^{226}Ra(α,5nγ) 1990Hu04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	A. K. Jain (a), R. Raut (b), J. K. Tuli	NDS 110,1409 (2009)	1-Dec-2008

E_α=50 MeV.
Measured E_γ, I_γ, $I_\gamma(\theta)$, E_{e^-}, I_{e^-}, $\gamma\gamma$, e^-n, e^-e^--, $e^-\gamma$. 225Th deduced levels, J, π, rotational bands, dipole moments. Theoretical calculations.
The level observed at 102 keV in the α-decay, not observed in the present work. Interpretations in 1988Le13.

^{225}Th Levels

For given s, π=− has greater effective moment of inertia than π=+. For given π, s=−i has larger effective moment of inertia than s=+i, for rotation frequencies <0.18 Mev. For each s, effective moment of inertia converge at a common value.

E(level)	J^π[&]	Comments
0.0[†]	(3/2$^+$)	
68.4[†]	(7/2$^+$)	
187.0[†]	(11/2$^+$)	
325.6[‡]	(13/2$^-$)	
370.2[†]	(15/2$^+$)	
519.7[‡]	(17/2$^-$)	
614.3[†]	(19/2$^+$)	
768.7[‡]	(21/2$^-$)	
910.7[†]	(23/2$^+$)	
1072.2[‡]	(25/2$^-$)	
1251.3[†]	(27/2$^+$)	
1426.3[‡]	(29/2$^-$)	
1631.8[†]	(31/2$^+$)	
1824.5[‡]	(33/2$^-$)	
2047.2?[†]	(35/2$^+$)	
2259.1?[‡]	(37/2$^-$)	
2494.4?[†]	(39/2$^+$)	
x[#]	(5/2$^+$)	E(level): Adjustment of energies of (5/2$^+$) and (9/2$^+$) states under the constraint that the difference between their energies must remain constant (103 keV) yielded x=31 keV.
x+103.5[#]	(9/2$^+$)	E(level): Adjustment of energies of (5/2$^+$) and (9/2$^+$) states under the constraint that the difference between their energies must remain constant (103 keV) yielded E(9/2$^+$)=135 keV.
x+222.8[@]	(11/2$^-$)	
x+271.1[#]	(13/2$^+$)	
x+401.6[@]	(15/2$^-$)	
x+498.1[#]	(17/2$^+$)	
x+636.5[@]	(19/2$^-$)	
x+775.6[#]	(21/2$^+$)	
x+925.2[@]	(23/2$^-$)	
x+1096[#]	(25/2$^+$)	

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^{226}Ra(α,5nγ) 1990Hu04 (continued)

^{225}Th Levels (continued)

E(level)	J$^{\pi}$[&]
x+1259.3[@]	(27/2$^-$)
x+1454.2?[#]	(29/2$^+$)
x+1626.3?[@]	(31/2$^-$)
x+1839.1?[#]	(33/2$^+$)
x+2020.1?[@]	(35/2$^-$)

† Band(A): s=−i, π=+ band.
‡ Band(B): s=−i, π=− band.
# Band(C): s=+i, π=+ band.
@ Band(D): s=+i, π=− band.
& Spin assignments deduced assuming stretched transitions.

γ(^{225}Th)

