(HI,xnγ):SD 1994Pi01,1998Re04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 195,368 (2024)	1-Dec-2023

Others: 1993Ca23, 1998CaZS, 1999ReZV, 2000Re10.

1994Pi01: ^{159}Tb(^{36}S,4nγ) at 165 MeV: measured Eγ, γγ coincidences, DCO ratios; determined existence of SD bands, γ intensity distribution for SD band transitions.

1998Re04: ^{174}Yb(^{23}Na,6nγ) E=132 MeV, ^{159}Tb(^{36}S,4nγ) E=165 MeV. Measured Eγ, γγ coincidences, using Gammasphere Ge detector array, observed interband transitions for SD bands. Determined $T_{1/2}$ and intrinsic quadrupole moments.

^{191}Tl Levels

E(level)[†]	Jπ	Comments
0.0+x[#]	J[‡]	Additional information 1.
131.4+x[@] *6*	J+1	
276.6+x[#] *4*	J+2	
427.5+x[@] *6*	J+3	
594.3+x[#] *5*	J+4	
764.7+x[@] *6*	J+5	
953.3+x[#] *5*	J+6	
1142.5+x[@] *6*	J+7	
1352.1+x[#] *6*	J+8	
1559.4+x[@] *6*	J+9	
1790.4+x[#] *6*	J+10	
2015.1+x[@] *6*	J+11	
2267.2+x[#] *6*	J+12	
2507.7+x[@] *7*	J+13	
2781.8+x[#] *7*	J+14	
3037.3+x[@] *7*	J+15	
3333.2+x[#] *7*	J+16	
3603.5+x[@] *8*	J+17	
3920.7+x[#] *8*	J+18	
4203.6+x[@] *9*	J+19	
4542.5+x[#] *9*	J+20	
4837.0+x[@] *10*	J+21	
5198.8+x[#] *9*	J+22	
5502.9+x[@] *11*	J+23	
5888.6+x[#] *10*	J+24	
6200.4+x[@] *12*	J+25	
6609.6+x[#] *14*	J+26	
6928.4+x[@] *16*	J+27	

[†] From least-squares adjustment to the γ ray energies.

[‡] J≈(23/2$^+$) from 1998Re04. See also 1992Ha35.

[#] Band(A): SD-1 band α=−1/2 (1994Pi01,1998Re04). Q_0=18.6 eb *+10−8* (2000Re10). Other values: 18 eb *1*, from tentative average value for SD-1 and SD-2 bands (1998Re04). Band population is ≈0.4% of the reaction channel. SD-1 and SD-2 are interpreted as signature partners arising from the π5/2[642] orbital. Comparing the extracted value of 0.145 *13* eb^{-1} for $(g_K-g_R)K/Q_0$ with

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(HI,xnγ):SD 1994Pi01,1998Re04 (continued)

^{191}Tl Levels (continued)

theoretical values provides strong support for this interpretation (1998Re04).

[@] Band(B): SD-2 band α=+1/2 (1994Pi01,1998Re04). Q_0=17.7 eb *+8−10* (2000Re10). Other values: 18 eb *1*, from tentative average value for SD-1 and SD-2 bands (1998Re04). Band population is ≈0.4% of the reaction channel. SD-2 is interpreted as the signature partner of SD-1 arising from the π5/2[642] orbital. Comparison of the extracted value $(g_K-g_R)K/Q_0$=0.125 eb^{-1} *15* with theoretical estimates (1998Re04) is also in agreement with the quoted orbital assignment (see also note for SD 1).

γ(^{191}Tl)

