$^{118}Sn(^{55}Mn,4n\gamma)$ **2013Ha02**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	ENSDF	15-Mar-2015

E=260 MeV; stack of two 0.6 mg/cm^2 ^{118}Sn targets; GAMMASPHERE detector array (101 Compton-suppressed Ge detectors); measured Eγ, Iγ, $\gamma\gamma$ coin, angular distribution ratios R.

Notation for quasiparticle orbits:

ν $i_{13/2}$: A, B, C, D.

ν $h_{9/2}$: E, F.

π $h_{11/2}$: E_p, F_p.

^{169}Re Levels

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
0.0[#]	$9/2^-$	2462.1[g] *4*	$(27/2^+)$	4533.3[i] *4*	$(41/2^+)$	6945.0[j] *5*	$(55/2^+)$
118.9[d] *4*	$(5/2^+)$	2486.81[@] *25*	$27/2^-$	4727.2[#] *4*	$45/2^-$	6998.9[f] *5*	$(57/2^+)$
136.39[@] *14*	$11/2^-$	2498.0[c] *3*	$25/2^+$	4728.2[g] *5*	$(43/2^+)$	7064.0[h] *5*	$55/2^+$
215.9 *4*	3/2	2509.4 *3*	$(25/2^+)$	4745.9[k] *5*	$41/2^-$	7248.1[&] *6*	$57/2^-$
271.5[e] *4*	$(7/2^+)$	2602.8[#] *3*	$29/2^-$	4798.5[j] *4*	$(43/2^+)$	7312.9[#] *5*	$57/2^-$
278.78 *25*	7/2	2657.7[f] *4*	$(29/2^+)$	4836.9[h] *4*	$43/2^+$	7398.3[i] *5*	$(57/2^+)$
382.70[#] *15*	$13/2^-$	2743.7[@] *3*	$31/2^-$	4867.1[c] *5*	$41/2^+$	7416.4[g] *5*	$(59/2^+)$
447.8[d] *3*	$(9/2^+)$	2896.4[g] *4*	$(31/2^+)$	5015.7[f] *5*	$(45/2^+)$	7494.3[c] *8*	$57/2^+$
535.98[&] *25*	$5/2^-$	2903.5[&] *3*	$29/2^-$	5048.6[&] *5*	$45/2^-$	7635.2[k] *6*	$57/2^-$
622.46[@] *18*	$15/2^-$	2921.0 *4*		5079.7[i] *4*	$(45/2^+)$	7755.9[@] *5*	$59/2^-$
633.78[&] *14*	$9/2^-$	2923.8[#] *3*	$33/2^-$	5125.3[@] *4*	$47/2^-$	7785.4[h] *6*	$59/2^+$
637.7[e] *3*	$(11/2^+)$	3025.4[c] *4*	$29/2^+$	5298.6[g] *5*	$(47/2^+)$	7838.0?[j] *7*	$(59/2^+)$
886.83[&] *15*	$13/2^-$	3083.8[h] *3*	$27/2^+$	5377.5[k] *5*	$45/2^-$	7843.7[f] *5*	$(61/2^+)$
898.0[d] *3*	$(13/2^+)$	3141.2[@] *4*	$35/2^-$	5389.1[j] *4*	$(47/2^+)$	8024.0[l] *8*	
940.03[#] *19*	$17/2^-$	3169.7[f] *4*	$(33/2^+)$	5426.3[c] *6*	$45/2^+$	8062.1[&] *7*	$61/2^-$
1121.7[e] *3*	$(15/2^+)$	3344.3[h] *3*	$31/2^+$	5537.6[#] *4*	$49/2^-$	8185.7[#] *5*	$61/2^-$
1218.50[@] *20*	$19/2^-$	3396.3[#] *3*	$37/2^-$	5545.8[h] *5*	$47/2^+$	8298.5[c] *10*	$61/2^+$
1275.62[&] *20*	$17/2^-$	3458.4[&] *4*	$33/2^-$	5595.0[f] *5*	$(49/2^+)$	8311.6[g] *6*	$(63/2^+)$
1342.92[b] *20*	$(15/2^+)$	3464.6[g] *4*	$(35/2^+)$	5726.8[&] *6*	$49/2^-$	8316.3?[i] *7*	$(61/2^+)$
1431.92[d] *23*	$(17/2^+)$	3608.1[c] *4*	$33/2^+$	5732.4[i] *5*	$(49/2^+)$	8554.2[h] *6*	$63/2^+$
1510.03 *22*		3686.7[@] *4*	$39/2^-$	5912.0[g] *5*	$(51/2^+)$	8626.3[@] *11*	$63/2^-$
1583.96[#] *22*	$21/2^-$	3720.1[h] *3*	$35/2^+$	5973.2[@] *4*	$51/2^-$	8778.6[f] *6*	$(65/2^+)$
1623.39[a] *19*	$(17/2^+)$	3792.2[f] *4*	$(37/2^+)$	6056.5[c] *6*	$49/2^+$	8861.5[l] *8*	
1663.45[c] *22*	$17/2^+$	3942.6[&] *4*	$37/2^-$	6061.3[k] *5*	$49/2^-$	8918.6[&] *7*	$65/2^-$
1764.8[&] *3*	$21/2^-$	3946.9[i] *4*	$(37/2^+)$	6105.3[j] *5*	$(51/2^+)$	9137.6?[c] *11*	$(65/2^+)$
1799.30[b] *21*	$(19/2^+)$	4005.8[#] *4*	$41/2^-$	6249.0[f] *5*	$(53/2^+)$	9295.7[g] *8*	$(67/2^+)$
1882.30[@] *23*	$23/2^-$	4106.5[g] *4*	$(39/2^+)$	6315.4[h] *5*	$51/2^+$	9395.9[h] *7*	$67/2^+$
1991.57[a] *22*	$(21/2^+)$	4164.3[k] *4*	$37/2^-$	6414.0[#] *4*	$53/2^-$	9741.5[l] *9*	
2038.4[c] *3*	$21/2^+$	4219.8[h] *4*	$39/2^+$	6466.5[&] *6*	$53/2^-$	9812.6[&] *7*	$69/2^-$
2122.9[f] *3*	$(21/2^+)$	4238.0[c] *5*	$37/2^+$	6516.5[i] *5*	$(53/2^+)$	10307.0[h] *8*	$71/2^+$
2183.50[g] *25*	$(23/2^+)$	4297.5 *7*	$(39/2^+)$	6615.5[g] *5*	$(55/2^+)$	10755.8[&] *9*	$73/2^-$
2257.74[#] *24*	$25/2^-$	4356.1[@] *4*	$43/2^-$	6743.0[c] *6*	$53/2^+$	11286.0[h] *10*	$75/2^+$
2306.5[f] *4*	$(25/2^+)$	4434.0[f] *5*	$(41/2^+)$	6812.3[k] *6*	$53/2^-$	11764.8[&] *10*	$77/2^-$
2321.0[&] *3*	$25/2^-$	4452.1[&] *5*	$41/2^-$	6869.5[@] *5*	$55/2^-$		

