>γ</sub></u>	<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Mult.<sup>‡</sup></u>	<u>α<sup>#</sup></u>	<u>Comments</u>
<sup>x</sup> 441.5 1 453.8 1	114 6	501.92	7/2 <sup>-</sup>	48.12	5/2 <sup>+</sup>	[E1]	0.01856 26	I(γ+ce)= 20 3. 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 <sup>-5</sup> 7; α(P)=8.98×10 <sup>-6</sup> 13; α(Q)=5.49×10 <sup>-7</sup> 8
468.1 3 470.1 2	24 6	494.30 470.12	1/2 <sup>-</sup> 3/2 <sup>-</sup>	26.2 0.0	3/2 <sup>+</sup> 1/2 <sup>+</sup>	(E1)	0.01732 24	I(γ+ce)= 116 6. I(γ+ce)= 14 4. 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 <sup>-5</sup> 6; α(P)=8.36×10 <sup>-6</sup> 12; α(Q)=5.14×10 <sup>-7</sup> 7
477.6 1	59 4	525.77	9/2 <sup>+</sup>	48.06	7/2 <sup>+</sup>			I(γ+ce)= 24 6. I(γ+ce)= 85 5. Mult.: D from Iγ(in)/Iγ(out)=0.9 2, δ ≈0.1 assumed by authors for a significant mixing of E2 ( <b>2008Is05</b> ).
494.3 2 <sup>x</sup> 524.4 2	37 4	494.30	1/2 <sup>-</sup>	0.0	1/2 <sup>+</sup>	[E2]	0.0526 7	I(γ+ce)= 19 3. 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 <sup>-5</sup> 8; α(Q)=1.729×10 <sup>-6</sup> 24
<sup>x</sup> 526.1 2	75 6					[E1]	0.01394 20	I(γ+ce)= 39 4. 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 <sup>-5</sup> 5; α(P)=6.67×10 <sup>-6</sup> 9; α(Q)=4.19×10 <sup>-7</sup> 6
636.5 5	<2.97	1504.7	17/2 <sup>+</sup>	868.2	19/2 <sup>-</sup>	[E1]	0.00975 14	I(γ+ce)= 75 6. α(K)=0.00784 11; α(L)=0.001444 20; α(M)=0.000348 5 α(N)=9.50×10 <sup>-5</sup> 13; α(O)=2.397×10 <sup>-5</sup> 34; α(P)=4.60×10 <sup>-6</sup> 6; α(Q)=2.98×10 <sup>-7</sup> 4
981.1 5	113 9	1029.2	(9/2 <sup>+</sup> )	48.06	7/2 <sup>+</sup>	(M1)	0.0575 8	I(γ+ce)< 3. 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 <sup>-5</sup> 4; α(Q)=2.163×10 <sup>-6</sup> 30 I(γ+ce)= 120 9.

† 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 <sup>248</sup>Cm(<sup>16</sup>O,<sup>15</sup>Oγ) measurement by the same group (**2008Is05**).

# **Additional information 2.**

@ Multiply placed.

& Multiply placed with undivided intensity.

<sup>x</sup> γ ray not placed in level scheme.

