^{152}Sm(^{35}Cl,4nγ) 1999Mu05

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 134, 149 (2016)	15-Apr-2015

Others: 1986CaZW, 1987CaZR (E=170 MeV).

1999Mu05: E=170 MeV; 98% ^{152}Sm target; HHIRF spin spectrometer array (11 HPGe detectors, 61 NaI(Tl) detectors); θ=24.7°, 63.4°, 92.7°, 116.6°, 155.3°; measured Eγ, Iγ, $\gamma(\theta)$, DCO ratios, $\gamma\gamma$ coin, γ-K x ray coin.

^{183}Au Levels

E(level)[†]	J$^{\pi}$[‡]	Comments
0.0[@]	5/2$^-$	
12.4[@]	9/2$^-$	E(level): from Adopted Levels.
69.1[&] *3*	7/2$^-$	
231.22[@] *18*	13/2$^-$	
273.49[&] *18*	11/2$^-$	
565.27[@] *24*	17/2$^-$	
599.58[&] *22*	15/2$^-$	
701.78[b] *24*	13/2$^+$	
865.37[b] *24*	17/2$^+$	
989.1[@] *3*	21/2$^-$	
1022.9[&] *3*	19/2$^-$	
1054.5[a] *4*	19/2$^-$	
1148.5[b] *4*	21/2$^+$	
1487.5[a] *3*	23/2$^-$	
1491.9[@] *4*	25/2$^-$	
1527.7[b] *4*	25/2$^+$	
1544.7[&] *4*	23/2$^-$	
1981.1[b] *5*	29/2$^+$	
1986.3[a] *4*	27/2$^-$	
2063.4[@] *4*	29/2$^-$	
2096.7[#&] *4*	27/2$^-$	
2490.9[b] *5*	33/2$^+$	
2541.4[a] *4*	31/2$^-$	
2685.7[#&] *6*	31/2$^-$	
2691.0[@] *5*	33/2$^-$	
3048.7[b] *5*	37/2$^+$	
3149.3[a] *5*	35/2$^-$	
3310.7?[#&] *8*	(35/2$^-$)	
3359.9[@] *5*	37/2$^-$	
3656.7[b] *6*	41/2$^+$	
3798.8[a] *5*	(39/2$^-$)	
4053.0[@] *6*	41/2$^-$	
4309.6[b] *6*	45/2$^+$	
4461.0[a] *6*	(43/2$^-$)	
4765.5[@] *6*	45/2$^-$	
4989.2[b] *7*	49/2$^+$	
5129.0?[a] *8*	(47/2$^-$)	
5500.5[@] *8*	(49/2$^-$)	

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^{152}Sm(^{35}Cl,4nγ) 1999Mu05 (continued)

^{183}Au Levels (continued)

E(level)[†]	J$^{\pi}$[‡]
5681.3[b] *7*	53/2$^+$
6276.5?[@] *9*	(53/2$^-$)
6381.5[b] *7*	57/2$^+$
7110.5[b] *9*	(61/2$^+$)
7879.5?[b] *10*	(65/2$^+$)

[†] From least-squares fit to Eγ.
[‡] Authors' values, based on measured DCO ratios and/or $\gamma(\theta)$, assuming J$^{\pi}$=5/2$^-$ and 9/2$^-$, respectively, for the g.s. and 12.4 level.
[#] Level omitted from Adopted Levels because deexciting γ was absent In a subsequent (^{29}Si,5nγ) study (2005So01) In which double-gated spectra clearly showed a different γ In cascade with 327γ and 423γ In same band.
[@] Band(A): (π h$_{9/2}$), α=+1/2 band.
[&] Band(B): possible (π f$_{7/2}$), α=−1/2 band. Prolate orbital; energetically favored signature.
[a] Band(C): possible (π h$_{9/2}$), α=−1/2 band. Prolate orbital; unfavored signature.
[b] Band(D): 1/2[660], α=+1/2 band.

