

**(HI,xnγ):SD 1999Ro21,1995Hu01,1996Du05**

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia		NDS 143, 1 (2017)	31-Mar-2017

**1999Ro21:** <sup>168</sup>Er(<sup>30</sup>Si,5nγ) E=160 MeV. Measured Eγ, Iγ, γγ using GAMMASPHERE array of 101 large Compton-suppressed Ge detectors. Three new SD bands were deduced while confirming six previously known SD bands. No evidence was found for three high energy transitions of 2222, 2282 and 2352 (as reported by **1996Du05**) linking SD-1 band to normal-deformed states.

**1998Va18:** <sup>172</sup>Yb(<sup>26</sup>Mg,5nγ) E=139 MeV. GAMMASPHERE array of 98 large- volume Compton-suppressed Ge detectors. Measured lifetimes by DSAM (line-shape and centroid-shift analyses).

**1996Du05, 1996Pe20:** <sup>168</sup>Er(<sup>30</sup>Si,5nγ) E=159 MeV. Measured Eγ, Iγ, γγ coin using EUROGAM 2 array with 15 escape suppressed Ge detectors at forward and backward angles and 24 “CLOVER” escape-suppressed Ge detectors near 90° to the beam direction. **1996Du05** confirm six SD bands; **1996Pe20** report transitions connecting SD1 band with the non-deformed levels. These transitions, however, have not been confirmed by **1999Ro21** using a larger detector array.

**1995Hu01:** <sup>174</sup>Yb(<sup>24</sup>Mg,5nγ); E=131 MeV, GAMMASPHERE 36-detector array; measured Eγ, Iγ, γγ coin, γ asymmetry; deduced six SD bands; cranked-shell model calculations.

Calculations, compilations: **1997Hu13, 1997Wu06, 1999Ha56, 1991Ch36.**

<sup>193</sup>Pb Levels

E(level)	Jπ <sup>†</sup>	Comments
y <sup>‡</sup>	J	E(level): 4217 relative to the 13/2 <sup>+</sup> isomer was suggested by <b>1996Pe20</b> on the basis of a tentative 2222γ to 1995+x level. But this transition has not been confirmed in the work of <b>1999Ro21</b> using a larger detector array. J <sup>π</sup> : ≈(23/2).
277.0+y <sup>‡</sup> 3	J+2	2282γ (Iγ=0.035 20) and 2352γ (Iγ=0.034 20) proposed by <b>1996Du05</b> as linking transitions to normal-deformed states have not been confirmed by <b>1999Ro21</b> using a larger detector array, thus these γ rays together with a 2222γ ( <b>1996Du05</b> ) have been omitted here.
594.3+y <sup>‡</sup> 5	J+4	
951.6+y <sup>‡</sup> 6	J+6	
1349.1+y <sup>‡</sup> 6	J+8	
1786.9+y <sup>‡</sup> 7	J+10	
2264.3+y <sup>‡</sup> 8	J+12	
2781.6+y <sup>‡</sup> 9	J+14	
3337.7+y <sup>‡</sup> 9	J+16	
3932.5+y <sup>‡</sup> 10	J+18	
4565.9+y <sup>‡</sup> 11	J+20	
5237.7+y <sup>‡</sup> 13	J+22	
5945.9+y <sup>‡</sup> 15	J+24	
z <sup>#</sup>	J1	J <sup>π</sup> : ≈(17/2).
190.2+z <sup>#</sup> 5	J1+2	
422.8+z <sup>#</sup> 6	J1+4	
698.0+z <sup>#</sup> 7	J1+6	
1015.9+z <sup>#</sup> 8	J1+8	
1376.8+z <sup>#</sup> 8	J1+10	
1780.3+z <sup>#</sup> 9	J1+12	
2226.2+z <sup>#</sup> 9	J1+14	
2714.4+z <sup>#</sup> 10	J1+16	
3242.4+z <sup>#</sup> 11	J1+18	
3812.2+z <sup>#</sup> 13	J1+20	
4422.7+z <sup>#</sup> 15	J1+22	

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(HL,xn $\gamma$ ):SD 1999Ro21,1995Hu01,1996Du05 (continued) $^{193}\text{Pb}$  Levels (continued)

E(level)	J $^{\pi}$ <sup>†</sup>	Comments
5072.7+z <sup>#</sup> 16	J1+24	
5762.5+z? <sup>#</sup> 18	J1+26	
u <sup>@</sup>	J2	J $^{\pi}$ : $\approx(21/2)$ .
251.5+u <sup>@</sup> 6	J2+2	
543.0+u <sup>@</sup> 7	J2+4	
875.4+u <sup>@</sup> 8	J2+6	
1247.5+u <sup>@</sup> 8	J2+8	
1659.4+u <sup>@</sup> 9	J2+10	
2110.0+u <sup>@</sup> 9	J2+12	
2598.9+u <sup>@</sup> 10	J2+14	
3125.5+u <sup>@</sup> 11	J2+16	
3688.9+u <sup>@</sup> 11	J2+18	
4288.8+u <sup>@</sup> 13	J2+20	
4925.8+u <sup>@</sup> 14	J2+22	
5598.0+u <sup>@</sup> 15	J2+24	
6307.2+u <sup>@</sup> 16	J2+26	
v <sup>&amp;</sup>	J3	J $^{\pi}$ : $\approx(23/2)$ .
273.0+v? <sup>&amp;</sup> 7	J3+2	
586.4+v <sup>&amp;</sup> 10	J3+4	
939.5+v <sup>&amp;</sup> 10	J3+6	
1331.4+v <sup>&amp;</sup> 11	J3+8	
1761.4+v <sup>&amp;</sup> 11	J3+10	
2228.5+v <sup>&amp;</sup> 12	J3+12	
2732.4+v <sup>&amp;</sup> 13	J3+14	
3271.9+v <sup>&amp;</sup> 13	J3+16	
3847.0+v <sup>&amp;</sup> 14	J3+18	
4457.0+v <sup>&amp;</sup> 15	J3+20	
5101.5+v <sup>&amp;</sup> 16	J3+22	
5777.9+v <sup>&amp;</sup> 17	J3+24	
6485.1+v <sup>&amp;</sup> 19	J3+26	
w <sup>a</sup>	J4	J $^{\pi}$ : $\approx(17/2)$ .
100.5+w <sup>b</sup> 8	J4+1	
213.2+w <sup>a</sup> 4	J4+2	
335.1+w <sup>b</sup> 6	J4+3	
467.9+w <sup>a</sup> 7	J4+4	
610.6+w <sup>b</sup> 7	J4+5	
763.9+w <sup>a</sup> 7	J4+6	
926.8+w <sup>b</sup> 8	J4+7	
1099.9+w <sup>a</sup> 8	J4+8	
1282.6+w <sup>b</sup> 8	J4+9	
1475.2+w <sup>a</sup> 9	J4+10	
1677.0+w <sup>b</sup> 9	J4+11	
1888.7+w <sup>a</sup> 9	J4+12	
2109.8+w <sup>b</sup> 9	J4+13	
2340.0+w <sup>a</sup> 10	J4+14	
2580.4+w <sup>b</sup> 10	J4+15	