E_γ [†]	I_γ [&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
132[@]		131.4+x	J+1	0.0+x	J			
145[@]		276.6+x	J+2	131.4+x	J+1			
150[@]		427.5+x	J+3	276.6+x	J+2			
166[@]		594.3+x	J+4	427.5+x	J+3			
170[@]		764.7+x	J+5	594.3+x	J+4			
189[@]		1142.5+x	J+7	953.3+x	J+6			
190[@]		953.3+x	J+6	764.7+x	J+5			
208[@]		1559.4+x	J+9	1352.1+x	J+8			
209[@]		1352.1+x	J+8	1142.5+x	J+7			
225[@]		2015.1+x	J+11	1790.4+x	J+10			
230[@]		1790.4+x	J+10	1559.4+x	J+9			
240[@]		2507.7+x	J+13	2267.2+x	J+12			
252[@]		2267.2+x	J+12	2015.1+x	J+11			
275[@]		2781.8+x	J+14	2507.7+x	J+13			
276.5[‡] *4*	39 *4*	276.6+x	J+2	0.0+x	J			
296.3[#] *4*	20 *2*	427.5+x	J+3	131.4+x	J+1			
317.7[‡] *3*	56 *6*	594.3+x	J+4	276.6+x	J+2			Eγ=317.9 *3* (1994Pi01).
337.2[#] *3*	31 *3*	764.7+x	J+5	427.5+x	J+3			
359.0[‡] *2*	82 *8*	953.3+x	J+6	594.3+x	J+4			Eγ=358.9 *3* (1994Pi01).
377.8[#] *2*	41 *4*	1142.5+x	J+7	764.7+x	J+5			Eγ=377.8 *6* (1994Pi01).
398.8[‡] *2*	95 *9*	1352.1+x	J+8	953.3+x	J+6	(E2)	0.0498 *7*	α(K)=0.0331 *5*; α(L)=0.01262 *18*; α(M)=0.00317 *4* α(N)=0.000795 *11*; α(O)=0.0001439 *20*; α(P)=8.70×10^{-6} *12* Eγ=399.4 *3* (1994Pi01).
416.9[#] *2*	90 *9*	1559.4+x	J+9	1142.5+x	J+7	(E2)	0.0443 *6*	α(K)=0.0299 *4*; α(L)=0.01086 *15*; α(M)=0.00272 *4* α(N)=0.000683 *10*; α(O)=0.0001239 *17*; α(P)=7.67×10^{-6} *11* Eγ=417.2 *3* (1994Pi01).
438.3[‡] *2*	100 *10*	1790.4+x	J+10	1352.1+x	J+8	(E2)	0.0390 *5*	α(K)=0.0268 *4*; α(L)=0.00921 *13*; α(M)=0.002296 *32* α(N)=0.000577 *8*; α(O)=0.0001050 *15*; α(P)=6.66×10^{-6} *9* Eγ=438.3 *3* (1994Pi01).
455.7[#] *2*	100 *10*	2015.1+x	J+11	1559.4+x	J+9	(E2)	0.0353 *5*	α(K)=0.02459 *35*; α(L)=0.00811 *11*; α(M)=0.002018 *28* α(N)=0.000507 *7*; α(O)=9.25×10^{-5} *13*; α(P)=5.99×10^{-6} *8* Eγ=455.5 *3* (1994Pi01).

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(HI,xnγ):SD 1994Pi01,1998Re04 (continued)

γ(^{191}Tl) (continued)

E_γ[†]	I_γ[&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
