(HI,xnγ) 1999Kl11,2003Pa38

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov and A. Rodionov, F. G. Kondev	NDS 112, 855 (2011)	31-Oct-2010

2001Pa25,2003Pa38: ^{100}Mo(^{37}Cl,4nγ) E=155 MeV. Measured Eγ, Iγ, γγ, γγ(θ)(DCO), γ(lin pol) deduced levels, J^{π}, bands structure , Q_t and B(M1)/B(E2) for the bands. EUROGAM II spectrometer with 54 Compton-suppressed HPGe detectors including 24 four-element Clover detectors.

1999Kl11: ^{110}Pd(^{28}Si,p2nγ) E=125 MeV. Measured Eγ, γγ, lifetimes using recoil-distance Doppler shift method, GASP II spectrometer.

1988Hi04: ^{118}Sn(^{19}F,4n), ^{117}Sn(^{19}F,3n) E=72-104 MeV; measured Eγ, Iγ, γ(θ), γγ, Iγ(t), σ(Eγ,E), ce deduced levels, J^{π}, A_2/A_0, α(exp). Enriched targets, Ge, Ge(Li), Si(Li) detectors, BGO anticompton shields, mini-orange electron spectrometer, cranked shell model.

Others: 1987Dr12, 1987Dr14, 1986Hi03, 1997Ha05, 2001Ri20, 2001Xu04.

^{133}Pr Levels

B(M1;J→J-1)/B(E2;J→J-2) [$(\mu_N/eb)^2$] ratios of reduced transition probabilities are obtained from fig. 4 of 2003Pa38 by evaluators.

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	Comments
0	(3/2⁺)		
61.3[m] 7	(5/2⁺)		
192.0[d] 8	(11/2⁻)		
225.5[l] 7	(7/2⁺)		
430.3 7	(7/2⁺)		
475.5[m] 7	(9/2⁺)		
502.2[d] 8	(15/2⁻)	44.5 ps 27	
701.9[l] 7	(11/2⁺)		
790.4 8	(13/2⁻)		
938.3 8	(15/2⁻)		
1053.6[d] 8	(19/2⁻)	2.37 ps 7	
1081.1[m] 7	(13/2⁺)		
1171.6[n] 8	(15/2⁻)		
1265.3 8	(17/2⁻)		
1325.0[l] 7	(15/2⁺)		
1648.2 8	(19/2⁻)		
1670.9[n] 9			
1762.4[d] 8	(23/2⁻)		
1788.5[m] 7	(17/2⁺)		
1949.6? 13			E(level): the level is introduced in 1988Hi04 as uncertain; sum of energy of transitions exciting and de-exciting the level is not equal to energy difference between the corresponding levels: ΣEγ=896+400=1296, level energy difference =2331-1054=1277.
1992.2[i] 8	(19/2⁺)		
2033.6[h] 8	(21/2⁻)	≤35[@] ns	
2045.1[l] 7	(19/2⁺)		
2203.2[b] 8	(19/2⁺)	≤35[@] ns	
2330.8[n] 9			
2352.1[c] 8	(21/2⁺)		
2356.2[j] 8	(21/2⁺)		
2444.8[i] 8	(23/2⁺)		
2473.8[g] 8	(23/2⁻)		
2574.9[d] 8	(27/2⁻)		

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(HI,xnγ) 1999Kl11,2003Pa38 (continued)

^{133}Pr Levels (continued)

E(level)[†]	Jπ[‡]	Comments
2576.6[k] *10*	(23/2$^+$)	
2597.7[b] *8*	(23/2$^+$)	
2673.5 *13*		
2691.8 *10*		
2721.9 *8*	(25/2$^-$)	
2744.5[j] *8*	(25/2$^+$)	
2802.1[l] *13*	(23/2$^+$)	
2924.8[c] *8*	(25/2$^+$)	B(M1;J→J-1)/B(E2;J→J-2)=23.0 *18*.
2932.9[i] *8*	(27/2$^+$)	
2953.8[h] *8*	(25/2$^-$)	B(M1;J→J-1)/B(E2;J→J-2)=8.7 *9*.
3078.1[n] *10*		
3192.2[k] *10*	(27/2$^+$)	
3252.2[a] *8*	(21/2$^-$)	
3274.3[j] *8*	(29/2$^+$)	
3319.4[b] *8*	(27/2$^+$)	B(M1;J→J-1)/B(E2;J→J-2)=16.9 *13*.
3371.0[&] *8*	(23/2$^-$)	
3438.1[d] *8*	(31/2$^-$)	
3464.0[g] *8*	(27/2$^-$)	B(M1;J→J-1)/B(E2;J→J-2)=8.3 *9*.
3528.9 *8*	(29/2$^-$)	
3535.9[a] *8*	(25/2$^-$)	
3564.5[i] *8*	(31/2$^+$)	
3767.1[c] *8*	(29/2$^+$)	B(M1;J→J-1)/B(E2;J→J-2)=12.5 *10*.
3786.8[&] *8*	(27/2$^-$)	
3819.6[n] *11*		
3882.2[k] *9*	(31/2$^+$)	
3959.2[h] *8*	(29/2$^-$)	B(M1;J→J-1)/B(E2;J→J-2)=6.1 *5*.
3972.6[j] *8*	(33/2$^+$)	
4106.7[f] *8*	(29/2$^-$)	
4123.5[a] *8*	(29/2$^-$)	
4250.9[e] *8*	(31/2$^-$)	
4263.6[b] *8*	(31/2$^+$)	B(M1;J→J-1)/B(E2;J→J-2)=11.1 *21*.
4303.6[d] *11*	(35/2$^-$)	
4351.6[i] *9*	(35/2$^+$)	
4377.7[f] *8*	(33/2$^-$)	
4533.0[&] *8*	(31/2$^-$)	
4573.6[e] *8*	(35/2$^-$)	
4677.4[k] *10*	(35/2$^+$)	
4793.2[c] *8*	(33/2$^+$)	B(M1;J→J-1)/B(E2;J→J-2)=8.4 *15*.
4805.2[j] *8*	(37/2$^+$)	
4817.4[f] *8*	(37/2$^-$)	
5004.9[a] *8*	(33/2$^-$)	B(M1;J→J-1)/B(E2;J→J-2)=17 *3*.
5113.8[e] *8*	(39/2$^-$)	B(M1;J→J-1)/B(E2;J→J-2)=17.9 *6*.
5171.1[d] *13*	(39/2$^-$)	
5260.1[i] *10*	(39/2$^+$)	
5354.0[b] *8*	(35/2$^+$)	B(M1;J→J-1)/B(E2;J→J-2)=7.9 *9*.
5464.6[f] *8*	(41/2$^-$)	B(M1;J→J-1)/B(E2;J→J-2)=20 *4*.
5532.5[&] *8*	(35/2$^-$)	B(M1;J→J-1)/B(E2;J→J-2)=12.8 *19*.
5564.3[k] *11*	(39/2$^+$)	

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(HI,xnγ) 1999Kl11,2003Pa38 (continued)

^{133}Pr Levels (continued)

E(level)[†]	Jπ[‡]	Comments
5744.4[j] *9*	(41/2+)	
5868.2[e] *8*	(43/2−)	B(M1;J→J-1)/B(E2;J→J-2)=16.4 *16*.
5906.7[c] *9*	(37/2+)	
6092.9[d] *13*	(43/2−)	
6106.4[a] *8*	(37/2−)	B(M1;J→J-1)/B(E2;J→J-2)=8.9 *19*.
6264.1[i] *12*	(43/2+)	
6322.2[f] *8*	(45/2−)	B(M1;J→J-1)/B(E2;J→J-2)=14.0 *21*.
6518.3[k] *15*	(43/2+)	
6724.4[&] *8*	(39/2−)	B(M1;J→J-1)/B(E2;J→J-2)=16 *3*.
6764.6[j] *10*	(45/2+)	
6823.2[e] *9*	(47/2−)	B(M1;J→J-1)/B(E2;J→J-2)=16 *4*.
7082.9[d] *15*	(47/2−)	
7336.4[a] *9*	(41/2−)	B(M1;J→J-1)/B(E2;J→J-2)=12.5 *22*.
7340.1[i] *16*	(47/2+)	
7371.5[f] *9*	(49/2−)	B(M1;J→J-1)/B(E2;J→J-2)=12.8 *19*.
7534.3[k] *18*	(47/2+)	
7858.6[j] *14*	(49/2+)	
7969.0[e] *9*	(51/2−)	
8121.9[d] *18*	(51/2−)	
8477.1[i] *19*	(51/2+)	
8613.7[f] *9*	(53/2−)	
8621.3[k] *21*	(51/2+)	
9016.6[j] *17*	(53/2+)	
9199.9[d] *21*	(55/2−)	
9666.1[i] *21*	(55/2+)	
10227.6[j] *20*	(57/2+)	
10341.9[d] *23*	(59/2−)	
10909.1[i] *24*	(59/2+)	
11561.0[d] *25*	(63/2−)	
12200[i] *3*	(63/2+)	
12860[d] *3*	(67/2−)	
14211[d] *3*	(71/2−)	

† From a least-squares fit to Eγ′s.