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**(HL,xn $\gamma$ ):SD 1999Ro21,1995Hu01,1996Du05 (continued)** $^{193}\text{Pb}$  Levels (continued)

E(level)	J $\pi^\dagger$	E(level)	J $\pi^\dagger$	E(level)	J $\pi^\dagger$	E(level)	J $\pi^\dagger$
2828.5+w <sup>a</sup> 12	J4+16	6877.0+w <sup>b</sup> 18	J4+29	5620.8+s <sup>c</sup> 20	J5+24	a <sup>e</sup>	J7
3087.8+w <sup>b</sup> 11	J4+17	s <sup>c</sup>	J5	t <sup>d</sup>	J6	212.9+a <sup>e</sup> 5	J7+2
3355.0+w <sup>a</sup> 13	J4+18	260.6+s <sup>c</sup> 7	J5+2	281.8+t <sup>d</sup> 6	J6+2	468.7+a <sup>e</sup> 7	J7+4
3631.3+w <sup>b</sup> 12	J4+19	560.4+s <sup>c</sup> 10	J5+4	603.2+t <sup>d</sup> 9	J6+4	766.0+a <sup>e</sup> 10	J7+6
3917.2+w <sup>a</sup> 14	J4+20	900.5+s <sup>c</sup> 10	J5+6	964.1+t <sup>d</sup> 10	J6+6	1102.5+a <sup>e</sup> 11	J7+8
4211.0+w <sup>b</sup> 13	J4+21	1279.4+s <sup>c</sup> 12	J5+8	1362.6+t <sup>d</sup> 11	J6+8	1478.3+a <sup>e</sup> 13	J7+10
4513.4+w <sup>a</sup> 16	J4+22	1696.6+s <sup>c</sup> 13	J5+10	1798.5+t <sup>d</sup> 12	J6+10	1894.2+a <sup>e</sup> 13	J7+12
4825.6+w <sup>b</sup> 15	J4+23	2150.6+s <sup>c</sup> 14	J5+12	2270.8+t <sup>d</sup> 14	J6+12	2349.7+a <sup>e</sup> 14	J7+14
5144.7+w <sup>a</sup> 18	J4+24	2641.7+s <sup>c</sup> 15	J5+14	2778.9+t <sup>d</sup> 15	J6+14	2845.3+a <sup>e</sup> 15	J7+16
5475.1+w <sup>b</sup> 16	J4+25	3167.8+s <sup>c</sup> 15	J5+16	3322.1+t <sup>d</sup> 16	J6+16	3380.7+a <sup>e</sup> 17	J7+18
5811.5+w <sup>a</sup> 20	J4+26	3729.1+s <sup>c</sup> 16	J5+18	3900.1+t <sup>d</sup> 17	J6+18	3956.0+a <sup>e</sup> 19	J7+20
6159.1+w <sup>b</sup> 17	J4+27	4325.5+s <sup>c</sup> 17	J5+20	4512.1+t <sup>d</sup> 18	J6+20		
6512.0+w <sup>a</sup> 22	J4+28	4956.6+s <sup>c</sup> 19	J5+22	5158.9+t <sup>d</sup> 19	J6+22		

<sup>†</sup> Band SD-1 from 1996Pe20, others from 1996Du05; based on band structure and  $\gamma$  anisotropy. The lowest-level spin in each band has been estimated using the spin fit method.

<sup>‡</sup> Band(A): SD-1 band. (1999Ro21,1995Hu01,1996Du05,1996Pe20). Configuration= $\nu 3/2[761]$   $\alpha=-1/2$ . From ( $^{24}\text{Mg},5n\gamma$ ); band intensity relative to total  $^{193}\text{Pb}$  channel is 0.5%. Q(intrinsic)=17.3 +7-8 (1998Va18).

# Band(B): SD-2 band. (1999Ro21,1995Hu01,1996Du05). Configuration= $\nu 3/2[761]$   $\alpha=+1/2$ . From ( $^{24}\text{Mg},5n\gamma$ ); band intensity relative to total  $^{193}\text{Pb}$  channel is 0.3% (1995Hu01). Band intensity relative to SD-1 band=50% (1996Du05), 38% 8 (1999Ro21). SD-1 and SD-2 represent favored and unfavored signature components (with a large observed splitting) of the low-K, 3/2[761], N=7 neutron orbital (from ( $^{24}\text{Mg},5n\gamma$ )).

@ Band(C): SD-3 band. (1999Ro21,1995Hu01,1996Du05). Configuration= $\nu 3/2[642]$   $\alpha=+1/2$ . From ( $^{24}\text{Mg},5n\gamma$ ); band intensity relative to total  $^{193}\text{Pb}$  channel is 0.25% (1995Hu01). Band intensity relative to SD-1 band=50% (1996Du05), 46% 9 (1999Ro21).

& Band(D): SD-4 band. (1999Ro21,1995Hu01,1996Du05). Configuration= $\nu 3/2[642]$   $\alpha=-1/2$ . From ( $^{24}\text{Mg},5n\gamma$ ); band intensity relative to total  $^{193}\text{Pb}$  channel is 0.25% (1995Hu01). Band intensity relative to SD-1 band=50% (1996Du05), 23% 5 (1999Ro21). SD-3 and SD-4 are interpreted as signature partners (no signature splitting) based on a high K, 3/2[642] neutron orbital. The 5/2[512] neutron orbital suggested by 1995Hu01 is not supported by calculations and experimental comparisons of 1996Du05 and 1999Ro21.

<sup>a</sup> Band(E): SD-5 band. (1999Ro21,1995Hu01,1996Du05). Configuration= $\nu 9/2[624]$   $\alpha=+1/2$ . From ( $^{24}\text{Mg},5n\gamma$ ); band intensity relative to total  $^{193}\text{Pb}$  channel is 0.2% (1995Hu01). Band intensity relative to SD-1 band=30% (1996Du05), 15% 3 (1999Ro21).

<sup>b</sup> Band(F): SD-6 band. (1999Ro21,1995Hu01,1996Du05). Configuration= $\nu 9/2[624]$   $\alpha=-1/2$ . From ( $^{24}\text{Mg},5n\gamma$ ); band intensity relative to total  $^{193}\text{Pb}$  channel is 0.2% (1995Hu01). Band intensity relative to SD-1 band=30% (1996Du05), 20% 4 (1999Ro21).