E$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	α[#]	Comments
44.9 *2*	370.2	(15/2$^+$)	325.6	(13/2$^-$)			I$_\gamma$: Iγ(103 gate)=3.0 *6*, Iγ(118 gate)=10 *2*.
48.1 *2*	x+271.1	(13/2$^+$)	x+222.8	(11/2$^-$)			I$_\gamma$: Iγ(103 gate)=16 *3*.
68.4	68.4	(7/2$^+$)	0.0	(3/2$^+$)			E$_\gamma$: From the level scheme of 1990Hu04. Not listed in the table.
94.8 *2*	614.3	(19/2$^+$)	519.7	(17/2$^-$)	E1	0.1351 *21*	ce(L1)+ce(L2)<0.15 I$_\gamma$: Iγ(103 gate)=11.7 *12*, Iγ(118 gate)=24 *4*.
95.9 *2*	x+498.1	(17/2$^+$)	x+401.6	(15/2$^-$)	E1	0.1311 *20*	ce(L1)+ce(L2)<0.15 I$_\gamma$: Iγ(103 gate)=27 *3*, Iγ(118 gate)=8 *3*.
103.5	x+103.5	(9/2$^+$)	x	(5/2$^+$)	E2	9.60 *14*	(L1+L2)/L3=1.7 *2*
118.6	187.0	(11/2$^+$)	68.4	(7/2$^+$)	E2	5.36 *8*	(L1+L2)/L3=1.8 *2*
119.3 *2*	x+222.8	(11/2$^-$)	x+103.5	(9/2$^+$)	E1	0.323 *5*	ce(L1)+ce(L2)<0.15 I$_\gamma$: Iγ(103 gate)=30 *3*.
131.1 *2*	x+401.6	(15/2$^-$)	x+271.1	(13/2$^+$)	E1	0.258 *4*	ce(L1)+ce(L2)≈0.03 I$_\gamma$: Iγ(103 gate)=28 *3*, Iγ(118 gate)=9.5 *10*.
138.6[@] *2*	x+636.5	(19/2$^-$)	x+498.1	(17/2$^+$)	E1	0.226 *4*	ce(L1)+ce(L2)≈0.03 I$_\gamma$: Iγ(103 gate)=39 *4*, Iγ(118 gate)=47 *5*.
138.6[@] *2*	x+775.6	(21/2$^+$)	x+636.5	(19/2$^-$)	E1	0.226 *4*	ce(L1)+ce(L2)≈0.03 I$_\gamma$: Iγ(103 gate)=39 *4*, Iγ(118 gate)=47 *5*.
138.6[@] *2*	325.6	(13/2$^-$)	187.0	(11/2$^+$)	E1	0.226 *4*	ce(L1)+ce(L2)≈0.03 I$_\gamma$: Iγ(103 gate)=39 *4*, Iγ(118 gate)=47 *5*.
141.8 *2*	910.7	(23/2$^+$)	768.7	(21/2$^-$)	E1	0.214 *3*	ce(L1)+ce(L2)<0.06 I$_\gamma$: Iγ(103 gate)=5.0 *5*, Iγ(118 gate)=14.9 *15*.
149.4 *2*	519.7	(17/2$^-$)	370.2	(15/2$^+$)	E1	0.189 *3*	ce(L1)+ce(L2)≈0.03 I$_\gamma$: Iγ(103 gate)=18 *2*, Iγ(118 gate)=38 *4*.
149.8	x+925.2	(23/2$^-$)	x+775.6	(21/2$^+$)			
154.2 *2*	768.7	(21/2$^-$)	614.3	(19/2$^+$)	E1	0.175 *3*	ce(L1)+ce(L2)<0.06 I$_\gamma$: Iγ(103 gate)=9.0 *9*, Iγ(118 gate)=26 *3*.
161.9 *2*	1072.2	(25/2$^-$)	910.7	(23/2$^+$)	E1	0.1558 *23*	ce(L1)+ce(L2)<0.06 I$_\gamma$: Iγ(103 gate)=3.8 *5*, Iγ(118 gate)=12.3 *12*.
163.9 *2*	x+1259.3	(27/2$^-$)	x+1096	(25/2$^+$)			I$_\gamma$: Iγ(103 gate)=1.9 *4*, Iγ(118 gate)=2.3 *3*.
167.6 *2*	x+271.1	(13/2$^+$)	x+103.5	(9/2$^+$)	E2	1.288 *19*	(L1+L2)/L3=1.9 *3* I$_\gamma$: Iγ(103 gate)=13 *1*.
170.3 *2*	x+1096	(25/2$^+$)	x+925.2	(23/2$^-$)			I$_\gamma$: Iγ(103 gate)=8.5 *9*, Iγ(118 gate)=7.8 *8*.
173.2[&] *2*	x+1626.3?	(31/2$^-$)	x+1454.2?	(29/2$^+$)			I$_\gamma$: Iγ(103 gate)=7.5 *10*, Iγ(118 gate)=6.7 7.
174.9 *2*	1426.3	(29/2$^-$)	1251.3	(27/2$^+$)			I$_\gamma$: Iγ(103 gate)=4.4 *8*, Iγ(118 gate)=5.9 *6*.