γ(^{183}Au)

E$_{\gamma}$[†]	I$_{\gamma}$[†]	E$_i$(level)	J$_i^{\pi}$	E$_f$	J$_f^{\pi}$	Mult.[‡]	Comments
(12.4)		12.4	9/2$^-$	0.0	5/2$^-$		
163.6 *2*	33 *3*	865.37	17/2$^+$	701.78	13/2$^+$	Q	Mult.: DCO=1.12 *14*; A$_2$=+0.21 *27*, A$_4$=+0.1 *4*.
204.4 *2*	80.6 *20*	273.49	11/2$^-$	69.1	7/2$^-$	Q	Mult.: DCO=1.0 *3*; A$_2$=+0.35 *7*, A$_4$=−0.27 *14*.
218.8 *2*	103.0 *25*	231.22	13/2$^-$	12.4	9/2$^-$	Q	Mult.: DCO=1.00 *7*; A$_2$=+0.39 *7*, A$_4$=−0.150 *9*.
261.1 *2*	35.1 *11*	273.49	11/2$^-$	12.4	9/2$^-$	D	Mult.: DCO=0.74 *22*; A$_2$=−0.08 *7*, A$_4$=−0.05 *11*.
265.8 *2*	48 *5*	865.37	17/2$^+$	599.58	15/2$^-$	D	Mult.: DCO=0.58 *9*; A$_2$=−0.32 *17*, A$_4$=+0.23 *26*.
283.1 *2*	100	1148.5	21/2$^+$	865.37	17/2$^+$	(Q)	Mult.: DCO=1.02 *11*; A$_2$=+0.32 *17*, A$_4$=−0.38 *9*.
300.0 *5*	11 *3*	865.37	17/2$^+$	565.27	17/2$^-$		
326.1 *2*	58.6 *10*	599.58	15/2$^-$	273.49	11/2$^-$	Q	Mult.: DCO=1.02 *14*; A$_2$=+0.38 *6*, A$_4$=+0.12 *9*.
334.1 *2*	59.6 *7*	565.27	17/2$^-$	231.22	13/2$^-$	Q	Mult.: DCO=1.07 *13*.
368.0 *5*	10.9 *7*	599.58	15/2$^-$	231.22	13/2$^-$	D	Mult.: DCO=0.51 *8*.
379.2 *2*	85.0 *23*	1527.7	25/2$^+$	1148.5	21/2$^+$	Q	Mult.: DCO=0.99 *15*.
423.2 *2*	26 *6*	1022.9	19/2$^-$	599.58	15/2$^-$	Q	Mult.: DCO=0.92 *25*; A$_2$=+0.51 *6*, A$_4$=−0.10 *8*.
423.9 *2*	51.6 *10*	989.1	21/2$^-$	565.27	17/2$^-$	Q	Mult.: A$_2$=+0.51 *6*, A$_4$=−0.10 *8*.
428.3 *2*	36 *4*	701.78	13/2$^+$	273.49	11/2$^-$	D+Q	Mult.: DCO=0.8 *4*; A$_2$=−0.74 *7*, A$_4$=+0.19 *10*.
433.0 *2*	7.3 *7*	1487.5	23/2$^-$	1054.5	19/2$^-$	(Q)	Mult.: A$_2$=+0.64 *24*, A$_4$=+0.2 *4*.
441.0 *5*	17 *5*	1986.3	27/2$^-$	1544.7	23/2$^-$		Mult.: DCO=1.4 *4*.
453.4 *2*	75 *5*	1981.1	29/2$^+$	1527.7	25/2$^+$	Q	Mult.: DCO=1.05 *15*; A$_2$=+0.49 *6*, A$_4$=+0.03 *9*.
455.0 *5*	7 *3*	1054.5	19/2$^-$	599.58	15/2$^-$		Mult.: DCO=1.3 *6*.
464.0 *5*	13.3 *20*	1487.5	23/2$^-$	1022.9	19/2$^-$	(Q)	Mult.: DCO=1.0 *3*; A$_2$=+0.46 *12*, A$_4$=−0.02 *19*.
498.5 *2*	14 *3*	1487.5	23/2$^-$	989.1	21/2$^-$		Mult.: A$_2$=+0.17 *4*, A$_4$=+0.28 *8*.
498.9 *2*	25.9 *10*	1986.3	27/2$^-$	1487.5	23/2$^-$		Mult.: DCO=0.89 *18*; A$_2$=+0.17 *4*, A$_4$=+0.3 *8*.
502.8 *2*	38 *4*	1491.9	25/2$^-$	989.1	21/2$^-$	(Q)	Mult.: A$_2$=+0.42 *11*, A$_4$=+0.015 *19*.
509.8 *2*	73 *6*	2490.9	33/2$^+$	1981.1	29/2$^+$	Q	Mult.: DCO=0.99 *20*; A$_2$=+0.69 *9*, A$_4$=+0.05 *13*.
522.0 *5*	15 *4*	1544.7	23/2$^-$	1022.9	19/2$^-$		
552.0 *5*	5 *2*	2096.7	27/2$^-$	1544.7	23/2$^-$		Mult.: DCO=2.20 *11*.
555.0 *5*	1.8 *3*	1544.7	23/2$^-$	989.1	21/2$^-$		
555.1 *2*	14.3 *18*	2541.4	31/2$^-$	1986.3	27/2$^-$	Q	Mult.: A$_2$=+0.32 *11*, A$_4$=−0.13 *15*.
557.8 *2*	59 *6*	3048.7	37/2$^+$	2490.9	33/2$^+$	(Q)	Mult.: DCO=1.2 *4*; A$_2$=+0.56 *9*, A$_4$=+0.08 *12*.
571.5 *2*	19 *4*	2063.4	29/2$^-$	1491.9	25/2$^-$	(Q)	Mult.: DCO=1.0 *4*; A$_2$=+0.53 *10*, A$_4$=+0.08 *15*.
589.0 *5*	6 *3*	2685.7	31/2$^-$	2096.7	27/2$^-$		