476.8[‡] *2*	97 *10*	2267.2+x	J+12	1790.4+x	J+10	(E2)	0.0316 *4*	α(K)=0.02228 *31*; α(L)=0.00703 *10*; α(M)=0.001742 *24* α(N)=0.000438 *6*; α(O)=8.01×10^{-5} *11*; α(P)=5.30×10^{-6} *7* Eγ=476.8 *3* (1994Pi01).
492.8[#] *3*	100 *10*	2507.7+x	J+13	2015.1+x	J+11	(E2)	0.0291 *4*	α(K)=0.02075 *29*; α(L)=0.00634 *9*; α(M)=0.001567 *22* α(N)=0.000394 *6*; α(O)=7.22×10^{-5} *10*; α(P)=4.85×10^{-6} *7* Eγ=493.5 *3* (1994Pi01).
514.5[‡] *3*	77 *8*	2781.8+x	J+14	2267.2+x	J+12			Eγ=514.9 *3* (1994Pi01).
529.6[#] *3*	70 *7*	3037.3+x	J+15	2507.7+x	J+13	(E2)	0.02451 *34*	α(K)=0.01780 *25*; α(L)=0.00509 *7*; α(M)=0.001252 *18* α(N)=0.000315 *4*; α(O)=5.80×10^{-5} *8*; α(P)=4.02×10^{-6} *6* Eγ=530.3 *3* (1994Pi01).
551.4[‡] *3*	70 *7*	3333.2+x	J+16	2781.8+x	J+14	(E2)	0.02231 *31*	α(K)=0.01636 *23*; α(L)=0.00451 *6*; α(M)=0.001107 *16* α(N)=0.000278 *4*; α(O)=5.14×10^{-5} *7*; α(P)=3.63×10^{-6} *5* Eγ=551.0 *3* (1994Pi01).
566.1[#] *3*	52 *5*	3603.5+x	J+17	3037.3+x	J+15	(E2)	0.02099 *29*	α(K)=0.01548 *22*; α(L)=0.00418 *6*; α(M)=0.001023 *14* α(N)=0.000257 *4*; α(O)=4.76×10^{-5} *7*; α(P)=3.40×10^{-6} *5* Eγ=566.0 *3* (1994Pi01).
587.5[‡] *3*	49 *5*	3920.7+x	J+18	3333.2+x	J+16	(E2)	0.01928 *27*	α(K)=0.01434 *20*; α(L)=0.00375 *5*; α(M)=0.000917 *13* α(N)=0.0002305 *32*; α(O)=4.27×10^{-5} *6*; α(P)=3.10×10^{-6} *4* Eγ=587.7 *3* (1994Pi01).
600.1[#] *4*	40 *4*	4203.6+x	J+19	3603.5+x	J+17			Eγ=599.5 *3* (1994Pi01).
621.8[‡] *3*	31 *3*	4542.5+x	J+20	3920.7+x	J+18			Eγ=622.9 *6* (1994Pi01).
633.4[#] *4*	29 *3*	4837.0+x	J+21	4203.6+x	J+19			Eγ=632.6 *6* (1994Pi01).
656.3[‡] *4*	21 *2*	5198.8+x	J+22	4542.5+x	J+20			Eγ=655.7 *6* (1994Pi01).
665.9[#] *4*	18 *2*	5502.9+x	J+23	4837.0+x	J+21			
689.8[‡] *4*	19 *2*	5888.6+x	J+24	5198.8+x	J+22			
697.5[#] *5*	15 *2*	6200.4+x	J+25	5502.9+x	J+23			
721[‡] *1*		6609.6+x	J+26	5888.6+x	J+24			
728[#] *1*		6928.4+x	J+27	6200.4+x	J+25			