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^{226}Ra(α,5nγ) 1990Hu04 (continued)

$\gamma(^{225}Th)$ (continued)

E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[#]	Comments
178.8[@&] *2*	x+401.6	(15/2$^-$)	x+222.8	(11/2$^-$)			I_γ: Iγ(103 gate)=2.9 *4*, Iγ(118 gate)=7.0 *7*.
178.8[@] *2*	1251.3	(27/2$^+$)	1072.2	(25/2$^-$)			I_γ: Iγ(103 gate)=2.9 *4*, Iγ(118 gate)=7.0 *7*.
183.2 *2*	370.2	(15/2$^+$)	187.0	(11/2$^+$)	E2	0.914 *14*	(L1+L2)/L3=2.3 *2* I_γ: Iγ(103 gate)=6.4 *7* Iγ(118 gate)=21.
193.1[&] *2*	1824.5	(33/2$^-$)	1631.8	(31/2$^+$)			I_γ: Iγ(103 gate)=8.4 *13*, Iγ(118 gate)=8.1 *12*.
194.1[@&] *2*	x+1454.2?	(29/2$^+$)	x+1259.3	(27/2$^-$)			I_γ: Iγ(103 gate)=2.1 *7*, Iγ(118 gate)=3.3 *12*.
194.1[@] *2*	519.7	(17/2$^-$)	325.6	(13/2$^-$)			I_γ: Iγ(103 gate)=2.1 *7*, Iγ(118 gate)=3.3 *12*.
205.4 *2*	1631.8	(31/2$^+$)	1426.3	(29/2$^-$)			I_γ: Iγ(103 gate)=5.2 *7*, Iγ(118 gate)=4.7 *10*.
211.6[@&] *2*	x+1839.1?	(33/2$^+$)	x+1626.3?	(31/2$^-$)			I_γ: Iγ(103 gate)=2.7 *3*, Iγ(118 gate)=2.5 *3*.
211.6[@&] *2*	2259.1?	(37/2$^-$)	2047.2?	(35/2$^+$)			I_γ: Iγ(103 gate)=2.7 *3*, Iγ(118 gate)=2.5 *3*.
222.7[&] *5*	2047.2?	(35/2$^+$)	1824.5	(33/2$^-$)			I_γ: Iγ(103 gate)=0.8 *4*, Iγ(118 gate)=2.9 *6*.
227.0 *2*	x+498.1	(17/2$^+$)	x+271.1	(13/2$^+$)	E2	0.419 *6*	(L1+L2)/L3=2.4 *6* I_γ: Iγ(103 gate)=11 *2*, Iγ(118 gate)=3.4 *11*.
234.9[@] *2*	x+636.5	(19/2$^-$)	x+401.6	(15/2$^-$)			I_γ: Iγ(103 gate)=3.9 *4*, Iγ(118 gate)=2.4 *4*.
234.9[@&] *2*	2494.4?	(39/2$^+$)	2259.1?	(37/2$^-$)			I_γ: Iγ(103 gate)=3.9 *4*, Iγ(118 gate)=2.4 *4*.
244.1 *2*	614.3	(19/2$^+$)	370.2	(15/2$^+$)	E2	0.327 *5*	(L1+L2)/L3=2.2 *6* I_γ: Iγ(103 gate)=3.6 *4*, Iγ(118 gate)=14.0 *14*.
249.0 *2*	768.7	(21/2$^-$)	519.7	(17/2$^-$)			I_γ: Iγ(103 gate)=3.6 *4*, Iγ(118 gate)=5.9 *6*.