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^{152}Sm(^{35}Cl,4nγ) 1999Mu05 (continued)

γ(^{183}Au) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
607.9 *2*	6.2 *5*	3149.3	$35/2^-$	2541.4	$31/2^-$	Q	Mult.: DCO=0.90 *17*; A_2=+0.76 *10*, A_4=−0.22 *17*.
608.0 *2*	27 *4*	3656.7	$41/2^+$	3048.7	$37/2^+$		Mult.: DCO=0.90 *17*; A_2=+0.39 *8*, A_4=+0.25 *13*.
609.2 *2*	5 *2*	2096.7	$27/2^-$	1487.5	$23/2^-$		
625.0[#] *5*	1 *1*	3310.7?	$(35/2^-)$	2685.7	$31/2^-$		
627.6 *2*	16 *4*	2691.0	$33/2^-$	2063.4	$29/2^-$	Q	Mult.: DCO=0.91 *14*; A_2=+0.58 *14*, A_4=−0.08 *21*.
649.5 *2*	5.5 *20*	3798.8	$(39/2^-)$	3149.3	$35/2^-$		Mult.: DCO=0.9 *3*; A_2=+0.58 *14*, A_4=+0.28 *23*.
652.9 *2*	14.3 *18*	4309.6	$45/2^+$	3656.7	$41/2^+$		Mult.: DCO=0.7 *3*; A_2=+1.0 *3*, A_4=+0.29 *25*.
662.2 *2*	3.4 *20*	4461.0	$(43/2^-)$	3798.8	$(39/2^-)$		
668.0[#] *5*	1 *1*	5129.0?	$(47/2^-)$	4461.0	$(43/2^-)$		
668.9 *2*	13 *4*	3359.9	$37/2^-$	2691.0	$33/2^-$	Q	Mult.: DCO=1.2 *3*; A_2=+1.02 *23*, A_4=+0.05 *28*.
679.6 *2*	12 *1*	4989.2	$49/2^+$	4309.6	$45/2^+$	(Q)	Mult.: A_2=+0.56 *23*, A_4=+0.16 *31*.
692.1 *2*	6.5 *10*	5681.3	$53/2^+$	4989.2	$49/2^+$	(Q)	Mult.: A_2=+0.72 *20*, A_4=−0.37 *36*.
693.1 *2*	8 *4*	4053.0	$41/2^-$	3359.9	$37/2^-$		Mult.: DCO=1.2 *6*; A_2=+0.72 *20*, A_4=−0.4 *4*.
700.2 *2*	3 *2*	6381.5	$57/2^+$	5681.3	$53/2^+$		
712.5 *2*	5 *2*	4765.5	$45/2^-$	4053.0	$41/2^-$		
729.0 *5*	1 *1*	7110.5	$(61/2^+)$	6381.5	$57/2^+$		
735.0 *5*	2 *1*	5500.5	$(49/2^-)$	4765.5	$45/2^-$		
769.0[#] *5*	1 *1*	7879.5?	$(65/2^+)$	7110.5	$(61/2^+)$		
776.0[#] *5*	1 *1*	6276.5?	$(53/2^-)$	5500.5	$(49/2^-)$		

[†] From 1999Mu05.