SD-5 and SD-6 are interpreted as signature partners (no signature splitting) based on a high K, 9/2[624] neutron orbital. From dipole interband transitions, 1996Du05 deduce B(M1)/B(E2)=0.15 4.  $g_K=-0.39$  12 (1996Du05), -0.27 9 (1999Ro21) from M1/E2 branching ratios, using  $\Theta_0=18.4$  and K=9/2.

<sup>c</sup> Band(G): SD-7 band. (1999Ro21). Band intensity relative to SD-1 band=17% 3 (1999Ro21). SD-7 and SD-8 are proposed as signature partners with configuration= $\nu 5/2[512]$ .

<sup>d</sup> Band(H): SD-8 band. (1999Ro21). Band intensity relative to SD-1 band=14% 3 (1999Ro21). SD-7 and SD-8 are proposed as signature partners with configuration= $\nu 5/2[512]$ .

<sup>e</sup> Band(I): SD-9 band. (1999Ro21). Band intensity relative to SD-1 band=5% 1 (1999Ro21). Configuration= $\nu 7_3$  intruder orbital.

**(HL,xnγ):SD 1999Ro21,1995Hu01,1996Du05 (continued)**

γ(<sup>193</sup>Pb)

<u>E<sub>γ</sub><sup>†</sup></u>	<u>I<sub>γ</sub><sup>@</sup></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>Comments</u>
101.4&		100.5+w	J4+1	w	J4	
112.4&		213.2+w	J4+2	100.5+w	J4+1	
122.0‡ 5		335.1+w	J4+3	213.2+w	J4+2	
132.9‡ 5		467.9+w	J4+4	335.1+w	J4+3	
142.5‡ 5		610.6+w	J4+5	467.9+w	J4+4	
153.2‡ 5		763.9+w	J4+6	610.6+w	J4+5	
163.0‡ 5		926.8+w	J4+7	763.9+w	J4+6	
172.8‡ 5		1099.9+w	J4+8	926.8+w	J4+7	
182.7‡ 5		1282.6+w	J4+9	1099.9+w	J4+8	
190.2 5	0.19 5	190.2+z	J1+2	z	J1	I <sub>γ</sub> : 0.40 7 (1995Hu01).
193.0‡ 5		1475.2+w	J4+10	1282.6+w	J4+9	
201.9‡ 5		1677.0+w	J4+11	1475.2+w	J4+10	
211.7‡ 5		1888.7+w	J4+12	1677.0+w	J4+11	
212.9 5	0.40 5	212.9+a	J7+2	a	J7	
213.2 4	0.53 10	213.2+w	J4+2	w	J4	I <sub>γ</sub> : 0.96 19 (1995Hu01).
221.0‡ 5		2109.8+w	J4+13	1888.7+w	J4+12	
231.4&		2340.0+w	J4+14	2109.8+w	J4+13	
232.6 3	0.55 5	422.8+z	J1+4	190.2+z	J1+2	I <sub>γ</sub> : 0.61 9 (1995Hu01).
234.6 5	0.13 7	335.1+w	J4+3	100.5+w	J4+1	I <sub>γ</sub> : 0.26 6 (1995Hu01).
251.5 6	0.07 7	251.5+u	J2+2	u	J2	
254.6 7	0.72 11	467.9+w	J4+4	213.2+w	J4+2	I <sub>γ</sub> : 1.00 19 (1995Hu01).
255.8 5	1.00 12	468.7+a	J7+4	212.9+a	J7+2	
260.6 7	0.24 4	260.6+s	J5+2	s	J5	
273.0#& 7	0.17 7	273.0+v?	J3+2	v	J3	
275.2 3	0.68 5	698.0+z	J1+6	422.8+z	J1+4	I <sub>γ</sub> : 1.00 10 (1995Hu01).
275.5 5	0.35 7	610.6+w	J4+5	335.1+w	J4+3	I <sub>γ</sub> : 0.39 6 (1995Hu01).
277.0 3	0.47 5	277.0+y	J+2	y	J	I <sub>γ</sub> : 0.51 7 (1995Hu01).
281.8 6	0.15 2	281.8+t	J6+2	t	J6	
291.5 3	0.76 7	543.0+u	J2+4	251.5+u	J2+2	I <sub>γ</sub> : 0.58 8 (1995Hu01).
296.2 5	0.71 14	763.9+w	J4+6	467.9+w	J4+4	I <sub>γ</sub> : 0.60 10 (1995Hu01).
297.3 6	0.36 5	766.0+a	J7+6	468.7+a	J7+4	
299.8 6	0.51 7	560.4+s	J5+4	260.6+s	J5+2	
313.4 6	0.44 7	586.4+v	J3+4	273.0+v?	J3+2	I <sub>γ</sub> : 0.42 8 (1995Hu01).
316.2 5	0.45 7	926.8+w	J4+7	610.6+w	J4+5	I <sub>γ</sub> : 0.40 8 (1995Hu01).
317.3 3	0.95 9	594.3+y	J+4	277.0+y	J+2	I <sub>γ</sub> : 0.82 7 (1995Hu01).
317.9 3	0.91 9	1015.9+z	J1+8	698.0+z	J1+6	I <sub>γ</sub> : 0.84 10 (1995Hu01).
321.5 6	0.43 7	603.2+t	J6+4	281.8+t	J6+2	
332.4 3	0.86 7	875.4+u	J2+6	543.0+u	J2+4	I <sub>γ</sub> : 0.77 9 (1995Hu01).
336.1 4	0.91 10	1099.9+w	J4+8	763.9+w	J4+6	I <sub>γ</sub> : 0.45 10 (1995Hu01).
336.6 6	0.54 7	1102.5+a	J7+8	766.0+a	J7+6	
340.1 4	0.52 7	900.5+s	J5+6	560.4+s	J5+4	
353.1 4	0.68 7	939.5+v	J3+6	586.4+v	J3+4	I <sub>γ</sub> : 0.71 10 (1995Hu01).
355.9 5	0.87 8	1282.6+w	J4+9	926.8+w	J4+7	I <sub>γ</sub> : 0.70 9 (1995Hu01).
357.3 3	0.90 9	951.6+y	J+6	594.3+y	J+4	I <sub>γ</sub> : 0.82 7 (1995Hu01).
360.9 3	1.07 10	1376.8+z	J1+10	1015.9+z	J1+8	I <sub>γ</sub> : 0.76 10 (1995Hu01).
360.9 5	0.62 11	964.1+t	J6+6	603.2+t	J6+4	
372.1 3	1.03 9	1247.5+u	J2+8	875.4+u	J2+6	I <sub>γ</sub> : 1.00 11 (1995Hu01).
375.1 5	0.92 10	1475.2+w	J4+10	1099.9+w	J4+8	I <sub>γ</sub> : 0.90 18 (1995Hu01).
375.8 5	0.63 7	1478.3+a	J7+10	1102.5+a	J7+8	
378.9 5	0.63 10	1279.4+s	J5+8	900.5+s	J5+6	
391.9 3	0.85 7	1331.4+v	J3+8	939.5+v	J3+6	I <sub>γ</sub> : 0.80 11 (1995Hu01).
394.4 5	0.95 9	1677.0+w	J4+11	1282.6+w	J4+9	I <sub>γ</sub> : 0.60 7 (1995Hu01).