277.5 *2*	x+775.6	(21/2$^+$)	x+498.1	(17/2$^+$)			I_γ: Iγ(103 gate)=7.1 *7*, Iγ(118 gate)=2.5 *5*.
288.7 *5*	x+925.2	(23/2$^-$)	x+636.5	(19/2$^-$)			I_γ: Iγ(103 gate)=5.2 *5*, Iγ(118 gate)=0.8 *4*.
296.4 *2*	910.7	(23/2$^+$)	614.3	(19/2$^+$)			I_γ: Iγ(103 gate)=≈2, Iγ(118 gate)=6.1 *12*.
303.5 *2*	1072.2	(25/2$^-$)	768.7	(21/2$^-$)			I_γ: Iγ(103 gate)=5.3 *8*, Iγ(118 gate)=8.9 *9*.
320.4 *2*	x+1096	(25/2$^+$)	x+775.6	(21/2$^+$)			I_γ: Iγ(103 gate)=4.2 *6*, Iγ(118 gate)=2.1 *3*.
334.1 *2*	x+1259.3	(27/2$^-$)	x+925.2	(23/2$^-$)			I_γ: Iγ(103 gate)=3.5 *4*, Iγ(118 gate)=1.2 *3*.
340.6 *5*	1251.3	(27/2$^+$)	910.7	(23/2$^+$)			I_γ: Iγ(103 gate)=0.9 *3*, Iγ(118 gate)=4.7 *7*.
354.1 *2*	1426.3	(29/2$^-$)	1072.2	(25/2$^-$)			I_γ: Iγ(103 gate)=1.4 *5*, Iγ(118 gate)=4.7 *5*.
358.2[&] *5*	x+1454.2?	(29/2$^+$)	x+1096	(25/2$^+$)			I_γ: Iγ(103 gate)=1.8 *9*, Iγ(118 gate)=1.1 *4*.
367.0[&] *2*	x+1626.3?	(31/2$^-$)	x+1259.3	(27/2$^-$)			I_γ: Iγ(103 gate)=3.8 *4*, Iγ(118 gate)=2.8 *3*.
380.5 *5*	1631.8	(31/2$^+$)	1251.3	(27/2$^+$)			I_γ: Iγ(103 gate)=0.5 *3*, Iγ(118 gate)=2.4 *4*.
384.9[&] *5*	x+1839.1?	(33/2$^+$)	x+1454.2?	(29/2$^+$)			I_γ: Iγ(103 gate)=1.2 *3*, Iγ(118 gate)=0.9 *3*.
393.8[&] *5*	x+2020.1?	(35/2$^-$)	x+1626.3?	(31/2$^-$)			I_γ: Iγ(103 gate)=1.3 *3*, Iγ(118 gate)=0.6 *3*.
398.2 *5*	1824.5	(33/2$^-$)	1426.3	(29/2$^-$)			I_γ: Iγ(103 gate)=1.1 *3*, Iγ(118 gate)=2.4 *4*.
415.4[&] *5*	2047.2?	(35/2$^+$)	1631.8	(31/2$^+$)			I_γ: Iγ(103 gate)=1.6 *4*, Iγ(118 gate)=1.2 *3*.
434.6[&] *5*	2259.1?	(37/2$^-$)	1824.5	(33/2$^-$)			I_γ: Iγ(103 gate)=1.0 *3*, Iγ(118 gate)=1.4 *3*.
447.2[&] *5*	2494.4?	(39/2$^+$)	2047.2?	(35/2$^+$)			I_γ: Iγ(103 gate)=0.7 *2*, Iγ(118 gate)=1.2 *3*.