[‡] From measured DCO ratio (24°, 63°) and/or $\gamma(\theta)$; expected DCO ratios are 1.0 for stretched Q (or D, ΔJ=0) transitions and 0.6 for stretched D transitions. Note that A_4 coefficients for Q gammas deexciting the higher spin states are more positive than expected; 1999Mu05 attribute this to measurable correlations between individual γ detectors.

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

^{152}Sm(^{35}Cl,4nγ) 1999Mu05

Level Scheme

Intensities: Relative I_γ

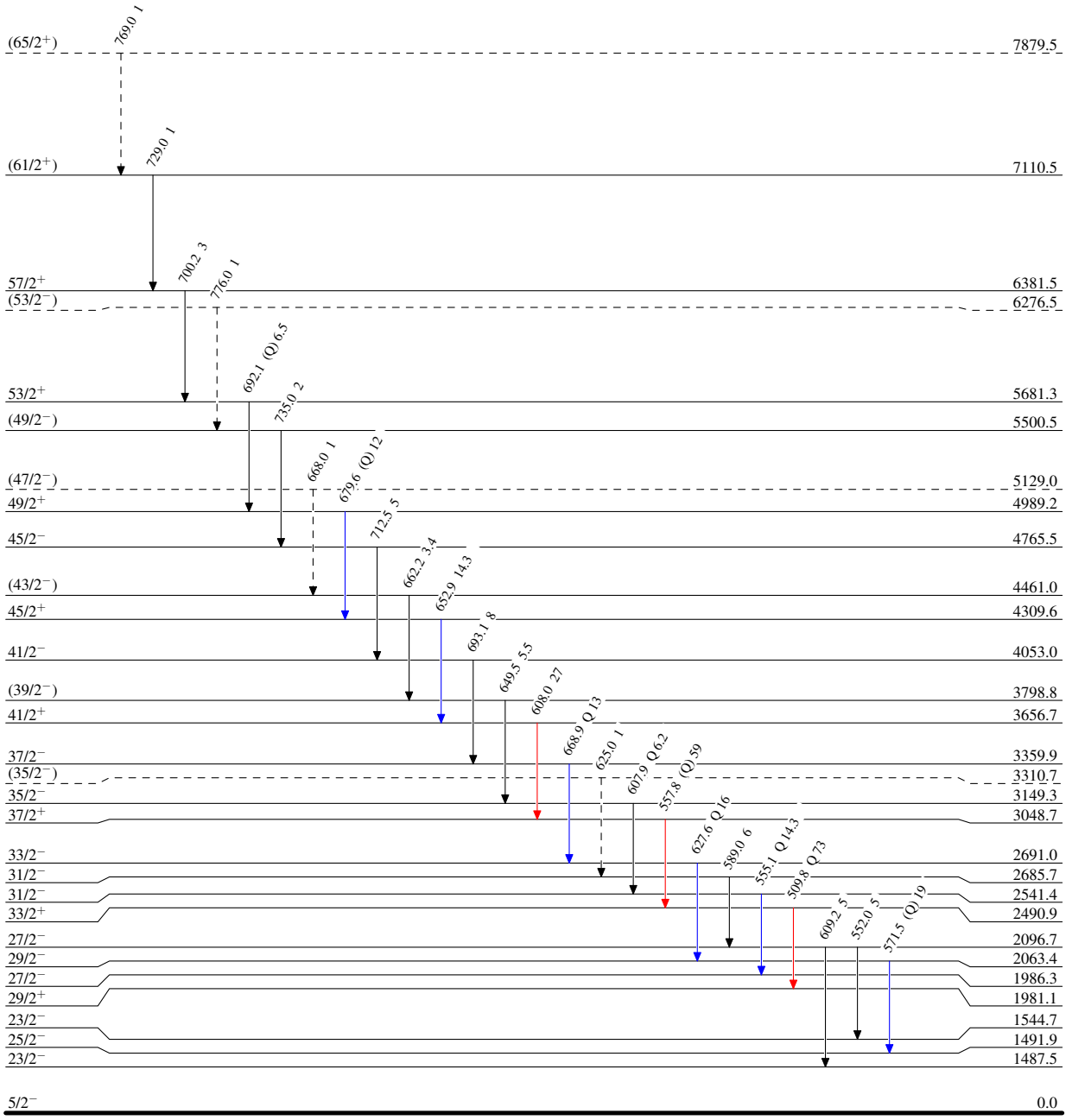
Legend

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

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

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

γ Decay (Uncertain)



