^{210}Pb(^{14}C,3nγ) 1991Fe07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ashok Jain, Sukhjeet Singh, Suresh Kumar, Jagdish Tuli	NDS 108, 883 (2007)	15-Jan-2007

1991Fe07: E=61-75 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO). Deduced bands of alternating parity with five Ge detectors. Reflection-asymmetric shape is suggested.

^{221}Ra Levels

E(level)	J^π	E(level)	J^π	E(level)	J^π	E(level)	J^π
0.0†	$5/2^+$	318.9‡ *5*	$(13/2^+)$	688.4‡ *5*	$(19/2^-)$	1180.5# *6*	$(25/2^-)$
53.2†	$7/2^+$	341.5# *5*	$(13/2^-)$	711.6# *5*	$(19/2^+)$	1197.4‡ *6*	$(25/2^+)$
103.5†	$5/2^-$	438.0# *5*	$(15/2^+)$	849.6# *5*	$(21/2^-)$	1344.4‡ *7*	$(27/2^-)$
121.90† *20*	$(9/2^+)$	440.4‡ *5*	$(15/2^-)$	866.9‡ *5*	$(21/2^+)$	1375.7# *7*	$(27/2^+)$
147.8†	$7/2^-$	566.0# *6*	$(17/2^-)$	990.4‡ *5*	$(23/2^-)$		
210.9# *4*	$(11/2^+)$	573.1‡ *5*	$(17/2^+)$	1025.9# *6*	$(23/2^+)$		

† From α-decay study of ^{225}Th (1989Ac01).
‡ Band(A): s=+i band; s is simplex quantum number.
# Band(B): s=−i band JJ^π assignments of 1991Fe07 are based on DCO-deduced multipolarities and band assignments. Similar band structure has been observed In ^{223}Th isotone.

$\gamma(^{221}$Ra)

E_γ	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	Comments
89.0 *3*	(88)	210.9	$(11/2^+)$	121.90	$(9/2^+)$	(M1)	
96.5 *3*	49	438.0	$(15/2^+)$	341.5	$(13/2^-)$	E1	R(DCO)= 0.9 *2*.
108.0 *3*	22	318.9	$(13/2^+)$	210.9	$(11/2^+)$	(M1)	
115.3 *3*	40	688.4	$(19/2^-)$	573.1	$(17/2^+)$	E1	R(DCO)= 0.8 *2*.
121.5 *3*	100	440.4	$(15/2^-)$	318.9	$(13/2^+)$	E1	R(DCO)= 0.9 *2*.
(121.9 2)		121.90	$(9/2^+)$	0.0	$5/2^+$		
123.5 *3*	36	990.4	$(23/2^-)$	866.9	$(21/2^+)$	(E1)	
128.0 *3*	70	566.0	$(17/2^-)$	438.0	$(15/2^+)$	E1	R(DCO)= 1.0 *2*.
130.6 *3*	59	341.5	$(13/2^-)$	210.9	$(11/2^+)$	E1	R(DCO)= 0.8 *2*.
132.7 *3*	46	573.1	$(17/2^+)$	440.4	$(15/2^-)$	(E1)	
138.0 *3*	72	849.6	$(21/2^-)$	711.6	$(19/2^+)$	E1	R(DCO)= 0.9 *3*.
140.8 *3*	14	990.4	$(23/2^-)$	849.6	$(21/2^-)$	(M1)	
145.6 *3*	51	711.6	$(19/2^+)$	566.0	$(17/2^-)$	E1	R(DCO)= 0.8 *2*.
147.0 *3*	23	1344.4	$(27/2^-)$	1197.4	$(25/2^+)$	(E1)	
154.6 *3*	38	1180.5	$(25/2^-)$	1025.9	$(23/2^+)$	(E1)	
161.2 *3*	23	849.6	$(21/2^-)$	688.4	$(19/2^-)$	(M1)	
176.3 *3*	53	1025.9	$(23/2^+)$	849.6	$(21/2^-)$	E1	R(DCO)= 1.1 *2*.
178.5 *3*	72	866.9	$(21/2^+)$	688.4	$(19/2^-)$	E1	R(DCO)= 0.8 *2*.
195.2 *3*	34	1375.7	$(27/2^+)$	1180.5	$(25/2^-)$	(E1)	
207.0 *3*	49	1197.4	$(25/2^+)$	990.4	$(23/2^-)$	E1	R(DCO)= 0.9 *2*.
224.5# *3*	(15)	566.0	$(17/2^-)$	341.5	$(13/2^-)$	(E2)	
248.0 *3*	11	688.4	$(19/2^-)$	440.4	$(15/2^-)$	E2	R(DCO)= 1.7 *5*.
254.2 *3*	22	573.1	$(17/2^+)$	318.9	$(13/2^+)$	(E2)	
273.6 *3*	22	711.6	$(19/2^+)$	438.0	$(15/2^+)$	(E2)	
283.6 *3*	18	849.6	$(21/2^-)$	566.0	$(17/2^-)$	E2	R(DCO)= 1.7 *4*.
293.8 *3*	20	866.9	$(21/2^+)$	573.1	$(17/2^+)$	E2	R(DCO)= 2.5 *4*.
302.0 *3*	28	990.4	$(23/2^-)$	688.4	$(19/2^-)$	E2	R(DCO)= 2.0 *4*.