[†] From 1999ReZV, except as noted. Alternative values are available from 1994Pi01 and quoted in the comments column.
[‡] Transition in SD Band 1.
[#] Transition in SD Band 2.
[@] From 1998Re04, connecting α=+1/2 and α=−1/2 signature SD bands.
[&] From 1999ReZV, relative values within each SD band. Intensity plots are also given by 1994Pi01.
[a] Multipolarity assignments for transitions within SD bands suggested in 1994Pi01, based on their DCO ratios (mentioned to be consistent with the expected value of 1.35, but not listed) and the assumption that ΔJ=2 transitions are stretched E2.
[b] Additional information 2.

(HI,xnγ):SD 1994Pi01,1998Re04

Level Scheme

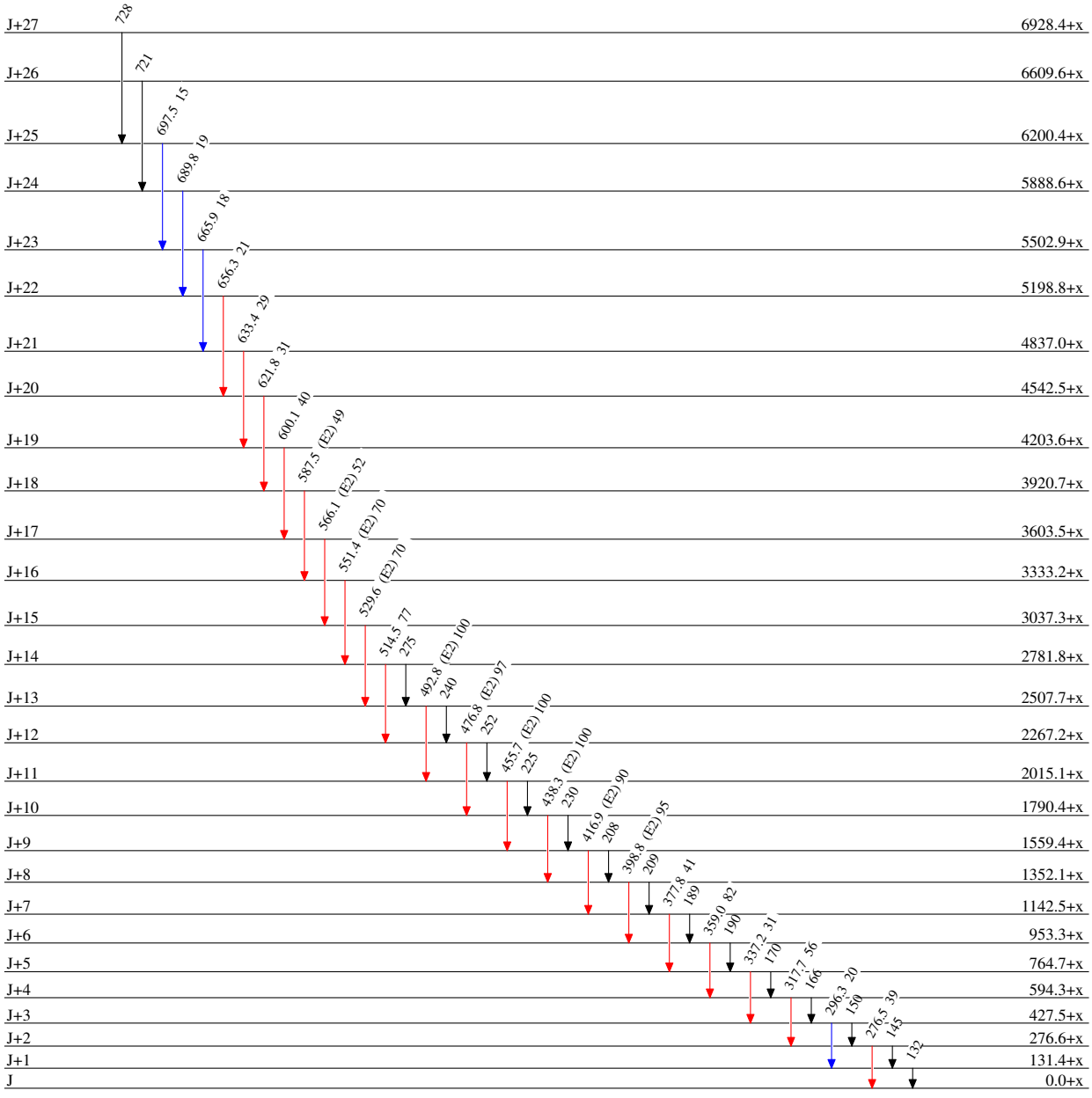
Intensities: Relative I_γ

Legend

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

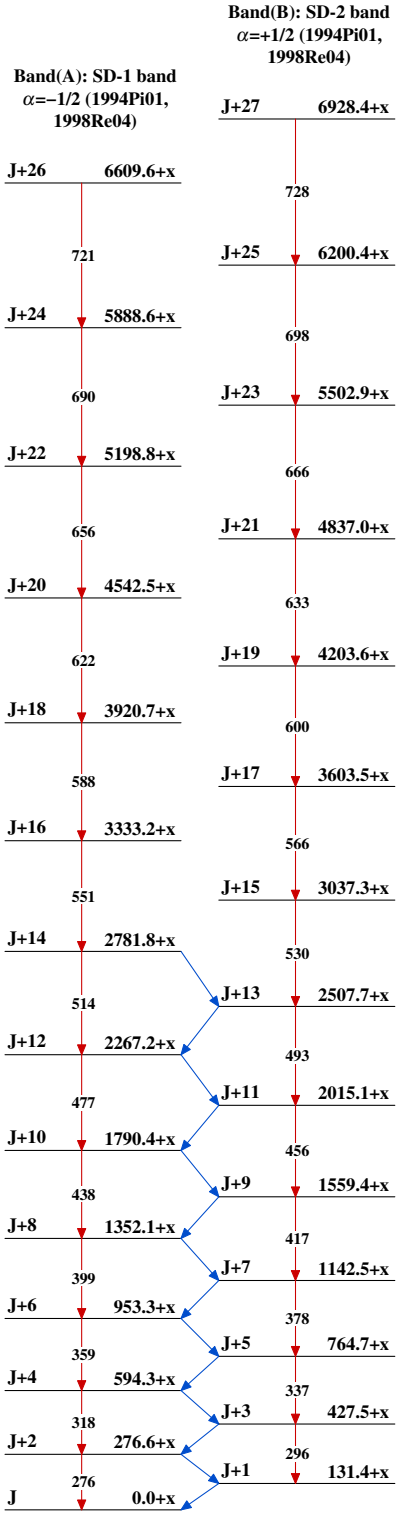
$I_\gamma < 10\% \times I_\gamma^{max}$

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



$^{191}_{81}Tl_{110}$

(HI,xnγ):SD 1994Pi01,1998Re04



$^{191}_{81}Tl_{110}$