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^{118}Sn(^{55}Mn,4nγ) 2013Ha02 (continued)

^{169}Re Levels (continued)

† From least squares fit to Eγ, ignoring lines with uncertain placement unless all transitions deexciting a given level are of that character.
‡ Authors′ proposed values; consistent with deduced band structure and measured transition multipolarities.
# Band(A): π 9/2[514] band, α=+1/2. Initial alignment≈1.5ħ; lower than cranked shell model prediction of 2.6ħ, possibly indicating mixing with K=11/2 orbital. first band crossing At ħω=0.23 MeV matches prediction for AB alignment. Observed B(M1)/B(E2) ratios and alignments consistent with calculated values for π 9/2[514] band. second crossing near 0.44 MeV associated with CD alignment. Yrast At lower spins.
@ Band(a): π 9/2[514] band, α=−1/2. See comment on signature partner band.
& Band(B): π 1/2[541] band. Decoupled sequence with initial alignment of 3ħ; delayed AB crossing At ħω=0.27 MeV; second crossing At ħω=0.43 MeV occurs At lower frequency than expected for CD alignment and alignment gain May instead result from mixing with another band.
[a] Band(C): α=+1/2 band fragment (3). Strongly feeds g.s. band via D transitions, possibly suggesting opposite parity; insufficient information for authors to suggest a configuration assignment.
[b] Band(c): α=−1/2, 3 quasiparticle band. See comment on signature partner band.
[c] Band(D): π 1/2[660] band. Decoupled band; initial alignment of 6 ħ is somwhat low for a 3-quasiparticle structure but consistent with π 1/2[660]; band crossing observed near ħω=0.30 MeV (possibly delayed AB alignment).
[d] Band(E): π 5/2[402] band, α=+1/2. Strongly-coupled structure with almost zero initial alignment, suggests π 5/2[402] or π7/2[402] and observed B(M1)/B(E2) ratios clearly favor the former.
[e] Band(e): π 5/2[402] band, α=−1/2. See comment on signature partner band.
[f] Band(F): π $h_{11/2}$⊗ν AE band, α=+1/2. Strongly-coupled structure. Energy and initial alignment≈10ħ suggests a 3-quasiparticle structure. Band crossing At ħω=0.30 MeV is near predicted BC crossing (AB is blocked) and is consistent with its observation In the π$h_{11/2}$ν$i_{13/2}$ band In ^{170}Re At 0.29 MeV. Observed B(M1)/B(E2) ratios consistent with those predicted for assigned configuration, where E is closest π=− orbital to the Fermi surface, and with absence of CD alignment At high frequency.
[g] Band(f): π $h_{11/2}$⊗ν AE band, α=−1/2. See comment on signature partner band.
[h] Band(G): π $h_{9/2}$⊗ν AE band, α=−1/2. Decoupled sequence. lowest level feeds J=25/2 and 27/2 states. Initial alignment 2-3 ħ larger than that of π$h_{11/2}$ νAE band; crossing At 0.37 MeV, between expectations for BC and CD alignments. larger deformation driven by π $h_{9/2}$ May delay BC crossing.
[i] Band(H): π $h_{11/2}$⊗ν AFBC band, α=+1/2. Strongly-coupled band feeding g.s. band. observed B(M1)/B(E2) ratios agree with those predicted for the suggested configuration.
[j] Band(h): π $h_{11/2}$⊗ν AF band, α=−1/2. See comment on signature partner band.
[k] Band(I): α=+1/2 band fragment (1). Decoupled sequence feeding 1/2[541] band via stretched Q transitions, suggesting π=−. excitation energy suggests 3− or 5-quasiparticle configuration. initial alignment≈13ħ. decoupled character suggests involvement of π 1/2[411], π 1/2[541] or π 1/2[660]; J rules out assignment As 1/2[541] signature partner, and 1/2[660] has already been assigned elsewhere, so authors tentatively assign the π 1/2[411]⊗νAEBC configuration.
[l] Band(J): band fragment (2). Feeds into 1/2[541] band.