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**(HL,xnγ):SD 1999Ro21,1995Hu01,1996Du05 (continued)**

γ(<sup>193</sup>Pb) (continued)

$E_\gamma$ †	$I_\gamma$ @	$E_i$ (level)	$J_i^\pi$	$E_f$	$J_f^\pi$	Comments
397.5 3	1.05 11	1349.1+y	J+8	951.6+y	J+6	$I_\gamma$ : 0.84 7 (1995Hu01).
398.5 5	1.00 17	1362.6+t	J6+8	964.1+t	J6+6	
403.5 3	0.97 10	1780.3+z	J1+12	1376.8+z	J1+10	$I_\gamma$ : 0.98 10 (1995Hu01).
411.9 3	1.04 9	1659.4+u	J2+10	1247.5+u	J2+8	$I_\gamma$ : 0.95 11 (1995Hu01).
413.5 5	1.04 14	1888.7+w	J4+12	1475.2+w	J4+10	$I_\gamma$ : 0.90 18 (1995Hu01).
415.9 4	0.62 7	1894.2+a	J7+12	1478.3+a	J7+10	
417.2 5	1.00 18	1696.6+s	J5+10	1279.4+s	J5+8	
430.0 3	0.81 8	1761.4+v	J3+10	1331.4+v	J3+8	$I_\gamma$ : 0.65 10 (1995Hu01).
432.8 4	1.02 10	2109.8+w	J4+13	1677.0+w	J4+11	$I_\gamma$ : 0.73 9 (1995Hu01).
435.9 4	0.58 11	1798.5+t	J6+10	1362.6+t	J6+8	
437.8 3	0.90 9	1786.9+y	J+10	1349.1+y	J+8	$I_\gamma$ : 0.82 7 (1995Hu01).
445.9 3	0.78 7	2226.2+z	J1+14	1780.3+z	J1+12	$I_\gamma$ : 0.82 10 (1995Hu01).
450.6 3	1.04 10	2110.0+u	J2+12	1659.4+u	J2+10	$I_\gamma$ : 0.79 10 (1995Hu01).
451.2 5	0.89 10	2340.0+w	J4+14	1888.7+w	J4+12	$I_\gamma$ : 0.87 18 (1995Hu01).
454.0 5	0.69 11	2150.6+s	J5+12	1696.6+s	J5+10	
455.5 4	0.60 5	2349.7+a	J7+14	1894.2+a	J7+12	
467.1 4	0.97 10	2228.5+v	J3+12	1761.4+v	J3+10	$I_\gamma$ : 0.76 10 (1995Hu01).
470.6 4	0.90 9	2580.4+w	J4+15	2109.8+w	J4+13	$I_\gamma$ : 0.90 10 (1995Hu01).
472.3 6	0.51 7	2270.8+t	J6+12	1798.5+t	J6+10	
477.4 3	0.86 9	2264.3+y	J+12	1786.9+y	J+10	$I_\gamma$ : 0.75 7 (1995Hu01).
488.2 4	0.68 6	2714.4+z	J1+16	2226.2+z	J1+14	$I_\gamma$ : 0.59 9 (1995Hu01).
488.6 5	0.73 10	2828.5+w	J4+16	2340.0+w	J4+14	$I_\gamma$ : 0.69 16 (1995Hu01).
488.9 3	1.00 10	2598.9+u	J2+14	2110.0+u	J2+12	$I_\gamma$ : 0.94 11 (1995Hu01).
491.1 5	0.54 11	2641.7+s	J5+14	2150.6+s	J5+12	
495.6 6	0.40 7	2845.3+a	J7+16	2349.7+a	J7+14	
503.9 4	1.00 10	2732.4+v	J3+14	2228.5+v	J3+12	$I_\gamma$ : 1.00 16 (1995Hu01).
507.4 4	0.83 9	3087.8+w	J4+17	2580.4+w	J4+15	$I_\gamma$ : 1.00 10 (1995Hu01).
508.1 6	0.58 8	2778.9+t	J6+14	2270.8+t	J6+12	
517.3 4	0.73 6	2781.6+y	J+14	2264.3+y	J+12	$I_\gamma$ : 1.00 10 (1995Hu01).
526.1 5	0.82 12	3167.8+s	J5+16	2641.7+s	J5+14	
526.5 5	0.95 16	3355.0+w	J4+18	2828.5+w	J4+16	$I_\gamma$ : 0.30 19 (1995Hu01).
526.6 4	0.95 10	3125.5+u	J2+16	2598.9+u	J2+14	$I_\gamma$ : 0.88 11 (1995Hu01).
528.0 5	0.30 5	3242.4+z	J1+18	2714.4+z	J1+16	$I_\gamma$ : 0.46 8 (1995Hu01).
535.4 7	0.29 5	3380.7+a	J7+18	2845.3+a	J7+16	
539.5 4	1.02 10	3271.9+v	J3+16	2732.4+v	J3+14	$I_\gamma$ : 0.51 9 (1995Hu01).
543.2 6	0.36 7	3322.1+t	J6+16	2778.9+t	J6+14	
543.5 5	0.75 7	3631.3+w	J4+19	3087.8+w	J4+17	$I_\gamma$ : 0.72 8 (1995Hu01).
556.1 3	0.74 6	3337.7+y	J+16	2781.6+y	J+14	$I_\gamma$ : 0.93 7 (1995Hu01).
561.3 5	0.80 12	3729.1+s	J5+18	3167.8+s	J5+16	
562.2 6	0.71 13	3917.2+w	J4+20	3355.0+w	J4+18	
563.4 4	0.54 7	3688.9+u	J2+18	3125.5+u	J2+16	$I_\gamma$ : 0.74 10 (1995Hu01).
569.8 6	0.15 5	3812.2+z	J1+20	3242.4+z	J1+18	
575.1 3	0.82 8	3847.0+v	J3+18	3271.9+v	J3+16	$I_\gamma$ : 0.53 9 (1995Hu01).
575.3 8	0.12 4	3956.0+a	J7+20	3380.7+a	J7+18	
578.0 5	0.67 8	3900.1+t	J6+18	3322.1+t	J6+16	
579.7 5	0.44 7	4211.0+w	J4+21	3631.3+w	J4+19	$I_\gamma$ : 0.48 6 (1995Hu01).
594.8 4	0.46 5	3932.5+y	J+18	3337.7+y	J+16	$I_\gamma$ : 0.60 7 (1995Hu01).
596.2 7	0.35 10	4513.4+w	J4+22	3917.2+w	J4+20	
596.4 6	0.65 12	4325.5+s	J5+20	3729.1+s	J5+18	
599.9 5	0.36 7	4288.8+u	J2+20	3688.9+u	J2+18	$I_\gamma$ : 0.40 8 (1995Hu01).
610.0 5	0.66 7	4457.0+v	J3+20	3847.0+v	J3+18	$I_\gamma$ : 0.57 8 (1995Hu01).
610.5 7	0.08 5	4422.7+z	J1+22	3812.2+z	J1+20	
612.0 6	0.29 5	4512.1+t	J6+20	3900.1+t	J6+18	
614.6 7	0.35 7	4825.6+w	J4+23	4211.0+w	J4+21	
631.1 7	0.44 10	4956.6+s	J5+22	4325.5+s	J5+20	
631.3 8	0.43 10	5144.7+w	J4+24	4513.4+w	J4+22	
633.4 5	0.22 5	4565.9+y	J+20	3932.5+y	J+18	$I_\gamma$ : 0.22 7 (1995Hu01).