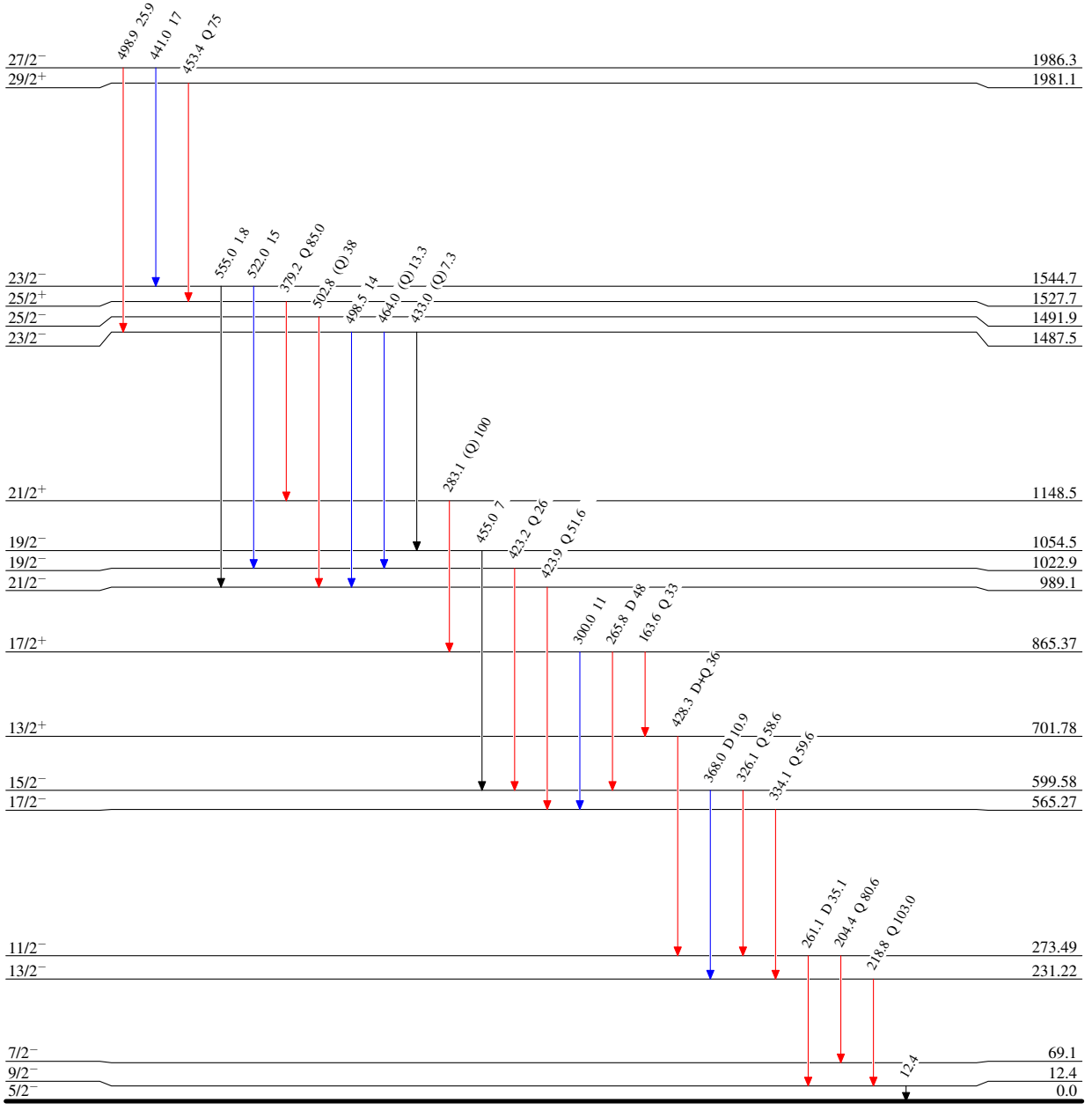
$^{183}_{79}Au_{104}$

^{152}Sm(^{35}Cl,4nγ) 1999Mu05

Level Scheme (continued)