γ(^{169}Re)

E_γ	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult. ‡	Comments
(61)		2183.50	(23/2$^+$)	2122.9	(21/2$^+$)		expected but unobserved, possibly due to large conversion associated with the expected M1 multipolarity.
97.8 *2*	3.0 *4*	633.78	9/2$^-$	535.98	5/2$^-$		Mult.: R=0.7 *1*; consistent with stretched D, but level scheme requires ΔJ=2.
113.4 *2*	0.5 *1*	1623.39	(17/2$^+$)	1510.03			
116.0 *2*	20 *1*	2602.8	29/2$^-$	2486.81	27/2$^-$	D	Mult.: R=0.60 *4*.
123.0 *2*	12 *1*	2306.5	(25/2$^+$)	2183.50	(23/2$^+$)	D	Mult.: R=0.61 *8*.
136.4 *2*	≈79	136.39	11/2$^-$	0.0	9/2$^-$	D(+Q)	I_γ: authors′ estimate based on intensity balance. Mult.: R=0.67 *3*.
140.9 *2*	27 *2*	2743.7	31/2$^-$	2602.8	29/2$^-$	D	Mult.: R=0.59 *3*.
152.5 *2*	6.8 *5*	271.5	(7/2$^+$)	118.9	(5/2$^+$)		

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$^{118}Sn(^{55}Mn,4n\gamma)$ 2013Ha02 (continued)

$\gamma(^{169}Re)$ (continued)