Continued on next page (footnotes at end of table)

**(HL,xn $\gamma$ ):SD 1999Ro21,1995Hu01,1996Du05 (continued)** $\gamma(^{193}\text{Pb})$  (continued)

$E_\gamma$ †	$I_\gamma$ @	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Comments
637.0 5	0.30 7	4925.8+u	J2+22	4288.8+u	J2+20	
644.5 6	0.31 7	5101.5+v	J3+22	4457.0+v	J3+20	
646.8 7	0.43 7	5158.9+t	J6+22	4512.1+t	J6+20	
649.5 5	0.25 7	5475.1+w	J4+25	4825.6+w	J4+23	
650.0 7	0.05 4	5072.7+z	J1+24	4422.7+z	J1+22	
664.2 7	0.35 10	5620.8+s	J5+24	4956.6+s	J5+22	
666.8 9	0.18 9	5811.5+w	J4+26	5144.7+w	J4+24	
671.8 6	0.14 5	5237.7+y	J+22	4565.9+y	J+20	
672.2 6	0.15 6	5598.0+u	J2+24	4925.8+u	J2+22	
676.4 6	0.20 7	5777.9+v	J3+24	5101.5+v	J3+22	
684.0 6	0.13 7	6159.1+w	J4+27	5475.1+w	J4+25	
689.8 <sup>#&amp;</sup> 8	0.04 4	5762.5+z?	J1+26	5072.7+z	J1+24	
700.5 8	0.18 9	6512.0+w	J4+28	5811.5+w	J4+26	$E_\gamma$ : from 1999Ro21 only.
707.2 8	0.07 7	6485.1+v	J3+26	5777.9+v	J3+24	$E_\gamma$ : 707.3 6 (1996Du05) was assigned to SD-3 band.
708.2 <sup>#&amp;</sup> 8	0.05 4	5945.9+y?	J+24	5237.7+y	J+22	
709.2 7	0.07 6	6307.2+u	J2+26	5598.0+u	J2+24	$E_\gamma$ : 709.3 6 (1996Du05) was assigned to SD-4 band.
717.9 7	0.07 7	6877.0+w	J4+29	6159.1+w	J4+27	

† From 1999Ro21. Values are also available from 1995Hu01 and 1996Du05 for SD-1 to SD-6. SD-7, SD-8 and SD-9 bands are reported by 1999Ro21 only.

‡ From 1996Du05.

# From 1996Du05, but not confirmed by 1999Ro21.




@ Relative transition intensities within each band, read by evaluator of 1998Ar07 from Fig. 1 of 1996Du05. Values from 1995Hu01 (Fig. 1) are given in comments. Intensity plots are given by 1999Ro21 for SD-7, SD-8 and SD-9 bands.

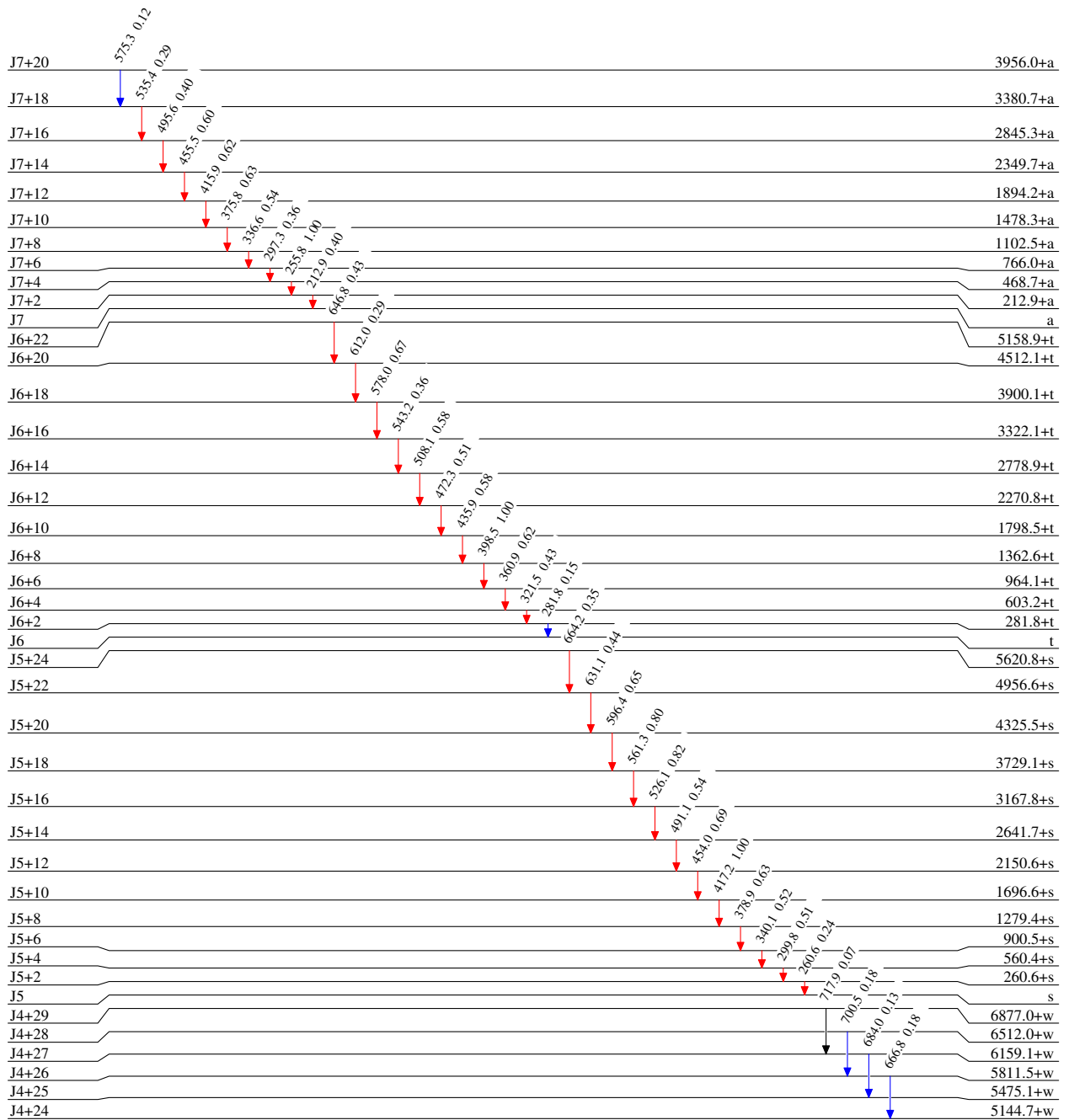
& Placement of transition in the level scheme is uncertain.