‡ From DCO, γ(θ) and α(exp) values, and band assignment.

\# From 1999Kl11, except as noted.

@ From the 50 ns resolving time of the EUROGAM II spectrometer (2003Pa38).

& Band(A): 3-qp oblate deformed band based on the (23/2−) state, α=−1/2; configuration=π11/2[505]($h_{11/2}$)⊗ν^2($h^2_{11/2}$). The assignment is tentative.

a Band(B): 3-qp oblate deformed band based on the (21/2−) state, α=+1/2; configuration=π11/2[505]($h_{11/2}$)⊗ν^2($h^2_{11/2}$). The assignment is tentative.

b Band(C): Kπ=(19/2+) 3-qp band, α=−1/2, configuration=π3/2[541]⊗ν^2(7/2[404],9/2[514]).

c Band(D): Kπ=(19/2+) 3-qp band, α=+1/2, configuration=π3/2[541]⊗ν^2(7/2[404],9/2[514]).

d Band(E): π3/2[541] ($h_{11/2}$) 1-qp prolate band, α=−1/2.

e Band(F): 5-qp band based on the (31/2−) state, α=−1/2, configuration=π^3(5/2[413],$h^2_{11/2}$)⊗ν^2(7/2[404],9/2[514]).

f Band(G): 5-qp band based on the (29/2−) state, α=+1/2, configuration=π^3(5/2[413],$h^2_{11/2}$)⊗ν^2(7/2[404],9/2[514]).

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(HI,xnγ) 1999Kl11,2003Pa38 (continued)

^{133}Pr Levels (continued)

[g] Band(H): K^{π}=(21/2⁻) 3-qp band, α=−1/2, configuration=π5/2[413]⊗ν^2(7/2[404],9/2[514]).
[h] Band(I): K^{π}=(21/2⁻) 3-qp band, α=+1/2, configuration=π5/2[413]⊗ν^2(7/2[404],9/2[514]).
[i] Band(J): 3-qp band based on the (19/2⁺) state, α=−1/2; configuration=π5/2[413]⊗$\pi^2(h^2_{11/2})$; Q_t=2.5-3.0 eb at low spin, but increases beyond 3.0 eb at high spin.
[j] Band(K): 3-qp band based on the (21/2⁺) state, α=+1/2, configuration=π5/2[413]⊗$\pi^2(h^2_{11/2})$; Q_t=2.5-3.0 eb at low spin, but increases beyond 3.0 eb at high spin.
[k] Band(L): 3-qp band based on (23/2⁺) state, α=−1/2, probable configuration=π3/2[411]⊗$\pi^2(h^2_{11/2})$.
[l] Band(M): π5/2[413] ($g_{7/2}$) 1-qp prolate band, α=−1/2.
[m] Band(N): π5/2[413] ($g_{7/2}$) 1-qp prolate band, α=+1/2.
[n] Band(O): Based on (15/2⁻) state, possible ΔJ=2 level sequence (1988Hi04).

γ(^{133}Pr)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[b]	Comments
62		61.3	(5/2⁺)	0	(3/2⁺)			
118.8 *1*	8.1 *5*	3371.0	(23/2⁻)	3252.2	(21/2⁻)	M1+E2		DCO=0.42 *4*.
126.8 *1*	4.9 *5*	4377.7	(33/2⁻)	4250.9	(31/2⁻)	M1+E2		DCO=0.49 *6*.
144.2 *2*	2.1 *5*	4250.9	(31/2⁻)	4106.7	(29/2⁻)	M1+E2		DCO=0.39 *5*.
148.88 *16*	44 *3*	2352.1	(21/2⁺)	2203.2	(19/2⁺)	M1+E2		DCO=0.37 *2*; A_2=−0.10 *4*.
164.3 *4*	120[a] *10*	225.5	(7/2⁺)	61.3	(5/2⁺)			A_2=+0.06 *6*.
165.04 *12*	29 *2*	3535.9	(25/2⁻)	3371.0	(23/2⁻)	M1+E2		DCO=0.33 *2*; A_2=−0.28 *14*.
169.75 *15*	53 *2*	2203.2	(19/2⁺)	2033.6	(21/2⁻)	E1		DCO=0.70 *5*.
188		2932.9	(27/2⁺)	2744.5	(25/2⁺)			
195.9 *1*	19 *1*	4573.6	(35/2⁻)	4377.7	(33/2⁻)	M1+E2		DCO=0.32 *2*; pol=−0.34 *24*.
205		430.3	(7/2⁺)	225.5	(7/2⁺)			
212.0 *4*	2.2 *5*	1265.3	(17/2⁻)	1053.6	(19/2⁻)			
225		225.5	(7/2⁺)	0	(3/2⁺)			
226.5 *7*	40[a] *10*	701.9	(11/2⁺)	475.5	(9/2⁺)			A_2=+0.11 *7*.
243.8 *1*	36 *2*	4817.4	(37/2⁻)	4573.6	(35/2⁻)	M1+E2		DCO=0.35 *2*; pol=−0.21 *18*; A_2=−0.11 *16*.
244		1325.0	(15/2⁺)	1081.1	(13/2⁺)			
245.6 *1*	71 *4*	2597.7	(23/2⁺)	2352.1	(21/2⁺)	M1+E2		DCO=0.38 *2*; pol=−0.54 *33*; A_2=−0.31 *10*.
250.0 *3*	10[a] *6*	475.5	(9/2⁺)	225.5	(7/2⁺)			
250.96 *12*	48 *3*	3786.8	(27/2⁻)	3535.9	(25/2⁻)	M1+E2		
256		2045.1	(19/2⁺)	1788.5	(17/2⁺)			
288.3 *3*	2.9 *5*	790.4	(13/2⁻)	502.2	(15/2⁻)			
290		3564.5	(31/2⁺)	3274.3	(29/2⁺)			
291.7 *1*	6.8 *5*	4250.9	(31/2⁻)	3959.2	(29/2⁻)	M1+E2		DCO=0.25 *4*.
296.4 *1*	40 *2*	5113.8	(39/2⁻)	4817.4	(37/2⁻)	M1+E2		DCO=0.32 *2*; pol=−0.07 *8*; A_2=+0.34 *25*.
299		2744.5	(25/2⁺)	2444.8	(23/2⁺)			
310.14 *9*	1000	502.2	(15/2⁻)	192.0	(11/2⁻)	E2	0.0455	α(K)exp=0.037 *3*; α(L)exp=0.0059 *4* α(K)=0.0364 *6*; α(L)=0.00715 *10*; α(M)=0.001550 *22*; α(N+..)=0.000395 *6* α(N)=0.000341 *5*; α(O)=5.14×10⁻⁵ *8*; α(P)=2.39×10⁻⁶ *4* DCO=0.92 *1*; pol=+0.59 *7*; A_2=0.36 *4*.
327.1 *1*	59 *3*	2924.8	(25/2⁺)	2597.7	(23/2⁺)	M1+E2		DCO=0.37 *2*; pol=−0.22 *10*; A_2=−0.69 *35*.
336.72 *9*	46 *3*	4123.5	(29/2⁻)	3786.8	(27/2⁻)	M1+E2		DCO=0.37 *2*; pol=−0.49 *14*; A_2=+0.02 *30*.
341		3274.3	(29/2⁺)	2932.9	(27/2⁺)			
350.8 *1*	34 *2*	5464.6	(41/2⁻)	5113.8	(39/2⁻)	M1+E2		DCO=0.27 *2*; pol=−0.42 *10*; A_2=−0.07 *11*.
369		430.3	(7/2⁺)	61.3	(5/2⁺)			
379		1081.1	(13/2⁺)	701.9	(11/2⁺)			
381.0[@] *2*	70[a] *10*	1171.6	(15/2⁻)	790.4	(13/2⁻)			A_2=−0.32 *12*. E_γ: peak contaminated by an impurity line.
381[@]		3819.6		3438.1	(31/2⁻)			

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(HI,xnγ) 1999Kl11,2003Pa38 (continued)