E_γ	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	Comments
155.6 *2*	16 *1*	2462.1	(27/2$^+$)	2306.5	(25/2$^+$)	D	Mult.: R=0.63 *5*.
175.9 *2*	25 *3*	1799.30	(19/2$^+$)	1623.39	(17/2$^+$)		Mult.: R=0.65 *9* for doublet.
176.3 *2*	9.1 *9*	447.8	(9/2$^+$)	271.5	(7/2$^+$)		
180.2 *2*	35 *2*	2923.8	33/2$^-$	2743.7	31/2$^-$	D	Mult.: R=0.65 *2*.
189.9 *2*	8.5 *9*	637.7	(11/2$^+$)	447.8	(9/2$^+$)		
191.4 *2*	6 *1*	1623.39	(17/2$^+$)	1431.92	(17/2$^+$)		Mult.: R=0.78 *9* for doublet.
191.9 *2*	15 *2*	2183.50	(23/2$^+$)	1991.57	(21/2$^+$)		Mult.: R=0.78 *9* for doublet.
192.3 *2*	14 *3*	1991.57	(21/2$^+$)	1799.30	(19/2$^+$)		Mult.: R=0.78 *9* for doublet.
195.5 *2*	19 *2*	2657.7	(29/2$^+$)	2462.1	(27/2$^+$)	D+Q	Mult.: R=0.71 *5*.
215.3 *2*	1.0 *2*	1799.30	(19/2$^+$)	1583.96	21/2$^-$		
217.4 *2*	39 *2*	3141.2	35/2$^-$	2923.8	33/2$^-$	D	Mult.: R=0.66 *2*.
223.7 *2*	8.0 *6*	1121.7	(15/2$^+$)	898.0	(13/2$^+$)		
229.1 *2*	33 *2*	2486.81	27/2$^-$	2257.74	25/2$^-$	D	Mult.: R=0.67 *3*.
238.7 *2*	21 *3*	2896.4	(31/2$^+$)	2657.7	(29/2$^+$)		Mult.: R=0.68 *8* for doublet.
239.8 *2*	100	622.46	15/2$^-$	382.70	13/2$^-$	D+Q	Mult.: R=0.81 *3*.
246.3 *2*	≈131	382.70	13/2$^-$	136.39	11/2$^-$	D+Q	Mult.: R=0.78 *2*.
253.1 *2*	17 *1*	886.83	13/2$^-$	633.78	9/2$^-$		Mult.: R=0.82 *2*.
255.2 *2*	38 *2*	3396.3	37/2$^-$	3141.2	35/2$^-$	D+Q	Mult.: R=0.73 *3*.
260.4 *2*	8.2 *7*	898.0	(13/2$^+$)	637.7	(11/2$^+$)		
260.5 *2*	1.5 *2*	3344.3	31/2$^+$	3083.8	27/2$^+$		
265.2 *2*	3.7 *4*	4798.5	(43/2$^+$)	4533.3	(41/2$^+$)		
273.3 *2*	19 *1*	3169.7	(33/2$^+$)	2896.4	(31/2$^+$)	D	Mult.: R=0.67 *5*.
278.4 *2*	48 *3*	1218.50	19/2$^-$	940.03	17/2$^-$	D+Q	Mult.: R=0.74 *3*.
280.5 *2*	11 *1*	1623.39	(17/2$^+$)	1342.92	(15/2$^+$)	D	Mult.: R=0.61 *5*.
281.2 *2*	4.0 *3*	5079.7	(45/2$^+$)	4798.5	(43/2$^+$)		
282.9 *2*	6.0 *8*	5298.6	(47/2$^+$)	5015.7	(45/2$^+$)	D	Mult.: R=0.61 *5*.
287.5 *2*	7.1 *8*	5015.7	(45/2$^+$)	4728.2	(43/2$^+$)	D	Mult.: R=0.60 *5*.