**(HI,xn $\gamma$ ):SD 1999Ro21,1995Hu01,1996Du05**

**Level Scheme**  
 Intensities: Relative  $I_{\gamma}$

Legend

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

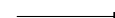


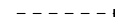
 $^{193}_{82}\text{Pb}_{111}$

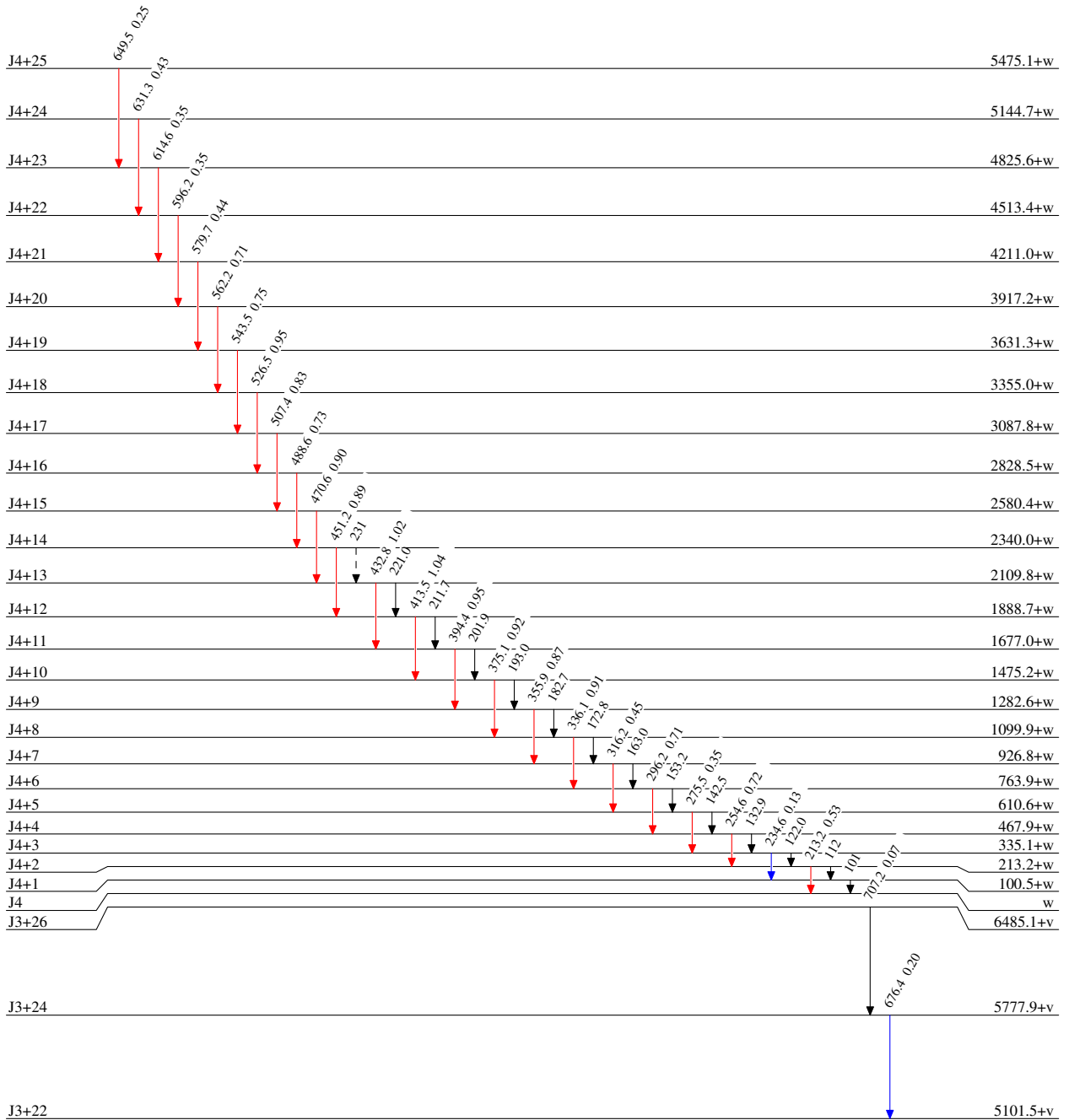
(HI,xn $\gamma$ ):SD 1999Ro21,1995Hu01,1996Du05

Legend

Level Scheme (continued)

Intensities: Relative  $I_\gamma$

-   $I_\gamma < 2\% \times I_\gamma^{max}$
-   $I_\gamma < 10\% \times I_\gamma^{max}$
-   $I_\gamma > 10\% \times I_\gamma^{max}$
-   $\gamma$  Decay (Uncertain)