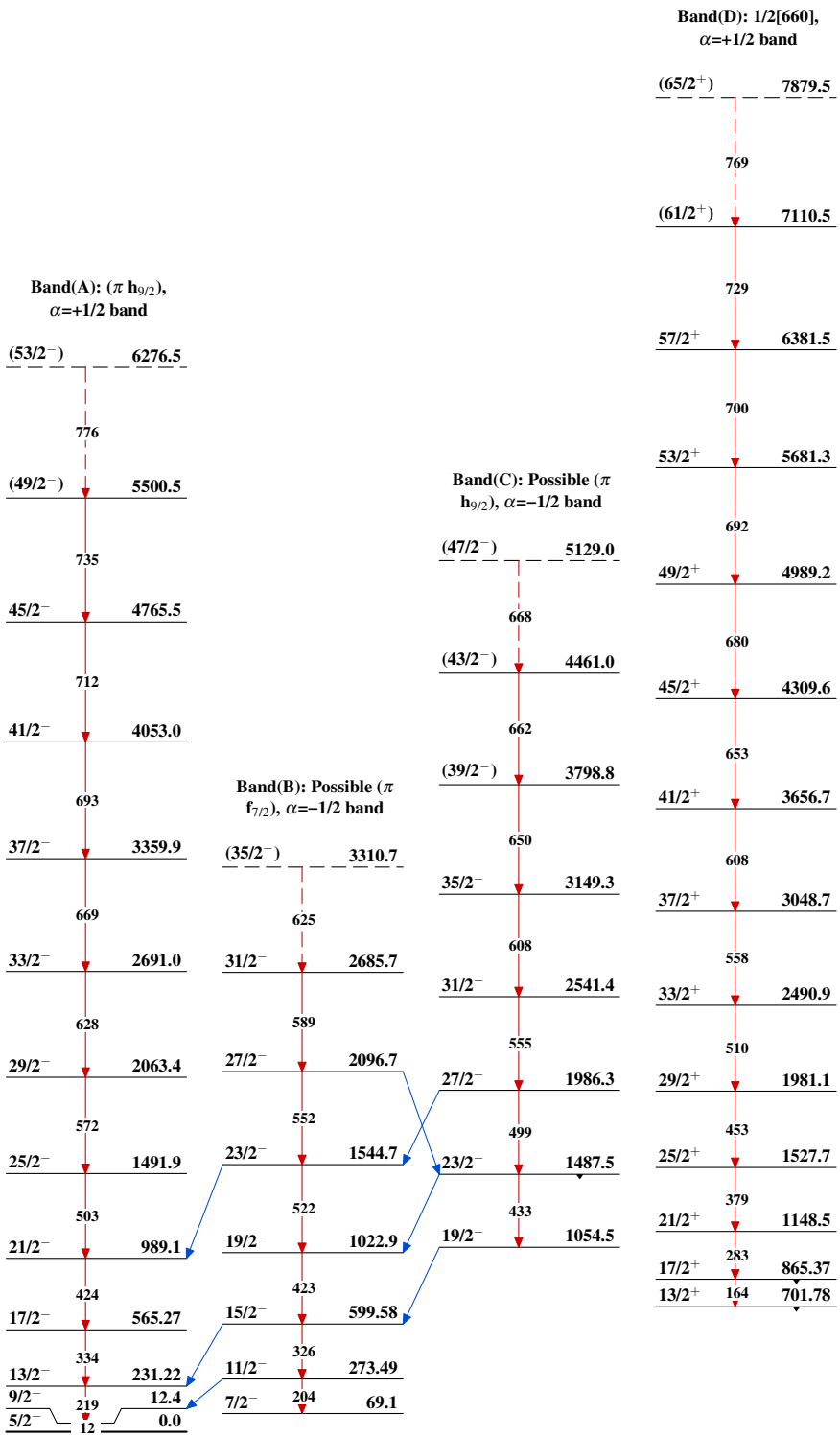
Intensities: Relative I_γ

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)



$^{183}_{79}Au_{104}$

$^{152}Sm(^{35}Cl,4n\gamma)$ 1999Mu05



$^{183}_{79}Au_{104}$