290.4 *2*	36 *3*	3686.7	39/2$^-$	3396.3	37/2$^-$		Mult.: R=0.70 *3*.
294.2 *2*	8 *1*	4728.2	(43/2$^+$)	4434.0	(41/2$^+$)		Mult.: R=0.66 *6* for doublet.
294.8 *2*	17 *2*	3464.6	(35/2$^+$)	3169.7	(33/2$^+$)	D	Mult.: R=0.65 *4*.
296.4 *2*	5.7 *5*	5595.0	(49/2$^+$)	5298.6	(47/2$^+$)		Mult.: R=0.66 *6* for doublet.
298.3 *2*	30 *2*	1882.30	23/2$^-$	1583.96	21/2$^-$	D	Mult.: R=0.70 *5*.
309.4 *2*	2.9 *2*	5389.1	(47/2$^+$)	5079.7	(45/2$^+$)		
310.2 *2*	6.3 *6*	1431.92	(17/2$^+$)	1121.7	(15/2$^+$)		
314.4 *2*	11 *1*	4106.5	(39/2$^+$)	3792.2	(37/2$^+$)		Mult.: R=0.56 *9* for doublet.
317.0 *2*	5.0 *6*	5912.0	(51/2$^+$)	5595.0	(49/2$^+$)		Mult.: R=0.56 *9* for doublet.
317.6 *2*	72 *4*	940.03	17/2$^-$	622.46	15/2$^-$		Mult.: R=0.79 *5* for doublet.
319.1 *2*	25 *1*	4005.8	41/2$^-$	3686.7	39/2$^-$		Mult.: R=0.79 *5* for doublet.
320.1 *2*	≈10	535.98	5/2$^-$	215.9	3/2	D(+Q)	Mult.: R=0.71 *3*.
321.0 *2*	4.0 *9*	2923.8	33/2$^-$	2602.8	29/2$^-$		
323.6 *2*	1.6 *2*	2122.9	(21/2$^+$)	1799.30	(19/2$^+$)		
327.5 *2*	9 *1*	4434.0	(41/2$^+$)	4106.5	(39/2$^+$)		
327.6 *2*	13 *2*	3792.2	(37/2$^+$)	3464.6	(35/2$^+$)		
328.9 *2*	1.6 *2*	447.8	(9/2$^+$)	118.9	(5/2$^+$)		
337.0 *2*	4.5 *4*	6249.0	(53/2$^+$)	5912.0	(51/2$^+$)		
343.2 *2*	2.0 *1*	5732.4	(49/2$^+$)	5389.1	(47/2$^+$)		
345.0 *2*	2.7 *8*	2602.8	29/2$^-$	2257.74	25/2$^-$		
350.3 *2*	18 *1*	4356.1	43/2$^-$	4005.8	41/2$^-$	D+Q	Mult.: R=0.72 *5*.
351.2 *2*	3.6 *3*	2657.7	(29/2$^+$)	2306.5	(25/2$^+$)		
355.0 *2*	1.4 *2*	633.78	9/2$^-$	278.78	7/2	D	Mult.: R=0.6 *1*.
365.4 *2*	41 *3*	1583.96	21/2$^-$	1218.50	19/2$^-$	D+Q	Mult.: R=0.86 *4*.
366.2 *2*	3.6 *3*	637.7	(11/2$^+$)	271.5	(7/2$^+$)		
366.6 *2*	3.9 *3*	6615.5	(55/2$^+$)	6249.0	(53/2$^+$)		
367.5 *2*	1.6 *3*	1799.30	(19/2$^+$)	1431.92	(17/2$^+$)		
368.2 *2*	3.0 *4*	1991.57	(21/2$^+$)	1623.39	(17/2$^+$)		
371.2 *2*	10 *1*	4727.2	45/2$^-$	4356.1	43/2$^-$	D+Q	Mult.: R=0.75 *6*.