γ(^{133}Pr) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[b]	Comments
388.4 *2*	153[&] *10*	2744.5	(25/2+)	2356.2	(21/2+)			A_2=+0.31 *10*.
394.46 *12*	43 *2*	3319.4	(27/2+)	2924.8	(25/2+)	M1+E2		DCO=0.32 *3*; A_2=−0.58 *18*.
399.7 *2*	48[&] *10*	2444.8	(23/2+)	2045.1	(19/2+)			A_2=+0.07 *20*. E_γ: in the table 1 of 1988Hi04 Eγ=399.72 that is interpreted as 399.7 *2* by the evaluators.
403.6 *1*	24 *1*	5868.2	(43/2−)	5464.6	(41/2−)	M1+E2		DCO=0.30 *4*; pol=−0.38 *18*; A_2==−0.40 *22*.
406		1670.9		1265.3	(17/2−)			
408		3972.6	(33/2+)	3564.5	(31/2+)			
409.46 *9*	31 *2*	4533.0	(31/2−)	4123.5	(29/2−)	M1+E2		DCO=0.33 *3*; pol=−0.32 *23*.
414.2 *2*	29[&] *10*	475.5	(9/2+)	61.3	(5/2+)	Q		A_2=+0.20 *11*.
430		430.3	(7/2+)	0	(3/2+)			
435.8 *3*	24 *7*	938.3	(15/2−)	502.2	(15/2−)			
439.7 *3*	2.1 *5*	4817.4	(37/2−)	4377.7	(33/2−)			
440.2 *1*	10 *1*	2473.8	(23/2−)	2033.6	(21/2−)	M1+E2		DCO=0.22 *5*; pol=−0.3 *3*.
447.7 *1*	28 *2*	3767.1	(29/2+)	3319.4	(27/2+)	M1+E2		DCO=0.34 *3*; A_2=−0.53 *25*.
452.5 *4*	67[&] *10*	2444.8	(23/2+)	1992.2	(19/2+)	E2		A_2=+0.35 *6*.
454.06 *19*	15 *1*	6322.2	(45/2−)	5868.2	(43/2−)			A_2=+0.14 *20*, complex peak (1988Hi04).
465		1788.5	(17/2+)	1325.0	(15/2+)			
471.8 *1*	19 *2*	5004.9	(33/2−)	4533.0	(31/2−)			
475.2 *2*	30 *4*	1265.3	(17/2−)	790.4	(13/2−)			
476.3 *3*	≤20	1648.2	(19/2−)	1171.6	(15/2−)			E_γ: from 1988Hi04; doublet with 476.45 γ from 701.9 level. I_γ: in 1988Hi04 Iγ=20 *2* for doublet of the 476.3γ + 476.4γ.
476.45 *29*	53[&] *10*	701.9	(11/2+)	225.5	(7/2+)	E2	0.01286	α(K)exp=0.0071 *7* α(K)=0.01066 *15*; α(L)=0.001735 *25*; α(M)=0.000371 *6*; α(N+..)=9.56×10^{-5} *14* α(N)=8.21×10^{-5} *12*; α(O)=1.273×10^{-5} *18*; α(P)=7.38×10^{-7} *11* A_2=−0.16 *20*. E_γ: from 1988Hi04; doublet with 476.3 *3* from 1648.2 level. I_γ: in 1988Hi04 Iγ=20 *2* for doublet of the 476.3γ + 476.4γ. Mult.: 702.5 (11/2+) state de-excites to 225.9 (7/2+) one by stretched E2 476.6γ; these states relate to hard established rotational band. In 1998Hi04 mult.=E2(+M1) from α(exp).
479.9 *1*	11 *2*	2953.8	(25/2−)	2473.8	(23/2−)			
488.1 *3*	177[&] *10*	2932.9	(27/2+)	2444.8	(23/2+)	E2	0.01203	α(K)exp=0.0109 *13* α(K)=0.00999 *14*; α(L)=0.001612 *23*; α(M)=0.000345 *5*; α(N+..)=8.88×10^{-5} *13* α(N)=7.63×10^{-5} *11*; α(O)=1.184×10^{-5} *17*; α(P)=6.93×10^{-7} *10* A_2=+0.47 *10*.
489[@]		2691.8		2203.2	(19/2+)			
495.2 *2*	5.1 *5*	3959.2	(29/2−)	3464.0	(27/2−)			
496.4 *1*	20 *2*	4263.6	(31/2+)	3767.1	(29/2+)	M1+E2		DCO=0.42 *5*.
499[@]		1670.9		1171.6	(15/2−)			
500.9 *5*	7.9 *5*	6823.2	(47/2−)	6322.2	(45/2−)			
504[@]		3078.1		2574.9	(27/2−)			

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(HI,xnγ) 1999Kl11,2003Pa38 (continued)

γ(^{133}Pr) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[b]	Comments
510.3 *2*	10 *2*	3464.0	(27/2⁻)	2953.8	(25/2⁻)			
527.6 *1*	11 *1*	5532.5	(35/2⁻)	5004.9	(33/2⁻)			
529.6 *1*	22 *2*	4793.2	(33/2⁺)	4263.6	(31/2⁺)			
529.8 *3*	196[&] *10*	3274.3	(29/2⁺)	2744.5	(25/2⁺)	E2	0.00965	α(K)exp=0.0059 *6* α(K)=0.00805 *12*; α(L)=0.001264 *18*; α(M)=0.000269 *4*; α(N+..)=6.96×10^{-5} *10* α(N)=5.97×10^{-5} *9*; α(O)=9.31×10^{-6} *14*; α(P)=5.62×10^{-7} *8* A_2=+0.57 *12*.
540.2 *4*	1.1 *5*	5113.8	(39/2⁻)	4573.6	(35/2⁻)			
548.2 *2*	6.9 *5*	7371.5	(49/2⁻)	6823.2	(47/2⁻)			
551.4 *1*	943 *35*	1053.6	(19/2⁻)	502.2	(15/2⁻)	E2	0.00868	α(K)exp=0.0081 *7*; α(L)exp=0.00090 *7* α(K)=0.00726 *11*; α(L)=0.001126 *16*; α(M)=0.000240 *4*; α(N+..)=6.20×10^{-5} *9* α(N)=5.32×10^{-5} *8*; α(O)=8.31×10^{-6} *12*; α(P)=5.09×10^{-7} *8* DCO=1.05 *1*; pol=+0.37 *2*; A_2=+0.45 *4*.
552.8 *2*	8.8 *5*	5906.7	(37/2⁺)	5354.0	(35/2⁺)			
554.9 *1*	55 *4*	2203.2	(19/2⁺)	1648.2	(19/2⁻)			A_2=+0.01 *10*.
560.9 *2*	15 *1*	5354.0	(35/2⁺)	4793.2	(33/2⁺)			
567.8 *3*	38[&] *10*	2356.2	(21/2⁺)	1788.5	(17/2⁺)			A_2=−0.02 *21*.
568[@]		2330.8		1762.4	(23/2⁻)			
572.5 *3*	3.1 *5*	2924.8	(25/2⁺)	2352.1	(21/2⁺)			
574.1 *2*	7.0 *4*	6106.4	(37/2⁻)	5532.5	(35/2⁻)			
585	31[&] *10*	2576.6	(23/2⁺)	1992.2	(19/2⁺)			
594.5 *2*	32 *4*	1648.2	(19/2⁻)	1053.6	(19/2⁻)			E_γ: 584 keV in 1988Hi04 is a misprint, possible.
597.6 *3*	3.6 *5*	7969.0	(51/2⁻)	7371.5	(49/2⁻)			
598.6 *6*	2.7 *5*	790.4	(13/2⁻)	192.0	(11/2⁻)	D+Q		A_2=−0.69 *15*.
605.6 *2*	41[&] *10*	1081.1	(13/2⁺)	475.5	(9/2⁺)			A_2=−0.02 *16*, complex peak (1988Hi04).
608	33[&] *10*	3882.2	(31/2⁺)	3274.3	(29/2⁺)			
612.0 *3*	5.1 *5*	7336.4	(41/2⁻)	6724.4	(39/2⁻)			
616	38[&] *10*	3192.2	(27/2⁺)	2576.6	(23/2⁺)			
617		1670.9		1053.6	(19/2⁻)			
618.1 *2*	8.1 *4*	6724.4	(39/2⁻)	6106.4	(37/2⁻)			
623.1 *2*	63 *9*	1325.0	(15/2⁺)	701.9	(11/2⁺)	E2	0.00635	α(K)exp=0.0063 *12* α(K)=0.00534 *8*; α(L)=0.000799 *12*; α(M)=0.0001697 *24*; α(N+..)=4.40×10^{-5} *7* α(N)=3.77×10^{-5} *6*; α(O)=5.92×10^{-6} *9*; α(P)=3.77×10^{-7} *6* A_2=+0.22 *14*.
631.6 *3*	177[&] *10*	3564.5	(31/2⁺)	2932.9	(27/2⁺)	E2	0.00614	α(K)exp=0.0033 *4* α(K)=0.00516 *8*; α(L)=0.000770 *11*; α(M)=0.0001635 *23*; α(N+..)=4.24×10^{-5} *6* α(N)=3.63×10^{-5} *6*; α(O)=5.71×10^{-6} *8*; α(P)=3.65×10^{-7} *6* A_2=+0.43 *11*.
644.7 *3*	2.1 *5*	8613.7	(53/2⁻)	7969.0	(51/2⁻)			
647.2 *3*	3.0 *5*	5464.6	(41/2⁻)	4817.4	(37/2⁻)			
660[@]		2330.8		1670.9				
667.27 *28*	38[&] *10*	1992.2	(19/2⁺)	1325.0	(15/2⁺)	E2		α(K)exp=0.0034 *4* A_2=+0.44 *10*.