$^{193}_{82}\text{Pb}_{111}$



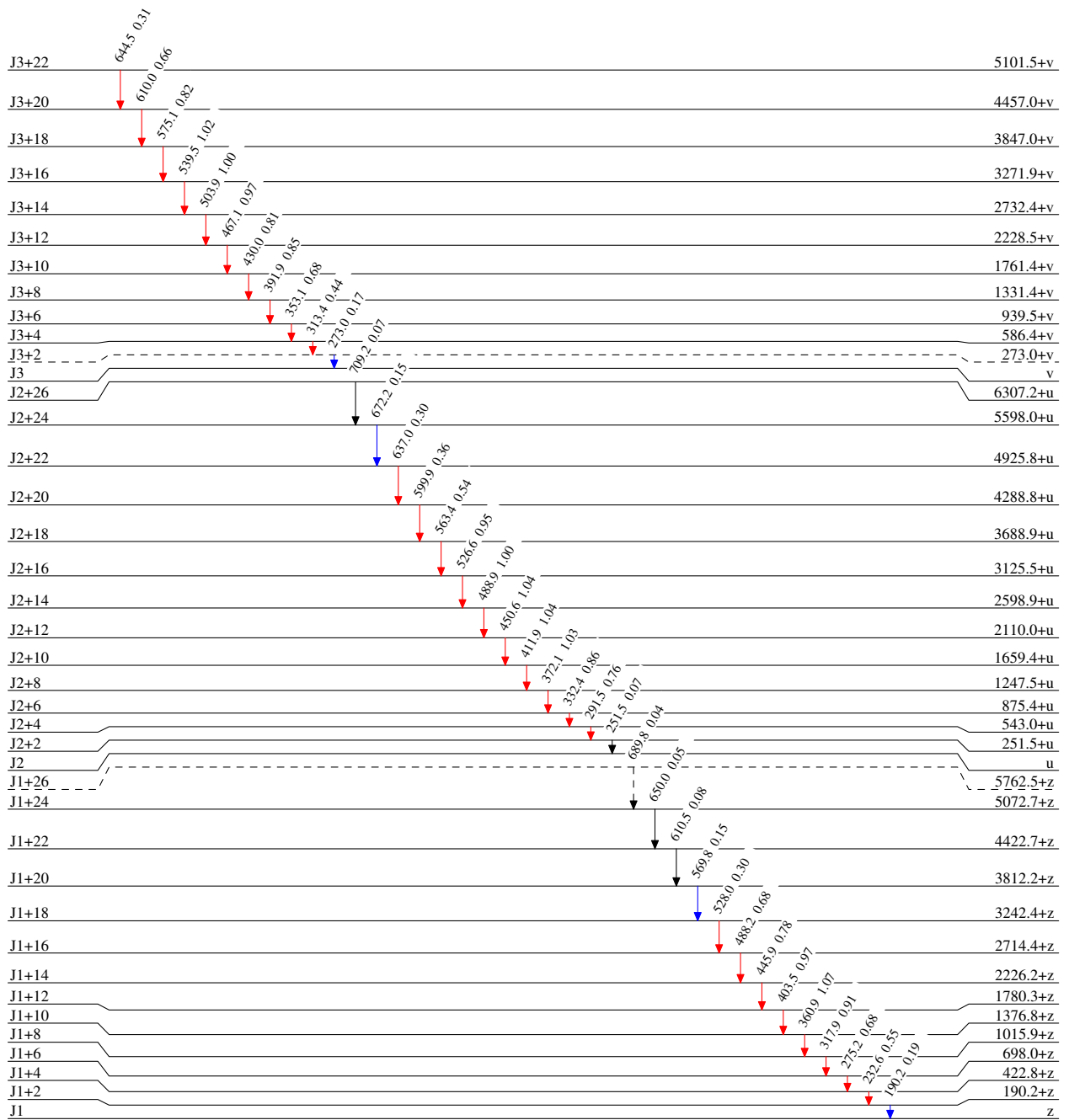
(HI,xn $\gamma$ ):SD 1999Ro21,1995Hu01,1996Du05

Legend

Level Scheme (continued)

Intensities: Relative I <sub>$\gamma$</sub>

- I <sub>$\gamma$</sub>  < 2% × I <sub>$\gamma$</sub> <sup>max</sup>
- I <sub>$\gamma$</sub>  < 10% × I <sub>$\gamma$</sub> <sup>max</sup>
- I <sub>$\gamma$</sub>  > 10% × I <sub>$\gamma$</sub> <sup>max</sup>
- - - - -  $\gamma$  Decay (Uncertain)

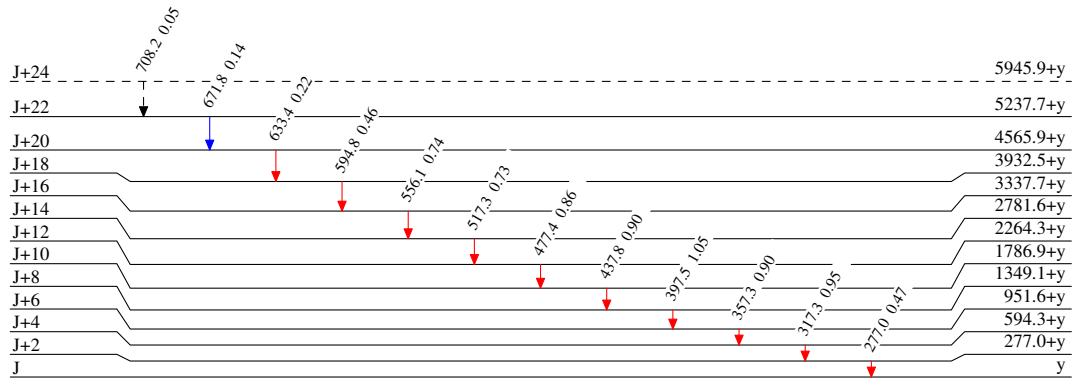


**(HL,xn $\gamma$ ):SD 1999Ro21,1995Hu01,1996Du05**

Legend

**Level Scheme (continued)**Intensities: Relative  $I_\gamma$ 

- $I_\gamma < 2\% \times I_\gamma^{\max}$
- $I_\gamma < 10\% \times I_\gamma^{\max}$
- $I_\gamma > 10\% \times I_\gamma^{\max}$
- - - -  $\gamma$  Decay (Uncertain)