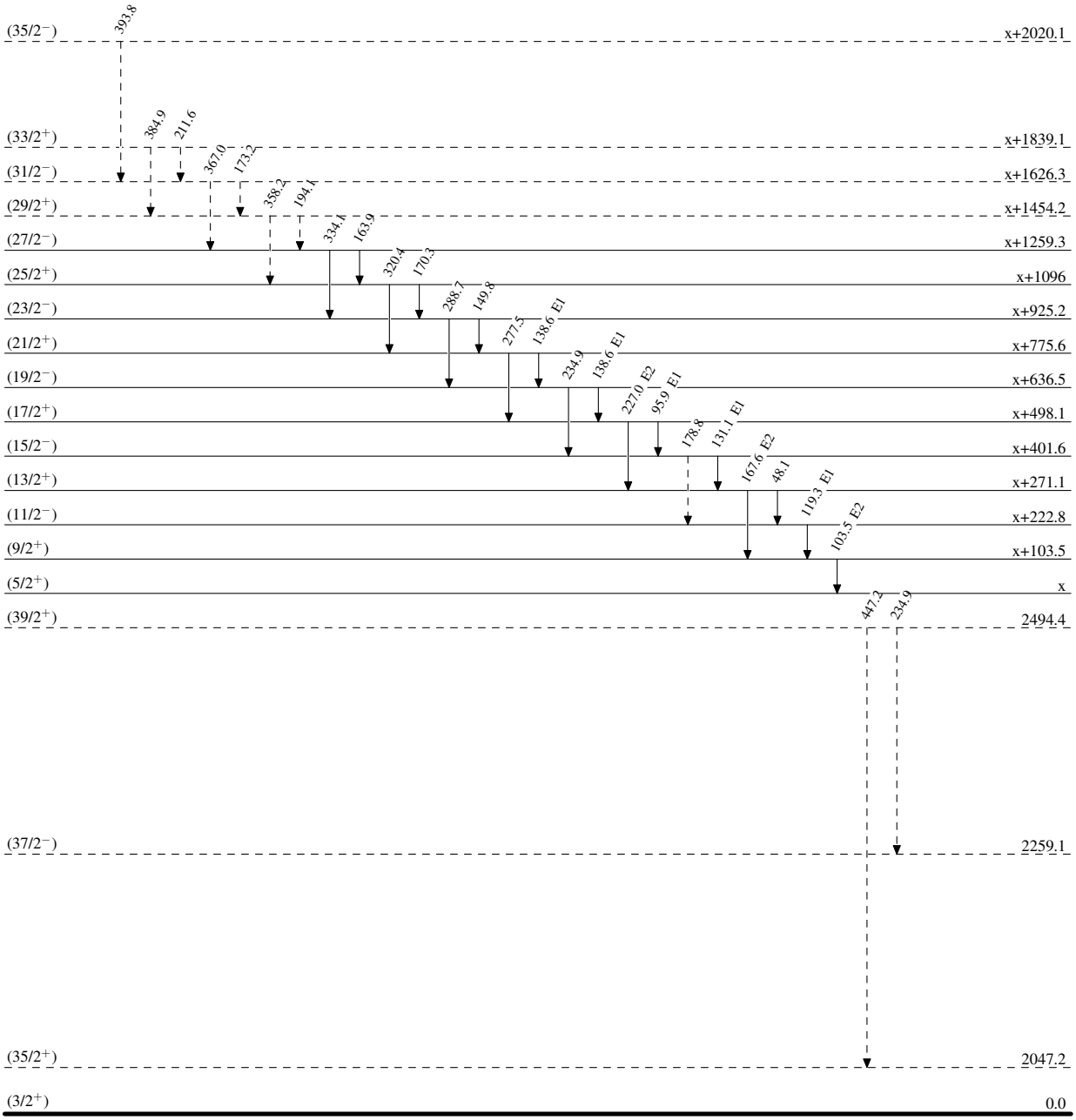
[†] Uncertainty in γ-energies is 0.2 keV for strong lines and up to 0.5 keV for weak lines. Lines with intensities around 1.0 have been considered as weak lines in this dataset.
[‡] Multipolarities from conversion electron measurements, (L1+L2)/L3 intensity ratios and (L1+L2) conversion coefficients.
[#] Calculated using bricc, assuming stretched transitions, according to 1990Hu04.
[@] Multiply placed.
[&] Placement of transition in the level scheme is uncertain.