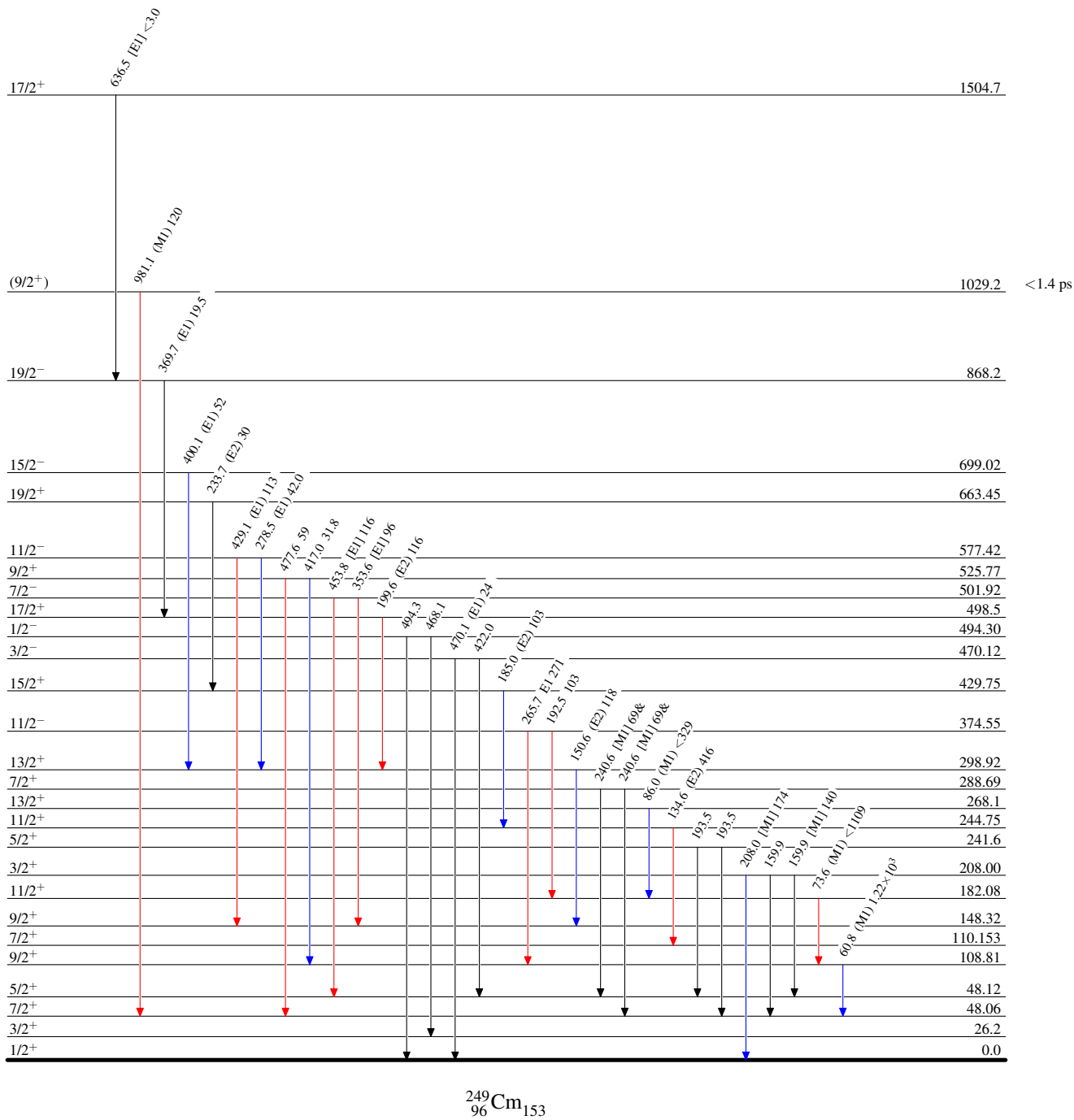
$^{248}\text{Cm}(^{18}\text{O}, ^{17}\text{O}\gamma)$  2008Is05