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(HI,xnγ) 1999Kl11,2003Pa38 (continued)

γ(^{133}Pr) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	α [b]	Comments
669.5[@] *2*	30[a] *10*	1171.6	(15/2⁻)	502.2	(15/2⁻)			A_2=−0.38 *10*.
682.46 *29*	129 *5*	2444.8	(23/2⁺)	1762.4	(23/2⁻)	E1	0.00190	α(K)exp≤0.0019 α(K)=0.001637 *23*; α(L)=0.000209 *3*; α(M)=4.35×10^{-5} *7*; α(N+..)=1.139×10^{-5} *16* α(N)=9.71×10^{-6} *14*; α(O)=1.560×10^{-6} *22*; α(P)=1.142×10^{-7} *16* DCO=0.92 *2*; pol=−0.72 *2*; A_2=+0.36 *10*.
690	43[&] *10*	3882.2	(31/2⁺)	3192.2	(27/2⁺)			
698.3 *2*	172[&] *10*	3972.6	(33/2⁺)	3274.3	(29/2⁺)			A_2=+0.19 *15*, complex peak (1988Hi04).
705	<25[&]	4677.4	(35/2⁺)	3972.6	(33/2⁺)			
707.3 *4*	31[&] *10*	1788.5	(17/2⁺)	1081.1	(13/2⁺)			
708.84 *8*	759 *38*	1762.4	(23/2⁻)	1053.6	(19/2⁻)	E2	0.00463	α(K)exp=0.0034 *4* α(K)=0.00391 *6*; α(L)=0.000567 *8*; α(M)=0.0001201 *17*; α(N+..)=3.12×10^{-5} *5* α(N)=2.67×10^{-5} *4*; α(O)=4.22×10^{-6} *6*; α(P)=2.78×10^{-7} *4* DCO=1.10 *1*; pol=+0.66 *8*; A_2=+0.44 *10*.
709.7 *2*	23 *4*	1648.2	(19/2⁻)	938.3	(15/2⁻)			
720.0 *3*	36[&] *10*	2045.1	(19/2⁺)	1325.0	(15/2⁺)			A_2=+0.18 *12*.
722.0 *5*	4.8 *5*	3319.4	(27/2⁺)	2597.7	(23/2⁺)			
742[@]		3819.6		3078.1				
746.4 *4*	8.0 *5*	938.3	(15/2⁻)	192.0	(11/2⁻)			
747[@]		3078.1		2330.8				
747	≤25[&]	3192.2	(27/2⁺)	2444.8	(23/2⁺)			
754.4 *3*	1.7 *5*	5868.2	(43/2⁻)	5113.8	(39/2⁻)			
757	≤25[&]	2802.1	(23/2⁺)	2045.1	(19/2⁺)			
759	≤25[&]	5564.3	(39/2⁺)	4805.2	(37/2⁺)			
763.3 *3*	74 *7*	1265.3	(17/2⁻)	502.2	(15/2⁻)	M1+E2		DCO=0.39 *4*; pol=−0.44 *19*; A_2=−0.01 *6*.
768.44 *12*	68 *5*	2033.6	(21/2⁻)	1265.3	(17/2⁻)	E2		DCO=0.94 *5*; pol=+0.38 *17*; A_2=−0.42 *11*.
773.6 *2*	1.0 *5*	3371.0	(23/2⁻)	2597.7	(23/2⁺)			Spins of initial and final levels for the transition in the table 1 2003Pa38 are of misprints.
786.8 *3*	1.1 *4*	4250.9	(31/2⁻)	3464.0	(27/2⁻)			
787.1 *4*	157[&] *10*	4351.6	(35/2⁺)	3564.5	(31/2⁺)			A_2=+0.43 *20*.
795	53[&] *10*	4677.4	(35/2⁺)	3882.2	(31/2⁺)			
807.0 *3*	11 *2*	3528.9	(29/2⁻)	2721.9	(25/2⁻)			
812.44 *9*	435 *18*	2574.9	(27/2⁻)	1762.4	(23/2⁻)	E2	0.00336	α(K)exp=0.0020 *2* α(K)=0.00286 *4*; α(L)=0.000402 *6*; α(M)=8.49×10^{-5} *12*; α(N+..)=2.21×10^{-5} *3* α(N)=1.89×10^{-5} *3*; α(O)=3.00×10^{-6} *5*; α(P)=2.04×10^{-7} *3* DCO=1.07 *1*; pol=+0.48 *7*; A_2=+0.46 *12*.
814	41[&] *10*	2576.6	(23/2⁺)	1762.4	(23/2⁻)			
832.6 *2*	115[&] *10*	4805.2	(37/2⁺)	3972.6	(33/2⁺)			
842.8 *3*	7.7 *5*	3767.1	(29/2⁺)	2924.8	(25/2⁺)			
848.7 *3*	7.2 *5*	4377.7	(33/2⁻)	3528.9	(29/2⁻)			
857.6 *3*	3.7 *5*	6322.2	(45/2⁻)	5464.6	(41/2⁻)			
861.6 *3*	3.2 *5*	3786.8	(27/2⁻)	2924.8	(25/2⁺)			
863.5 *7*	412[&] *10*	3438.1	(31/2⁻)	2574.9	(27/2⁻)			
865.5 *7*	248[&] *10*	4303.6	(35/2⁻)	3438.1	(31/2⁻)			

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(HI,xnγ) 1999Kl11,2003Pa38 (continued)

γ(^{133}Pr) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
867.5 *7*	144[&] *10*	5171.1	(39/2⁻)	4303.6	(35/2⁻)		
882.2 *3*	3.9 *5*	5004.9	(33/2⁻)	4123.5	(29/2⁻)		
885[@]		2673.5		1788.5	(17/2⁺)		
887	43[&] *10*	5564.3	(39/2⁺)	4677.4	(35/2⁺)		
896[@c]		1949.6?		1053.6	(19/2⁻)		
908.5 *4*	86[&] *10*	5260.1	(39/2⁺)	4351.6	(35/2⁺)		
920.1 *3*	4.1 *5*	2953.8	(25/2⁻)	2033.6	(21/2⁻)		
921.8 *2*	54 *9*	6092.9	(43/2⁻)	5171.1	(39/2⁻)		
929[@]		2691.8		1762.4	(23/2⁻)		
937.87 *26*	4.8 *5*	3535.9	(25/2⁻)	2597.7	(23/2⁺)		
938.4 *4*	77[&] *10*	1992.2	(19/2⁺)	1053.6	(19/2⁻)		
939.18 *29*	67[&] *10*	5744.4	(41/2⁺)	4805.2	(37/2⁺)		
939.6 *2*	9.0 *2*	4377.7	(33/2⁻)	3438.1	(31/2⁻)		
944.4 *3*	11 *2*	4263.6	(31/2⁺)	3319.4	(27/2⁺)		
949	≤25[&]	3882.2	(31/2⁺)	2932.9	(27/2⁺)		
954	29[&] *10*	6518.3	(43/2⁺)	5564.3	(39/2⁺)		
955.0 *5*	2.2 *5*	6823.2	(47/2⁻)	5868.2	(43/2⁻)		
959.4 *3*	22 *1*	2721.9	(25/2⁻)	1762.4	(23/2⁻)		
981.8 *4*	57[&] *10*	2744.5	(25/2⁺)	1762.4	(23/2⁻)		A_2=+0.03 *19*.
990.0 *7*	29[&] *10*	7082.9	(47/2⁻)	6092.9	(43/2⁻)		
990.2 *3*	5.3 *5*	3464.0	(27/2⁻)	2473.8	(23/2⁻)		
992.0 *7*	≤25[&]	2045.1	(19/2⁺)	1053.6	(19/2⁻)		
1000.6[c] *3*	4.1 *5*	5532.5	(35/2⁻)	4533.0	(31/2⁻)		E_γ: level-energy difference=999.44 *14*.
1004.0 *7*	43[&] *10*	6264.1	(43/2⁺)	5260.1	(39/2⁺)		
1005.3 *3*	6.8 *5*	3959.2	(29/2⁻)	2953.8	(25/2⁻)		
1016	29[&] *10*	7534.3	(47/2⁺)	6518.3	(43/2⁺)		
1019.1 *3*	24 *2*	3371.0	(23/2⁻)	2352.1	(21/2⁺)	E1	DCO=0.70 *10*; pol=0.39 *42*.
1020.2 *4*	38[&] *10*	6764.6	(45/2⁺)	5744.4	(41/2⁺)		
1026.8 *5*	10 *2*	4793.2	(33/2⁺)	3767.1	(29/2⁺)		
1039	≤25[&]	8121.9	(51/2⁻)	7082.9	(47/2⁻)		
1049.1 *3*	3.8 *5*	3252.2	(21/2⁻)	2203.2	(19/2⁺)		
1049.3 *3*	3.0 *5*	7371.5	(49/2⁻)	6322.2	(45/2⁻)		
1076	≤25[&]	7340.1	(47/2⁺)	6264.1	(43/2⁺)		
1078	<25[&]	9199.9	(55/2⁻)	8121.9	(51/2⁻)		
1087	<25[&]	8621.3	(51/2⁺)	7534.3	(47/2⁺)		
1090.2 *5*	11 *2*	5354.0	(35/2⁺)	4263.6	(31/2⁺)		
1094		7858.6	(49/2⁺)	6764.6	(45/2⁺)		
1101.0 *3*	4.7 *5*	6106.4	(37/2⁻)	5004.9	(33/2⁻)		
1112.9 *5*	7.8 *5*	5906.7	(37/2⁺)	4793.2	(33/2⁺)		
1113	≤25[&]	4677.4	(35/2⁺)	3564.5	(31/2⁺)		
1137	<25[&]	8477.1	(51/2⁺)	7340.1	(47/2⁺)		
1142	<25[&]	10341.9	(59/2⁻)	9199.9	(55/2⁻)		
1145.7 *5*	1.1 *5*	7969.0	(51/2⁻)	6823.2	(47/2⁻)		
1146.1 *5*	5.1 *5*	1648.2	(19/2⁻)	502.2	(15/2⁻)		
1149.43 *28*	42 *3*	2203.2	(19/2⁺)	1053.6	(19/2⁻)	E1	DCO=0.96 *6*; pol=−0.31 *44*; A_2=+0.46 *18*.
1152.9 *5*	2.8 *5*	4106.7	(29/2⁻)	2953.8	(25/2⁻)		
1158	<25[&]	9016.6	(53/2⁺)	7858.6	(49/2⁺)		
1169[@]		1670.9		502.2	(15/2⁻)		
1189	<25[&]	9666.1	(55/2⁺)	8477.1	(51/2⁺)		