Legend

^{226}Ra(α,5nγ) 1990Hu04

Level Scheme

γ Decay (Uncertain)



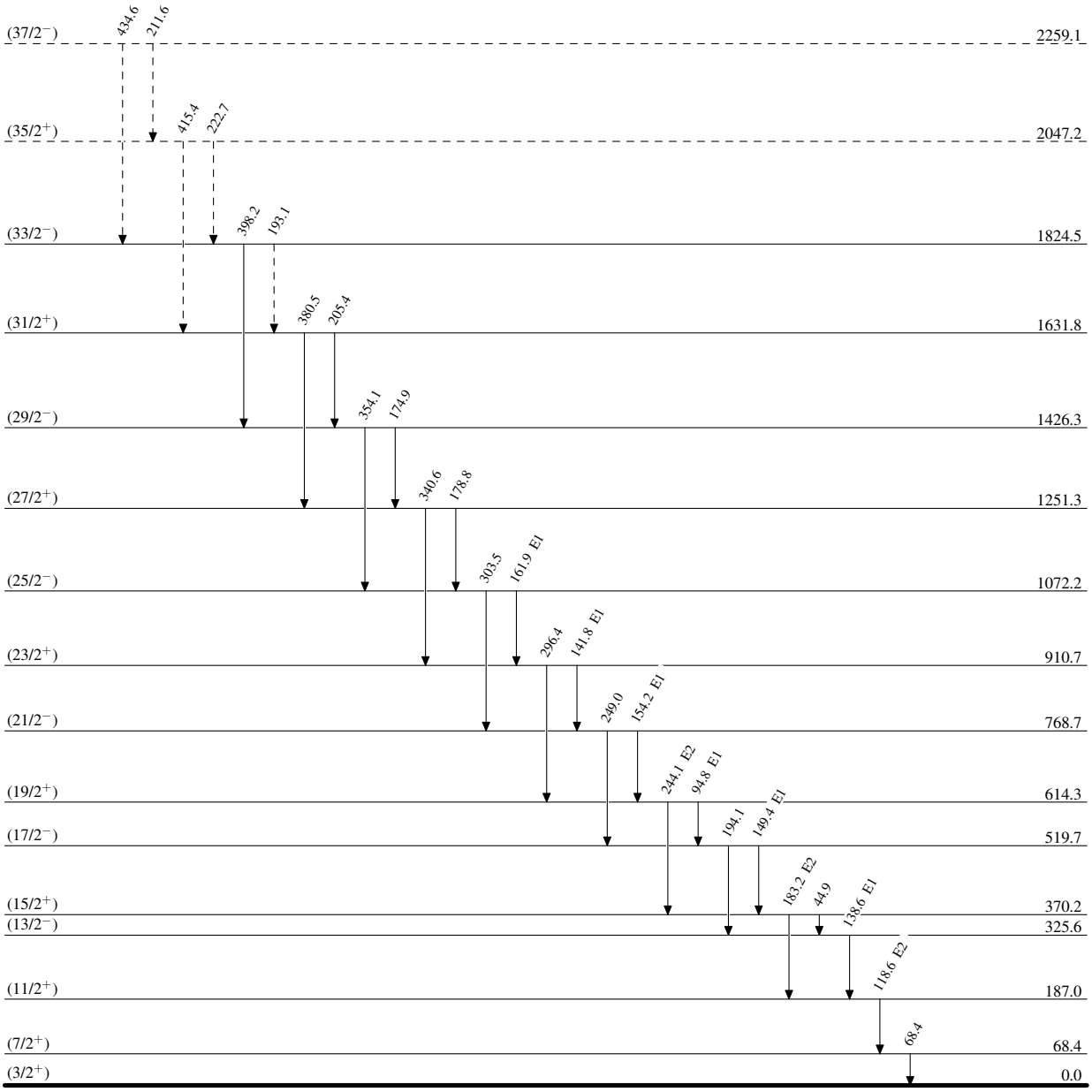
$^{225}_{90}Th_{135}$

Legend

^{226}Ra(α,5nγ) 1990Hu04

Level Scheme (continued)