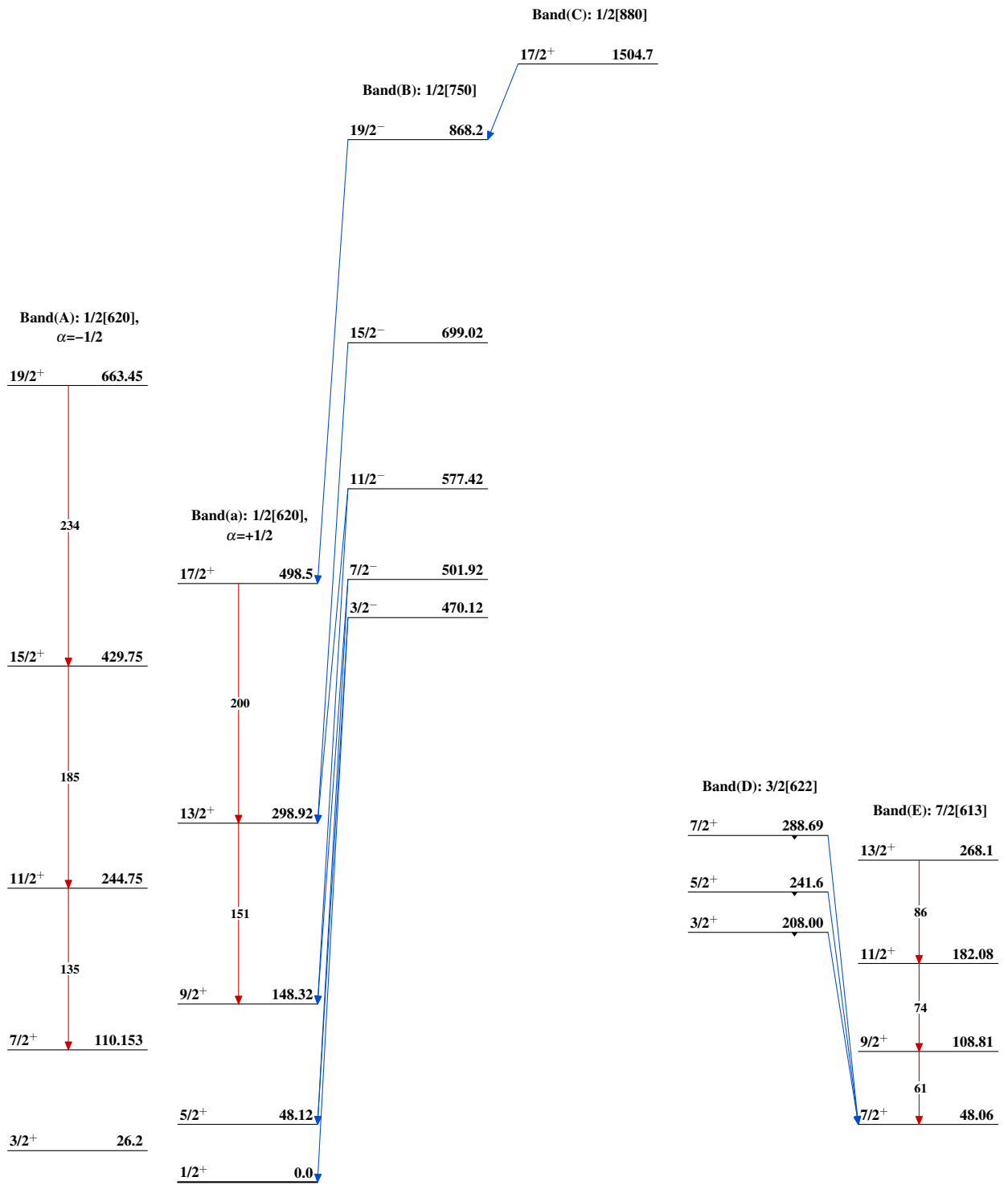
Level Scheme

Intensities: Relative  $I_{(\gamma+ce)}$   
& Multiply placed: undivided intensity given

Legend

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



$^{248}\text{Cm}(^{18}\text{O}, ^{17}\text{O}\gamma)$  2008Is05 $^{249}_{96}\text{Cm}_{153}$

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 $^{248}\text{Cm}(^{18}\text{O},^{17}\text{O}\gamma)$  2008Is05 (continued)

Band(F): 9/2[615]

9/2<sup>+</sup>      525.77

Band(G): 9/2[604]

(9/2<sup>+</sup>)      1029.2

Band(H): 11/2[725]

11/2<sup>-</sup>      374.55 $^{249}_{96}\text{Cm}_{153}$