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(HI,xnγ) 1999Kl11,2003Pa38 (continued)

γ(^{133}Pr) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [#]	Comments
1191.9 *3*	3.8 *5*	6724.4	(39/2⁻)	5532.5	(35/2⁻)		
1211	<25[&]	10227.6	(57/2⁺)	9016.6	(53/2⁺)		
1219	<25[&]	11561.0	(63/2⁻)	10341.9	(59/2⁻)		
1230.0 *5*	2.8 *5*	7336.4	(41/2⁻)	6106.4	(37/2⁻)		
1242.2 *5*	1.0 *5*	8613.7	(53/2⁻)	7371.5	(49/2⁻)		
1243	<25[&]	10909.1	(59/2⁺)	9666.1	(55/2⁺)		
1277[@]		2330.8		1053.6	(19/2⁻)		
1291	<25[&]	12200	(63/2⁺)	10909.1	(59/2⁺)		
1299	<25[&]	12860	(67/2⁻)	11561.0	(63/2⁻)		
1302.8 *4*	121 *5*	2356.2	(21/2⁺)	1053.6	(19/2⁻)	E1	DCO=0.51 *2*; pol=0.14 *2*; A_2=−0.38 *8*.
1351	<25[&]	14211	(71/2⁻)	12860	(67/2⁻)		

[†] Weighted average from available data assuming ΔEγ=1 keV when not stated.

[‡] From ^{100}Mo(^{37}Cl,4nγ): Iγ′s are mainly taken from 2003Pa38.

[#] From α(exp), γ(θ) (1988Hi04) and DCO, γ(lin pol) (2003Pa38) values. When transitions are stretched-quadrupole (E2) character (ΔJ=2) or pure no stretched dipole (ΔJ=0) the DCO ≈ 1. For pure dipole character (ΔJ=1) the DCO ≈ 0.5.

[@] Observed only in ^{117}Sn(^{19}F,3nγ) by 1988Hi04.

[&] Obtained from fig. 2 of 2001Pa25 by evaluators, reduced to 2003Pa38.

[a] From 1988Hi04, normalized to 2003Pa38 data.

[b] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[c] Placement of transition in the level scheme is uncertain.

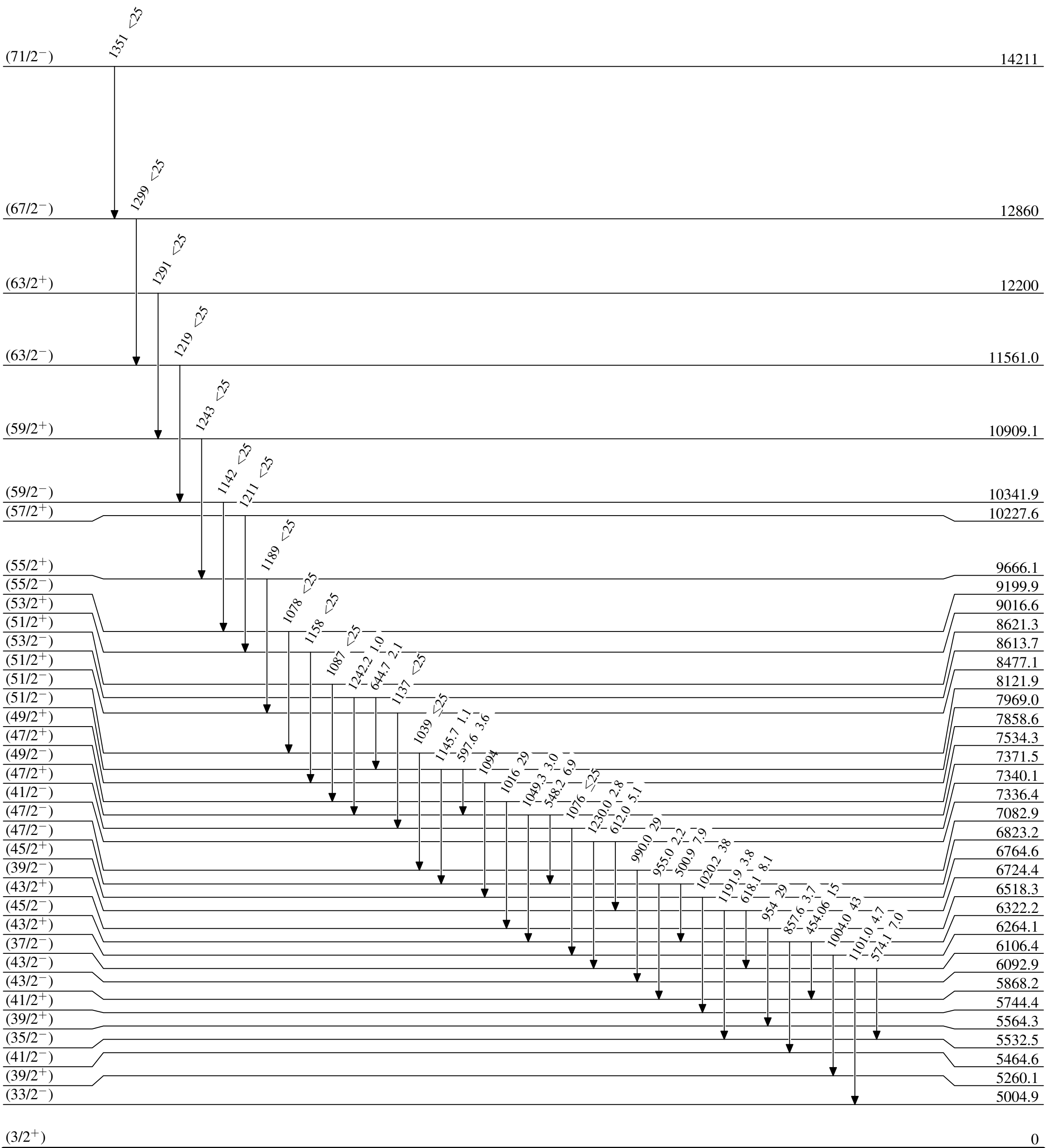
(HI,xnγ) 1999Kl11,2003Pa38

Legend

Level Scheme

Intensities: Relative I_γ

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



$^{133}_{59}Pr_{74}$

(HI,xnγ) 1999Kl11,2003Pa38

Level Scheme (continued)