Continued on next page (footnotes at end of table)

^{210}Pb(^{14}C,3nγ) 1991Fe07 (continued)

$\gamma(^{221}Ra)$ (continued)

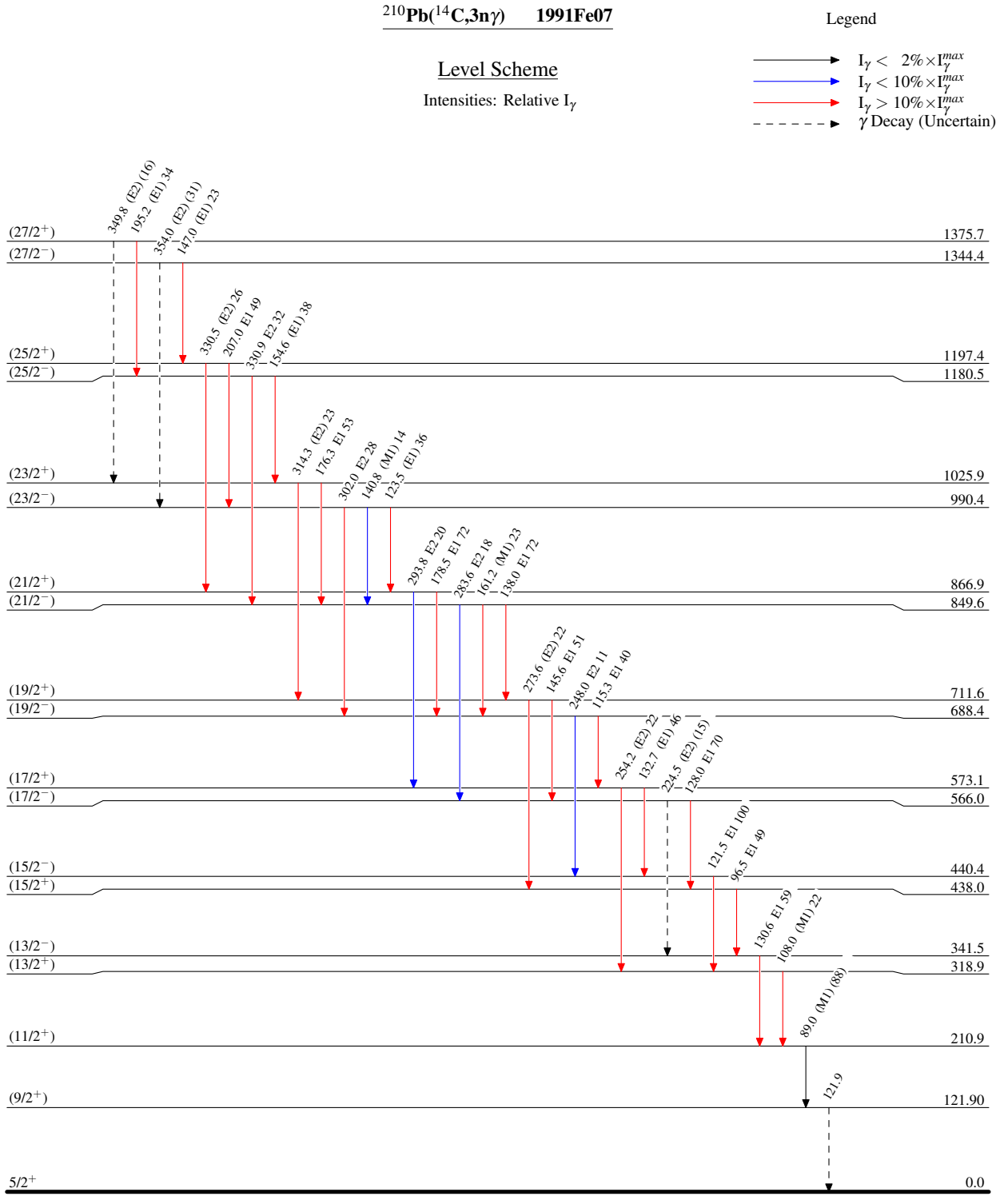
E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
314.3 *3*	23	1025.9	$(23/2^+)$	711.6	$(19/2^+)$	(E2)	
330.5 *3*	26	1197.4	$(25/2^+)$	866.9	$(21/2^+)$	(E2)	
330.9 *3*	32	1180.5	$(25/2^-)$	849.6	$(21/2^-)$	E2	R(DCO)= 1.8 *4*.
349.8[#] *3*	(16)	1375.7	$(27/2^+)$	1025.9	$(23/2^+)$	(E2)	
354.0[#] *3*	(31)	1344.4	$(27/2^-)$	990.4	$(23/2^-)$	(E2)	