γ Decay (Uncertain)



$^{225}_{90}Th_{135}$

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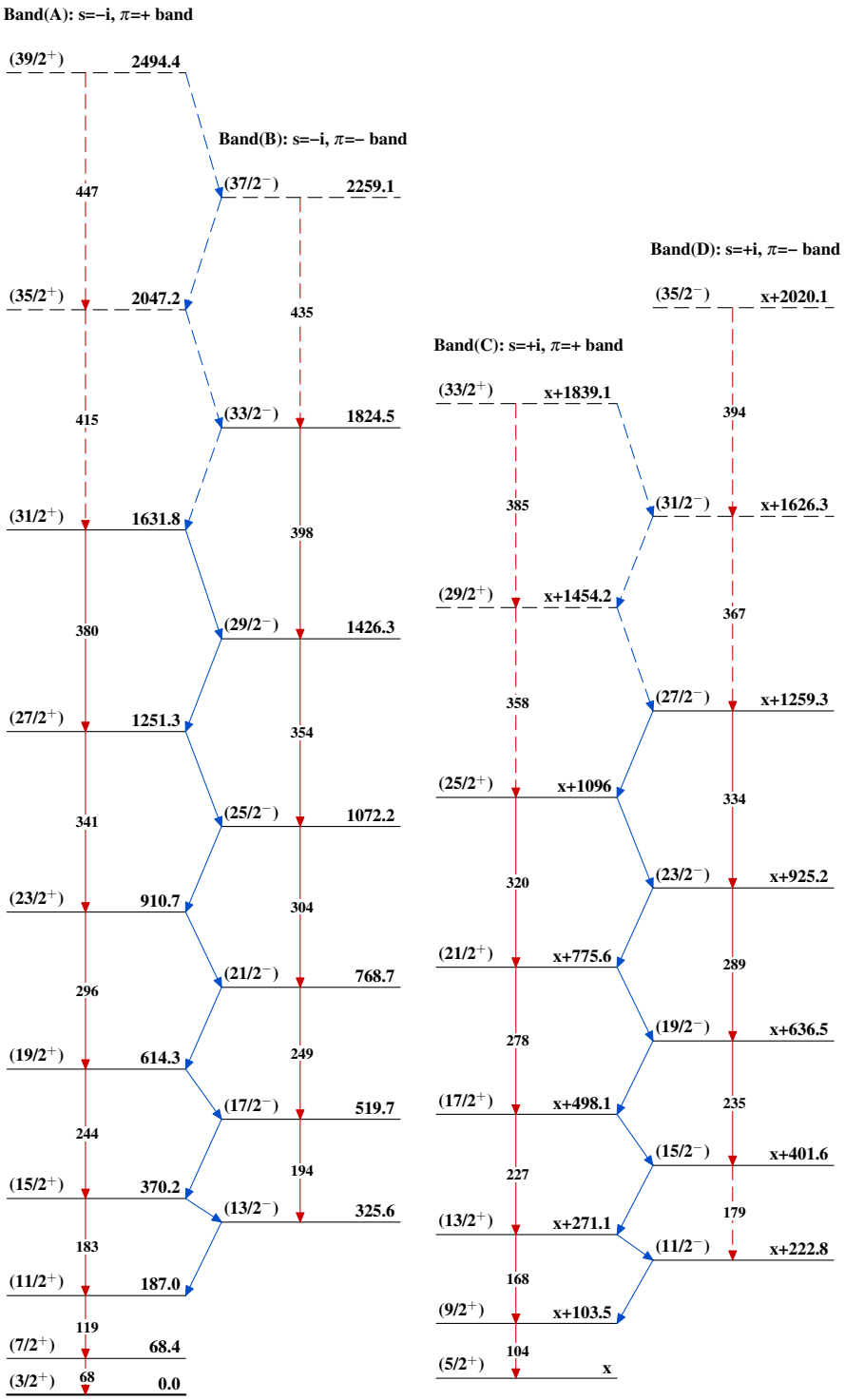

$^{225}_{90}Th_{135}$