Intensities: Relative I_γ

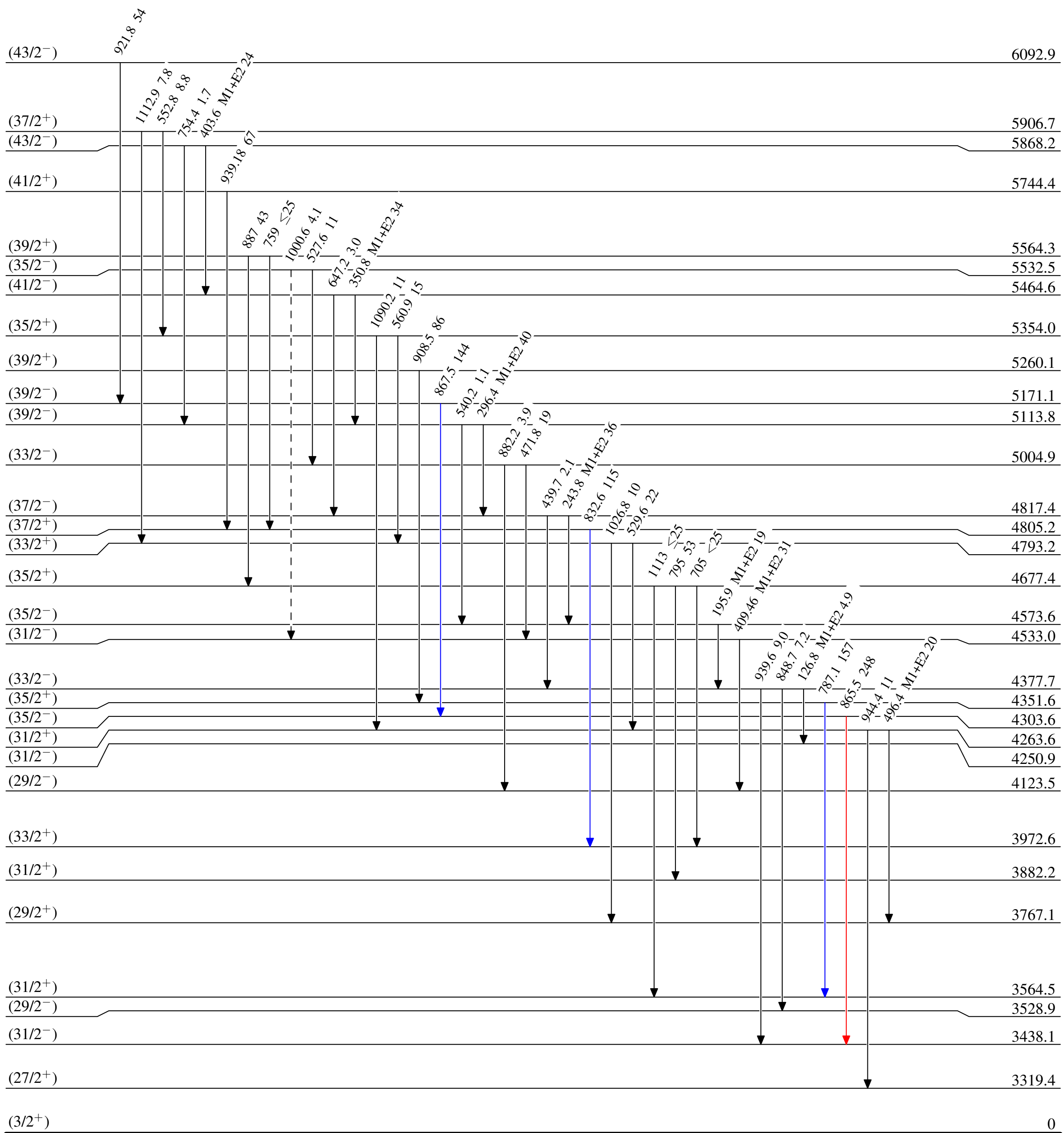
Legend

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

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

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

γ Decay (Uncertain)



$^{133}_{59}Pr_{74}$

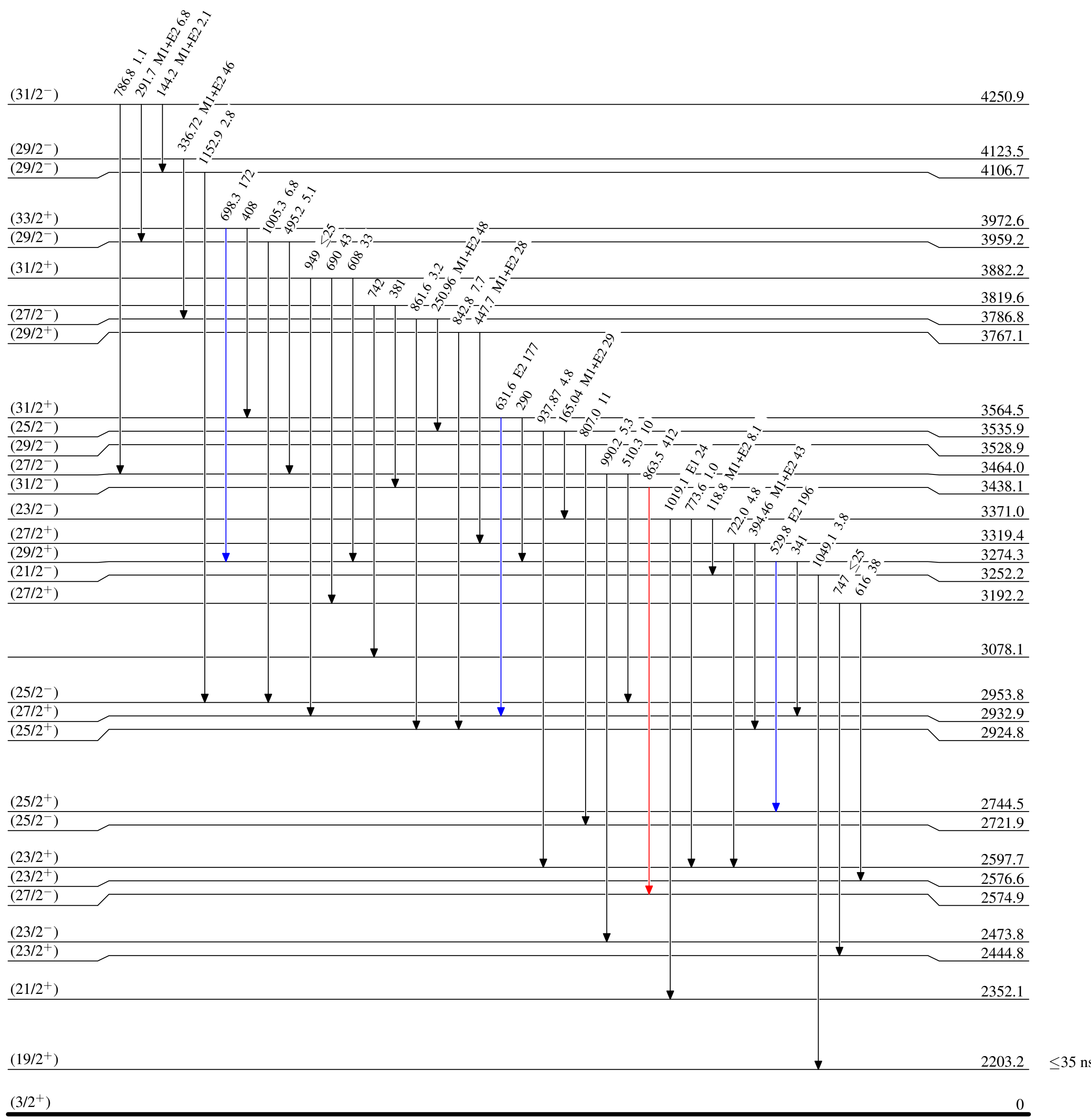
(HI,xnγ) 1999Kl11,2003Pa38

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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