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$^{118}Sn(^{55}Mn,4n\gamma)$ **2013Ha02 (continued)**

$\gamma(^{169}Re)$ (continued)

E_γ	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult. ‡	Comments
372.9 2	1.5 1	6105.3	(51/2+)	5732.4	(49/2+)		
374.9 2	3.3 4	2038.4	21/2+	1663.45	17/2+	Q	Mult.: R=0.9 1.
375.4 2	27 2	2257.74	25/2−	1882.30	23/2−	(D+Q)	Mult.: R=0.76 4.
375.8 2	2.4 3	3720.1	35/2+	3344.3	31/2+		
382.7 2	≈31	382.70	13/2−	0.0	9/2−		Mult.: R=0.76 5; low for ΔJ=2 required by level scheme.
383.4 2	2.8 2	6998.9	(57/2+)	6615.5	(55/2+)		
384.2 2	3.2 5	2183.50	(23/2+)	1799.30	(19/2+)		
387.8 2	0.8 2	1663.45	17/2+	1275.62	17/2−		
388.8 2	17 2	1275.62	17/2−	886.83	13/2−	(Q)	Mult.: R=0.89 2.
397.5 2	6.3 6	3141.2	35/2−	2743.7	31/2−		Mult.: R=0.9 1 for doublet.
398.0 2	6.5 5	5125.3	47/2−	4727.2	45/2−		Mult.: R=0.9 1 for doublet.
404.9 2	12 1	1623.39	(17/2+)	1218.50	19/2−	D	Mult.: R=0.58 8.
411.1 2	1.0 1	6516.5	(53/2+)	6105.3	(51/2+)		
412.3 2	3.7 4	5537.6	49/2−	5125.3	47/2−	D+Q	Mult.: R=0.87 9.
417.5 2	1.7 1	7416.4	(59/2+)	6998.9	(57/2+)		
423.3 5	<0.3	3344.3	31/2+	2921.0			
427.3 2	1.3 1	7843.7	(61/2+)	7416.4	(59/2+)		
428.6 2	0.8 1	6945.0	(55/2+)	6516.5	(53/2+)		
429.7 2	0.6 1	8185.7	61/2−	7755.9	59/2−		
434.3 2	4.6 5	2896.4	(31/2+)	2462.1	(27/2+)		
435.7 2	2.5 4	5973.2	51/2−	5537.6	49/2−		
440.7 2	2.1 3	6414.0	53/2−	5973.2	51/2−		
440.8 2	0.3 1	3344.3	31/2+	2903.5	29/2−		
443.0 2	0.5 1	7755.9	59/2−	7312.9	57/2−		
443.4 2	1.0 2	7312.9	57/2−	6869.5	55/2−		
450.1 2	5.1 5	898.0	(13/2+)	447.8	(9/2+)		
453.4 2	0.5 1	7398.3	(57/2+)	6945.0	(55/2+)		
455.4 2	1.2 1	6869.5	55/2−	6414.0	53/2−		
459.6 2	2.4 2	2498.0	25/2+	2038.4	21/2+	Q	Mult.: R=1.0 1.
467.0 2	0.5 2	8778.6	(65/2+)	8311.6	(63/2+)		
467.9 2	0.6 2	8311.6	(63/2+)	7843.7	(61/2+)		
471.0 2	1.0 2	2509.4	(25/2+)	2038.4	21/2+		
472.5 2	9 1	3396.3	37/2−	2923.8	33/2−	Q	Mult.: R=1.00 8.
484.1 2	4.9 4	1121.7	(15/2+)	637.7	(11/2+)		
484.2 2	11 1	3942.6	37/2−	3458.4	33/2−	Q	Mult.: R=1.06 5.
486.0	67 5	622.46	15/2−	136.39	11/2−		Mult.: R=0.86 4.
489.2 2	15 1	1764.8	21/2−	1275.62	17/2−	Q	Mult.: R=0.87 2.
497.4 2	5.9 8	633.78	9/2−	136.39	11/2−	(D)	Mult.: R=0.96 5. Interpreted by authors As D, ΔJ=0 transition, but compatible with Q, ΔJ=2 also.
499.7 2	1.9 2	4219.8	39/2+	3720.1	35/2+		
501.0 5	<0.3	4798.5	(43/2+)	4297.5	(39/2+)		
509.5 2	9.5 9	4452.1	41/2−	3942.6	37/2−	Q	Mult.: R=1.03 3.
512.0 2	4.8 4	3169.7	(33/2+)	2657.7	(29/2+)		
516.0 2	0.8 1	3025.4	29/2+	2509.4	(25/2+)		
527.5 2	1.1 1	3025.4	29/2+	2498.0	25/2+	Q	Mult.: R=0.92 8.
533.9 2	5.4 5	1431.92	(17/2+)	898.0	(13/2+)		
545.4 2	10.5 6	3686.7	39/2−	3141.2	35/2−	Q	Mult.: R=1.02 8.
546.4 2	0.7 1	5079.7	(45/2+)	4533.3	(41/2+)		
554.9 2	13 2	3458.4	33/2−	2903.5	29/2−		Mult.: R=0.99 5 for doublet.
556.3 2	14 2	2321.0	25/2−	1764.8	21/2−		Mult.: R=0.99 5 for doublet.
557.3 2	43 4	940.03	17/2−	382.70	13/2−	Q	Mult.: R=1.03 5.
559.2 2	1.0 1	5426.3	45/2+	4867.1	41/2+	Q	Mult.: R=1.1 1.
568.3 2	8.3 8	3464.6	(35/2+)	2896.4	(31/2+)	Q	Mult.: R=0.91 5.
570.5 2	5.6 5	5298.6	(47/2+)	4728.2	(43/2+)	Q	Mult.: R=0.91 5.
574.4 5	<0.3	3083.8	27/2+	2509.4	(25/2+)		
579.3 2	3.3 4	5595.0	(49/2+)	5015.7	(45/2+)		Mult.: R=1.07 9 for doublet.