[†] Uncertainty is 10% for strong γ rays and 30% for others.
[‡] From R(DCO) gated with $\Delta J=1$, dipole transitions and intensity balance. The assignment is given without parentheses only when R(DCO) are given by 1991Fe07.
[#] Placement of transition in the level scheme is uncertain.

^{210}Pb(^{14}C,3nγ) **1991Fe07**

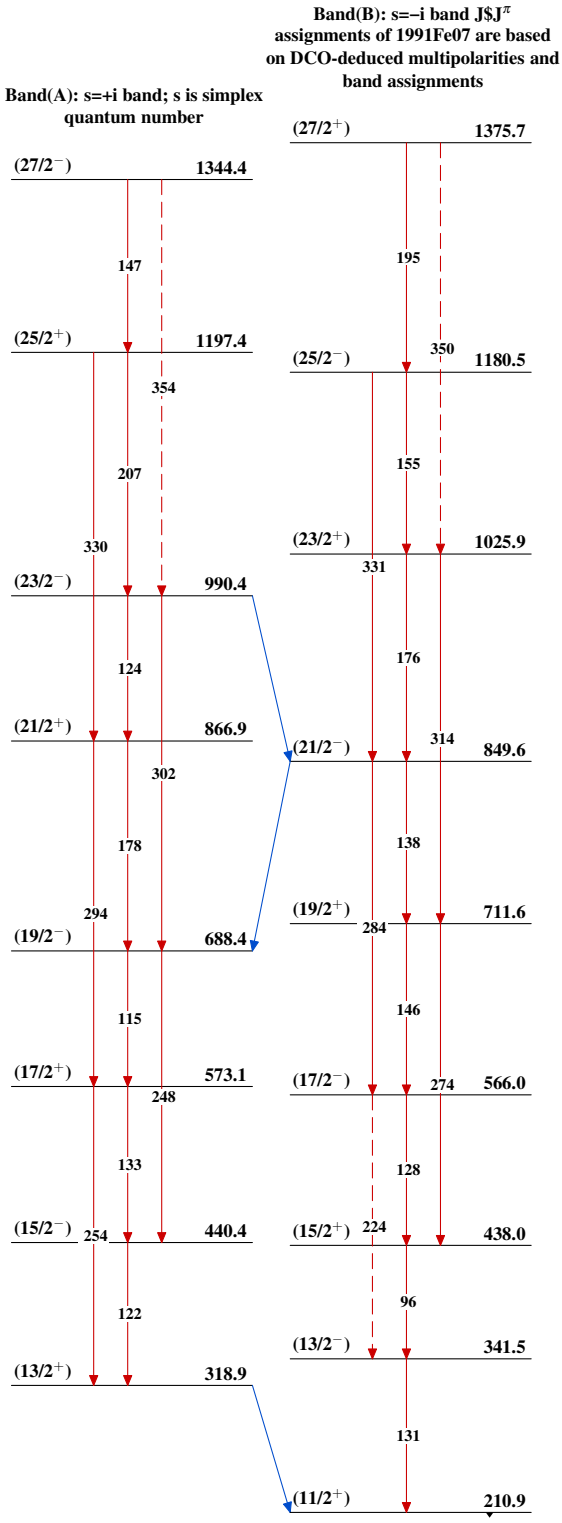
Level Scheme

Intensities: Relative I_γ



$^{221}_{88}Ra_{133}$

^{210}Pb(^{14}C,3nγ) 1991Fe07



$^{221}_{88}Ra_{133}$