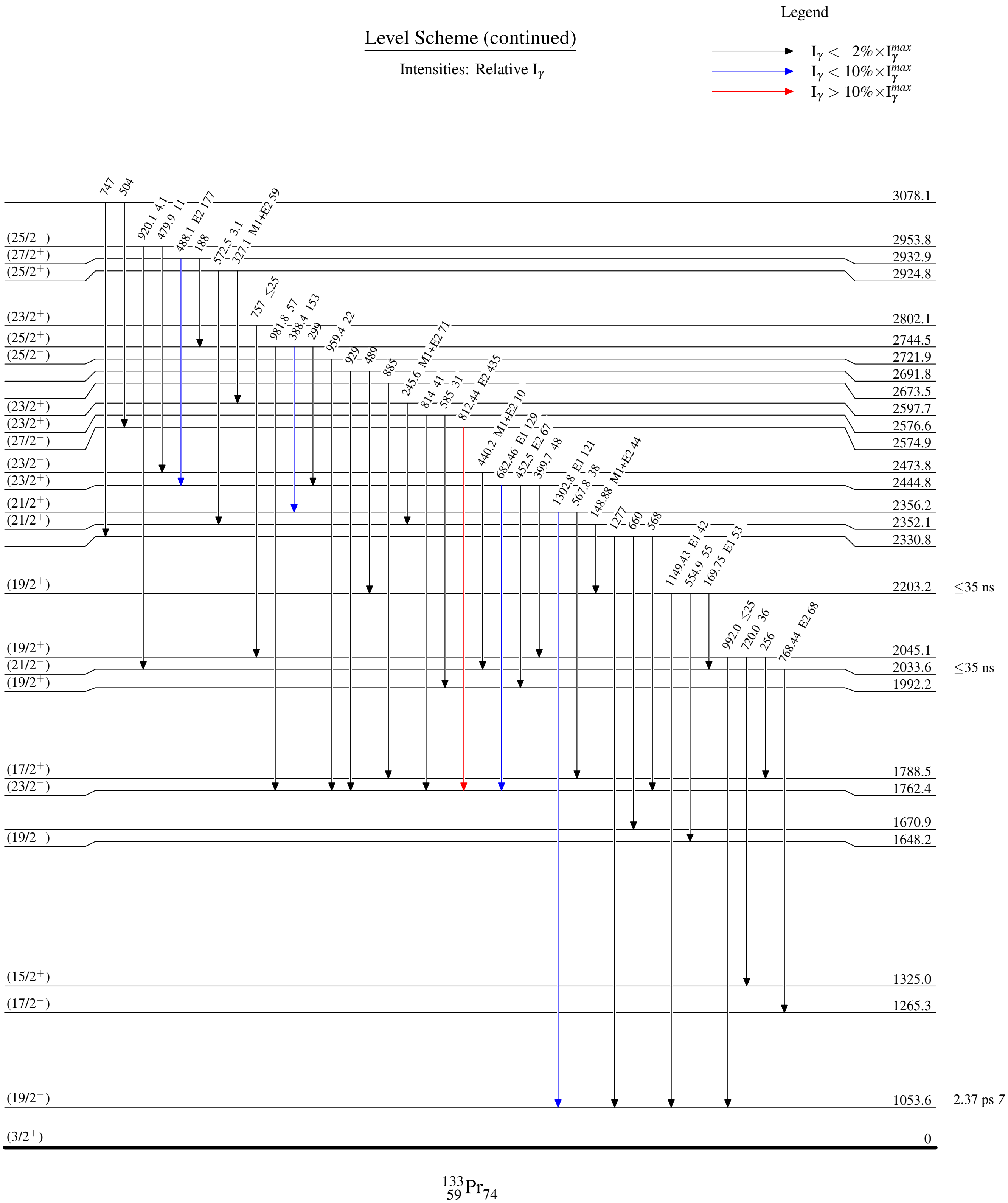


$^{133}_{59}Pr_{74}$

(HI,xnγ) 1999Kl11,2003Pa38

Level Scheme (continued)

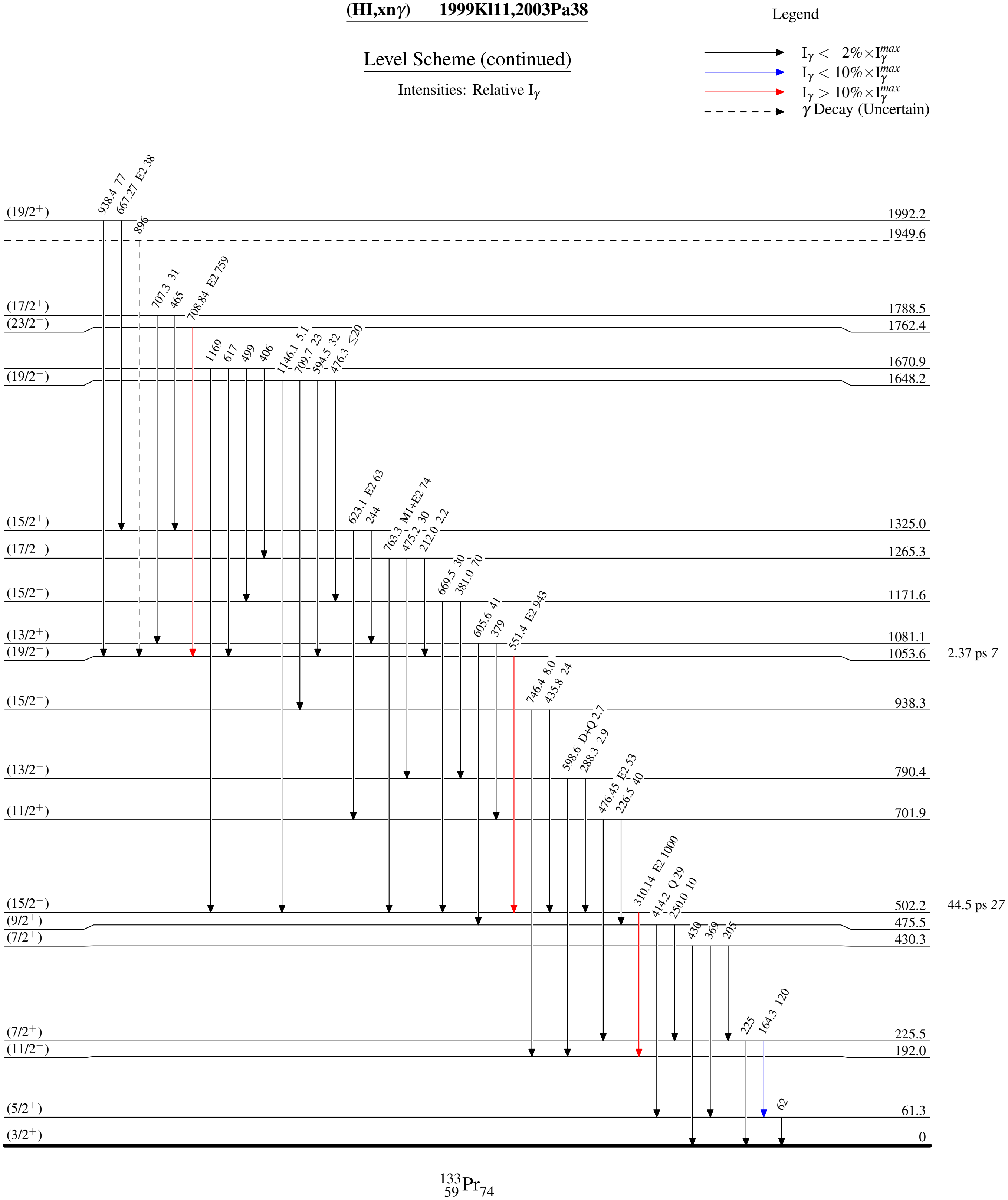
Intensities: Relative I_γ



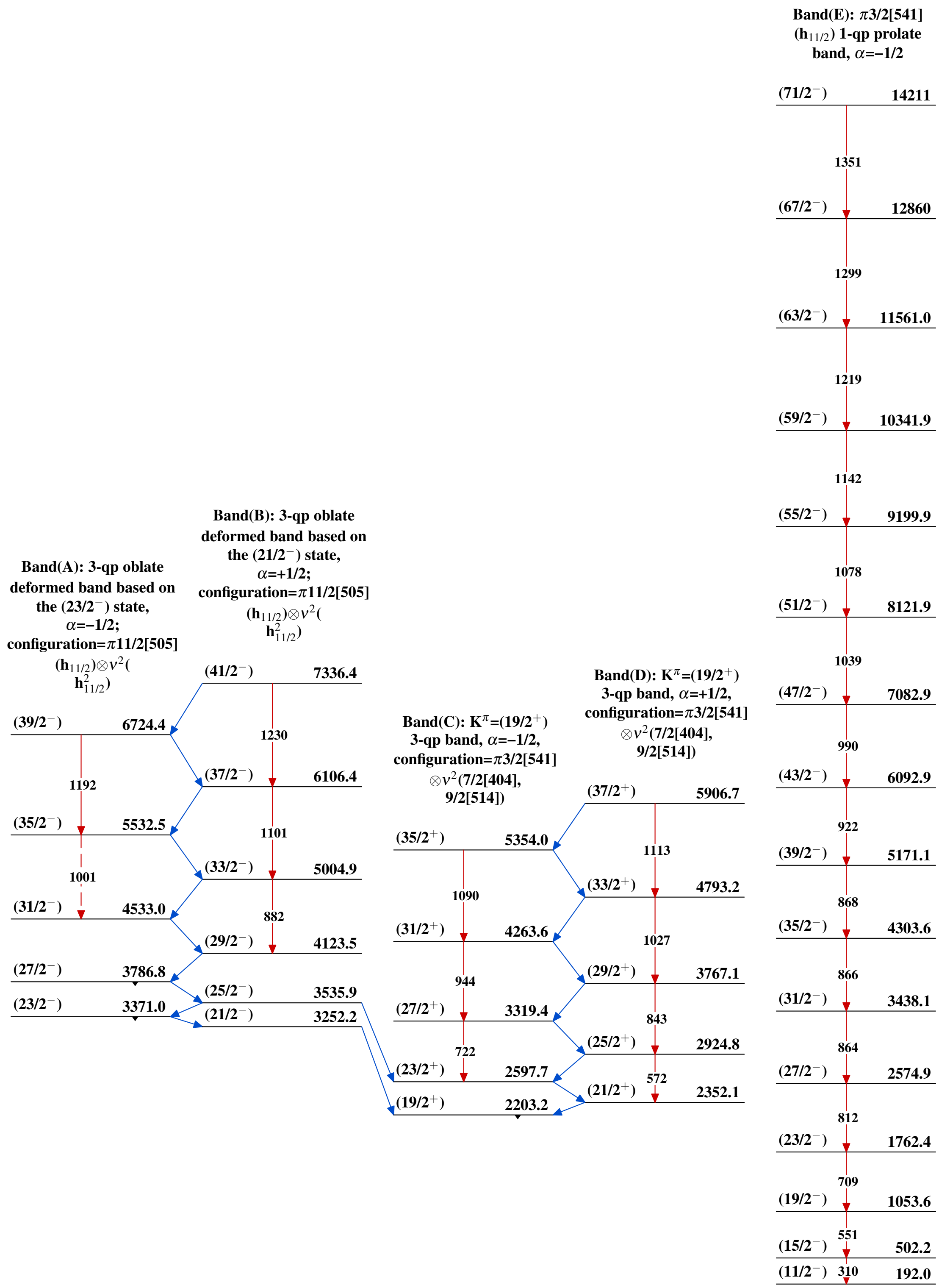
(HI,xnγ) 1999Kl11,2003Pa38

Level Scheme (continued)