Continued on next page (footnotes at end of table)

$^{118}Sn(^{55}Mn,4n\gamma)$ 2013Ha02 (continued)

$\gamma(^{169}Re)$ (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
581.6 2	0.8 1	4745.9	41/2⁻	4164.3	37/2⁻		
581.6 2	5.9 8	5015.7	(45/2⁺)	4434.0	(41/2⁺)		Mult.: R=1.07 9 for doublet.
582.5 2	13 2	2903.5	29/2⁻	2321.0	25/2⁻	Q	Mult.: R=1.10 3.
582.7 2	1.7 2	3608.1	33/2⁺	3025.4	29/2⁺	Q	Mult.: R=1.2 1.
585.7 5	<0.3	3083.8	27/2⁺	2498.0	25/2⁺		
586.4 2	0.7 1	4533.3	(41/2⁺)	3946.9	(37/2⁺)		
590.6 2	1.1 1	5389.1	(47/2⁺)	4798.5	(43/2⁺)		
596.0 2	74 5	1218.50	19/2⁻	622.46	15/2⁻	Q	Mult.: R=0.9 1.
596.5 2	8.6 6	5048.6	45/2⁻	4452.1	41/2⁻	Q	Mult.: R=0.96 3.
597.0 5	<0.3	3083.8	27/2⁺	2486.81	27/2⁻		
604.5 2	46 3	2486.81	27/2⁻	1882.30	23/2⁻		Mult.: R=0.79 4; low for ΔJ=2 required by level scheme.
609.5 2	14 1	4005.8	41/2⁻	3396.3	37/2⁻		
613.4 2	3.2 4	5912.0	(51/2⁺)	5298.6	(47/2⁺)		
617.1 2	2.4 2	4836.9	43/2⁺	4219.8	39/2⁺		
621.7 2	6.0 5	4728.2	(43/2⁺)	4106.5	(39/2⁺)		Mult.: R=0.99 6 for doublet.
622.5 2	7.9 7	3792.2	(37/2⁺)	3169.7	(33/2⁺)		Mult.: R=0.99 6 for doublet.
629.1 2	1.1 2	4867.1	41/2⁺	4238.0	37/2⁺		Mult.: R=0.9 2 for doublet.
629.9 2	1.4 2	4238.0	37/2⁺	3608.1	33/2⁺		Mult.: R=0.9 2 for doublet.
630.2 2	0.6 1	6056.5	49/2⁺	5426.3	45/2⁺		Mult.: R=0.9 2 for doublet.
631.6 2	1.0 1	5377.5	45/2⁻	4745.9	41/2⁻		
633.8 2	1.7 2	633.78	9/2⁻	0.0	9/2⁻		
641.8 2	7.4 6	4106.5	(39/2⁺)	3464.6	(35/2⁺)		Mult.: R=1.03 6 for doublet.
641.9 2	6.7 8	4434.0	(41/2⁺)	3792.2	(37/2⁺)		Mult.: R=1.03 6 for doublet.
643.9 2	45 4	1583.96	21/2⁻	940.03	17/2⁻		Mult.: R=0.81 5; low for ΔJ=2 transition implied by level scheme.
652.7 2	1.3 1	5732.4	(49/2⁺)	5079.7	(45/2⁺)		
653.9 2	2.5 2	6249.0	(53/2⁺)	5595.0	(49/2⁺)		
663.3 2	0.3 1	2921.0		2257.74	25/2⁻		
663.8 2	59 4	1882.30	23/2⁻	1218.50	19/2⁻	Q	Mult.: R=1.01 4.
669.4 2	7.9 5	4356.1	43/2⁻	3686.7	39/2⁻		
673.8	30 2	2257.74	25/2⁻	1583.96	21/2⁻	Q	Mult.: R=0.89 8.
678.2 2	6.8 4	5726.8	49/2⁻	5048.6	45/2⁻	Q	Mult.: R=1.02 4.
683.4 2	6.4 6	1623.39	(17/2⁺)	940.03	17/2⁻		Mult.: R=0.75 6.
683.8 2	0.7 1	6061.3	49/2⁻	5377.5	45/2⁻		
686.5 2	0.5 1	6743.0	53/2⁺	6056.5	49/2⁺		
690.9 2	2.1 3	2122.9	(21/2⁺)	1431.92	(17/2⁺)		
703.5 2	2.1 2	6615.5	(55/2⁺)	5912.0	(51/2⁺)		
705.9 2	1.0 1	4164.3	37/2⁻	3458.4	33/2⁻	Q	Mult.: R=0.98 5.
708.9 2	1.9 2	5545.8	47/2⁺	4836.9	43/2⁺		
716.2 2	1.1 1	6105.3	(51/2⁺)	5389.1	(47/2⁺)		
720.5 2	14 1	1342.92	(15/2⁺)	622.46	15/2⁻		Mult.: R=0.76 6; interpreted by authors As a ΔJ=0 transition.
721.4 2	9.2 6	4727.2	45/2⁻	4005.8	41/2⁻		
721.4 2	1.0 1	7785.4	59/2⁺	7064.0	55/2⁺		
739.7 2	5.4 4	6466.5	53/2⁻	5726.8	49/2⁻		Mult.: R=1.24 6; ΔJ=2 required by level SCHEME..
748.6 2	1.3 1	7064.0	55/2⁺	6315.4	51/2⁺		
749.9 2	1.8 1	6998.9	(57/2⁺)	6249.0	(53/2⁺)		
751.0 2	0.5 1	6812.3	53/2⁻	6061.3	49/2⁻		
751.3 5	<0.3	7494.3	57/2⁺	6743.0	53/2⁺		
762.9 5	<0.3	3083.8	27/2⁺	2321.0	25/2⁻		
768.8 2	0.8 1	8554.2	63/2⁺	7785.4	59/2⁺		
769.2 2	5.4 3	5125.3	47/2⁻	4356.1	43/2⁻		
769.6 2	1.7 2	6315.4	51/2⁺	5545.8	47/2⁺		
773.0 2	0.4 1	1991.57	(21/2⁺)	1218.50	19/2⁻		
775.9 5	<0.3	8024.0		7248.1	57/2⁻		
781.6 2	3.2 3	7248.1	57/2⁻	6466.5	53/2⁻	Q	Mult.: R=1.12 7.

Continued on next page (footnotes at end of table)

^{118}Sn(^{55}Mn,4nγ) 2013Ha02 (continued)