 $^{193}_{82}\text{Pb}_{111}$

**(HL,xn $\gamma$ ):SD 1999Ro21,1995Hu01,1996Du05**

		Band(D): SD-4 band	
		J3+26	6485.1+v
		J3+24	$\begin{matrix} 707 \\ \downarrow \\ 5777.9+v \end{matrix}$
		J3+22	$\begin{matrix} 676 \\ \downarrow \\ 5101.5+v \end{matrix}$
		J3+20	$\begin{matrix} 644 \\ \downarrow \\ 4457.0+v \end{matrix}$
		J3+18	$\begin{matrix} 610 \\ \downarrow \\ 3847.0+v \end{matrix}$
		J3+16	$\begin{matrix} 575 \\ \downarrow \\ 3271.9+v \end{matrix}$
		J3+14	$\begin{matrix} 540 \\ \downarrow \\ 2732.4+v \end{matrix}$
		J3+12	$\begin{matrix} 504 \\ \downarrow \\ 2228.5+v \end{matrix}$
		J3+10	$\begin{matrix} 467 \\ \downarrow \\ 1761.4+v \end{matrix}$
		J3+8	$\begin{matrix} 430 \\ \downarrow \\ 1331.4+v \end{matrix}$
		J3+6	$\begin{matrix} 392 \\ \downarrow \\ 939.5+v \end{matrix}$
		J3+4	$\begin{matrix} 353 \\ \downarrow \\ 586.4+v \end{matrix}$
		J3+2	$\begin{matrix} 313 \\ \downarrow \\ 273.0+v \end{matrix}$
		J3	$\begin{matrix} 273 \\ \downarrow \\ v \end{matrix}$
		Band(C): SD-3 band	
		J2+26	6307.2+u
		J2+24	$\begin{matrix} 709 \\ \downarrow \\ 5598.0+u \end{matrix}$
		J2+22	$\begin{matrix} 672 \\ \downarrow \\ 4925.8+u \end{matrix}$
		J2+20	$\begin{matrix} 637 \\ \downarrow \\ 4288.8+u \end{matrix}$
		J2+18	$\begin{matrix} 600 \\ \downarrow \\ 3688.9+u \end{matrix}$
		J2+16	$\begin{matrix} 563 \\ \downarrow \\ 3125.5+u \end{matrix}$
		J2+14	$\begin{matrix} 527 \\ \downarrow \\ 2598.9+u \end{matrix}$
		J2+12	$\begin{matrix} 489 \\ \downarrow \\ 2110.0+u \end{matrix}$
		J2+10	$\begin{matrix} 451 \\ \downarrow \\ 1659.4+u \end{matrix}$
		J2+8	$\begin{matrix} 412 \\ \downarrow \\ 1247.5+u \end{matrix}$
		J2+6	$\begin{matrix} 372 \\ \downarrow \\ 875.4+u \end{matrix}$
		J2+4	$\begin{matrix} 332 \\ \downarrow \\ 543.0+u \end{matrix}$
		J2+2	$\begin{matrix} 292 \\ \downarrow \\ 251.5+u \end{matrix}$
		J2	$\begin{matrix} 252 \\ \downarrow \\ u \end{matrix}$
		Band(B): SD-2 band	
		J1+26	5762.5+z
		J1+24	$\begin{matrix} 690 \\ \downarrow \\ 5072.7+z \end{matrix}$
		J1+22	$\begin{matrix} 650 \\ \downarrow \\ 4422.7+z \end{matrix}$
		J1+20	$\begin{matrix} 610 \\ \downarrow \\ 3812.2+z \end{matrix}$
		J1+18	$\begin{matrix} 570 \\ \downarrow \\ 3242.4+z \end{matrix}$
		J1+16	$\begin{matrix} 528 \\ \downarrow \\ 2714.4+z \end{matrix}$
		J1+14	$\begin{matrix} 488 \\ \downarrow \\ 2226.2+z \end{matrix}$
		J1+12	$\begin{matrix} 446 \\ \downarrow \\ 1780.3+z \end{matrix}$
		J1+10	$\begin{matrix} 404 \\ \downarrow \\ 1376.8+z \end{matrix}$
		J1+8	$\begin{matrix} 361 \\ \downarrow \\ 1015.9+z \end{matrix}$
		J1+6	$\begin{matrix} 318 \\ \downarrow \\ 698.0+z \end{matrix}$
		J1+4	$\begin{matrix} 277 \\ \downarrow \\ 422.8+z \end{matrix}$
		J1+2	$\begin{matrix} 237 \\ \downarrow \\ 190.2+z \end{matrix}$
		J1	$\begin{matrix} 190 \\ \downarrow \\ z \end{matrix}$
		Band(A): SD-1 band	
		J+24	5945.9+y
		J+22	$\begin{matrix} 708 \\ \downarrow \\ 5237.7+y \end{matrix}$
		J+20	$\begin{matrix} 672 \\ \downarrow \\ 4565.9+y \end{matrix}$
		J+18	$\begin{matrix} 633 \\ \downarrow \\ 3932.5+y \end{matrix}$
		J+16	$\begin{matrix} 595 \\ \downarrow \\ 3337.7+y \end{matrix}$
		J+14	$\begin{matrix} 556 \\ \downarrow \\ 2781.6+y \end{matrix}$
		J+12	$\begin{matrix} 517 \\ \downarrow \\ 2264.3+y \end{matrix}$
		J+10	$\begin{matrix} 477 \\ \downarrow \\ 1786.9+y \end{matrix}$
		J+8	$\begin{matrix} 438 \\ \downarrow \\ 1349.1+y \end{matrix}$
		J+6	$\begin{matrix} 398 \\ \downarrow \\ 951.6+y \end{matrix}$
		J+4	$\begin{matrix} 357 \\ \downarrow \\ 594.3+y \end{matrix}$
		J+2	$\begin{matrix} 317 \\ \downarrow \\ 277.0+y \end{matrix}$
		J	$\begin{matrix} 277 \\ \downarrow \\ y \end{matrix}$

(HL,xnγ):SD 1999Ro21,1995Hu01,1996Du05 (continued)

Band(I): SD-9 band

J7+20	3956.0+a
J7+18	575 3380.7+a
J7+16	535 2845.3+a
J7+14	496 2349.7+a
J7+12	456 1894.2+a
J7+10	416 1478.3+a
J7+8	376 1102.5+a
J7+6	337 766.0+a
J7+4	297 468.7+a
J7+2	256 212.9+a
J7	213 a

Band(H): SD-8 band

J6+22	5158.9+t
J6+20	647 4512.1+t
J6+18	612 3900.1+t
J6+16	578 3322.1+t
J6+14	543 2778.9+t
J6+12	508 2270.8+t
J6+10	472 1798.5+t
J6+8	436 1362.6+t
J6+6	398 964.1+t
J6+4	361 603.2+t
J6+2	322 281.8+t
J6	282 t

Band(G): SD-7 band

J5+24	5620.8+s
J5+22	664 4956.6+s
J5+20	631 4325.5+s
J5+18	596 3729.1+s
J5+16	561 3167.8+s
J5+14	526 2641.7+s
J5+12	491 2150.6+s
J5+10	454 1696.6+s
J5+8	417 1279.4+s
J5+6	379 900.5+s
J5+4	340 560.4+s
J5+2	300 260.6+s
J5	261 s

Band(F): SD-6 band

J4+29	6877.0+w
J4+27	718 6159.1+w
J4+25	684 5475.1+w
J4+23	650 4825.6+w
J4+21	615 4211.0+w
J4+19	580 3631.3+w
J4+17	544 3087.8+w
J4+15	507 2580.4+w
J4+13	471 2109.8+w
J4+11	433 1677.0+w
J4+9	394 1282.6+w
J4+7	356 926.8+w
J4+5	316 610.6+w
J4+3	276 335.1+w
J4+1	235 100.5+w

Band(E): SD-5 band

J4+28	6512.0+w
J4+26	700 5811.5+w
J4+24	667 5144.7+w
J4+22	631 4513.4+w
J4+20	596 3917.2+w
J4+18	562 3355.0+w
J4+16	526 2828.5+w
J4+14	489 2340.0+w
J4+12	451 1888.7+w
J4+10	414 1475.2+w
J4+8	375 1099.9+w
J4+6	336 763.9+w
J4+4	296 467.9+w
J4+2	255 213.2+w
J4	213 w