Intensities: Relative I_γ

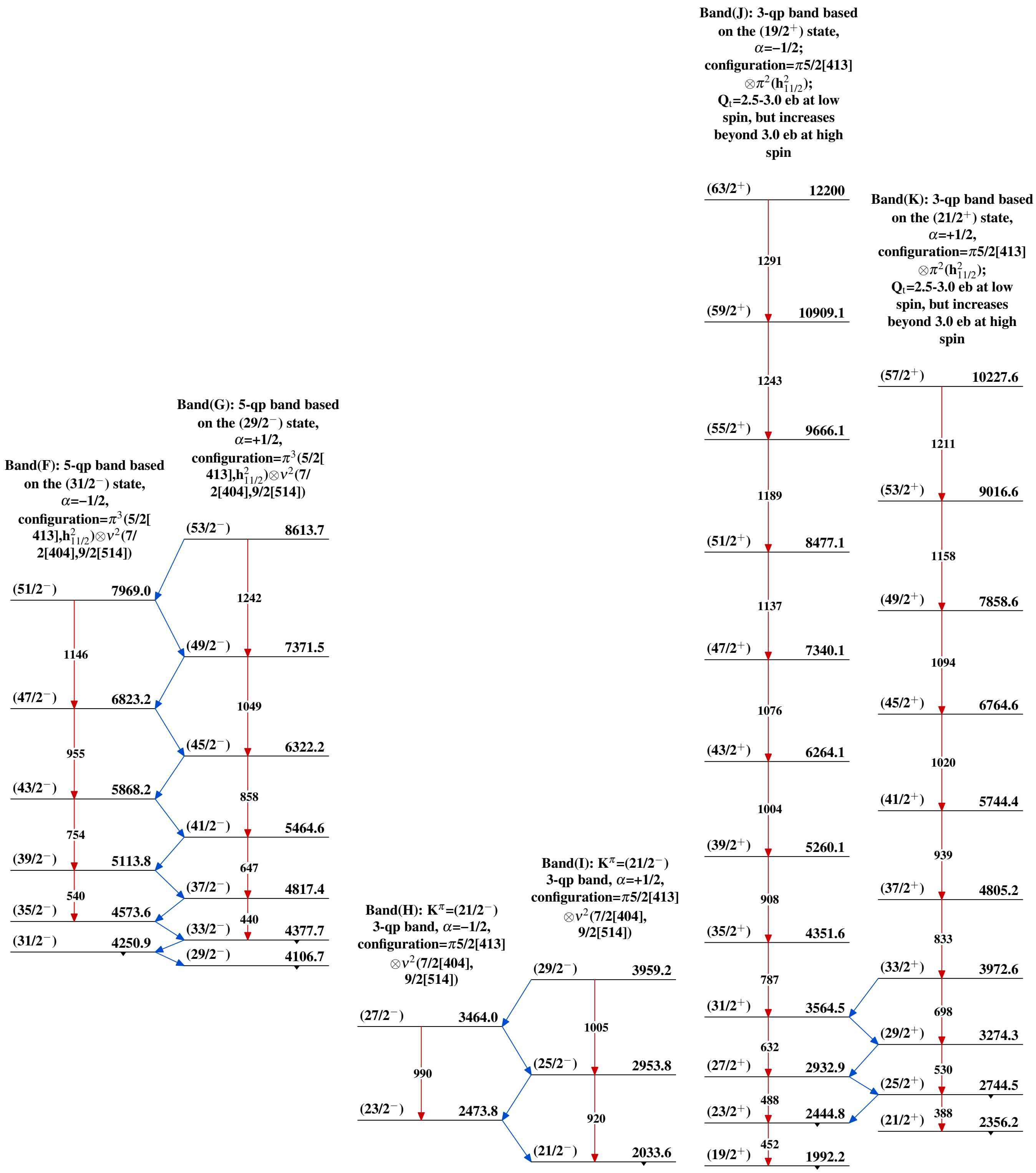


(HI,xnγ) 1999Kl11,2003Pa38



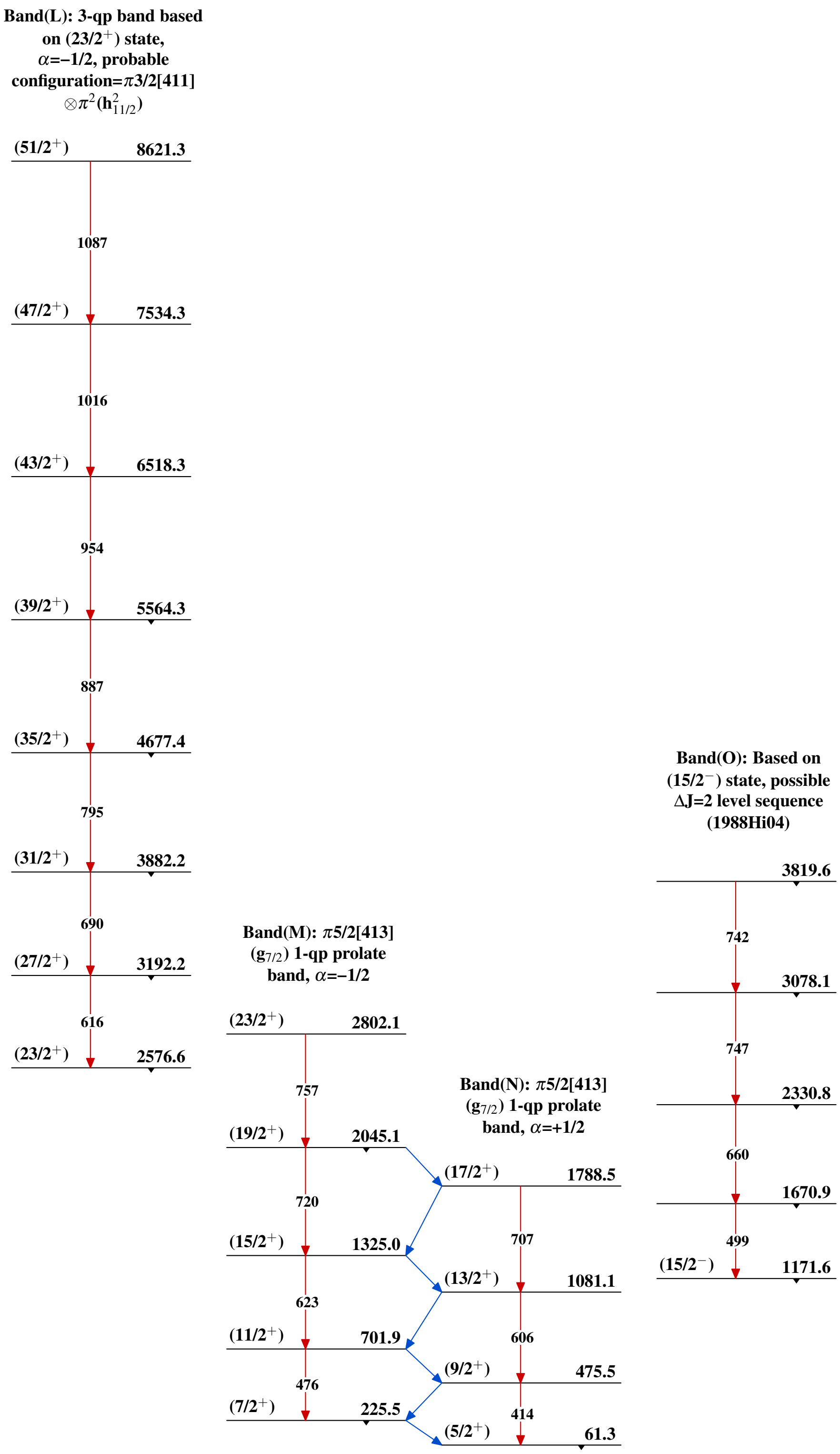
$^{133}_{59}Pr_{74}$

(HI,xnγ) 1999Kl11,2003Pa38 (continued)



$^{133}_{59}Pr_{74}$

(HI,xnγ) 1999Kl11,2003Pa38 (continued)



$^{133}_{59}Pr_{74}$