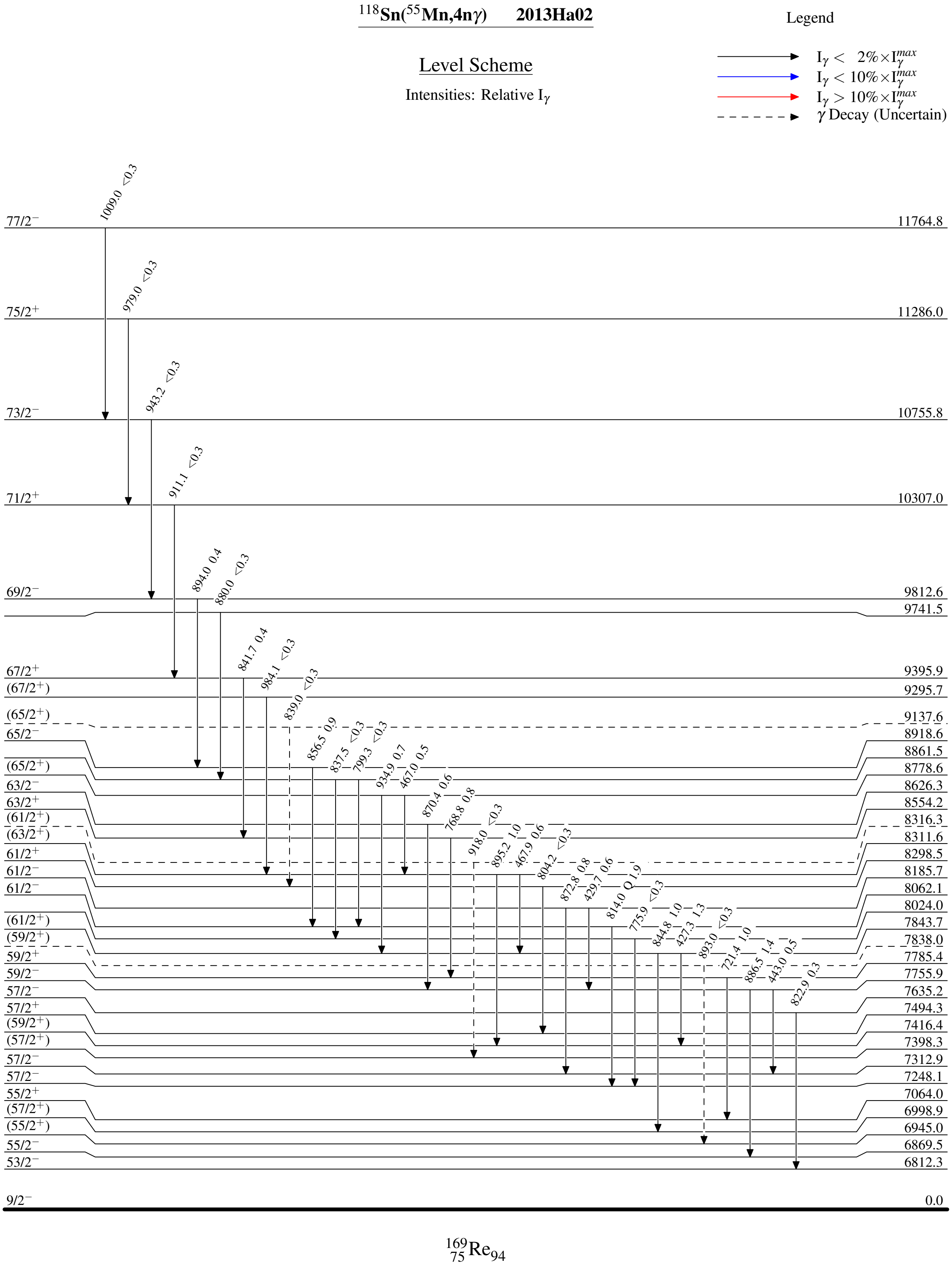
γ(^{169}Re) (continued)

E_γ	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult. ‡	Comments
784.1 2	1.0 1	6516.5	(53/2+)	5732.4	(49/2+)		
799.3 5	<0.3	8861.5		8062.1	61/2−		
800.8 2	1.3 1	7416.4	(59/2+)	6615.5	(55/2+)		
803.3 2	0.3 1	4745.9	41/2−	3942.6	37/2−	Q	Mult.: R=1.05 7.
804.2 5	<0.3	8298.5	61/2+	7494.3	57/2+		
805.6 2	0.7 1	3946.9	(37/2+)	3141.2	35/2−		
810.4 2	4.1 3	5537.6	49/2−	4727.2	45/2−		
814.0 2	1.9 2	8062.1	61/2−	7248.1	57/2−	Q	Mult.: R=1.2 1.
822.9 2	0.3 1	7635.2	57/2−	6812.3	53/2−		
823.4 2	0.4 1	4219.8	39/2+	3396.3	37/2−		
837.5 5	<0.3	8861.5		8024.0			
839.0# 5	<0.3	9137.6?	(65/2+)	8298.5	61/2+		
839.7 2	0.8 1	6945.0	(55/2+)	6105.3	(51/2+)		
841.7 2	0.4 1	9395.9	67/2+	8554.2	63/2+		
844.8 2	1.0 1	7843.7	(61/2+)	6998.9	(57/2+)		
846.7 2	3.6 4	4533.3	(41/2+)	3686.7	39/2−		
847.9 2	2.9 4	5973.2	51/2−	5125.3	47/2−		
856.5 2	0.9 1	8918.6	65/2−	8062.1	61/2−		
859.3 2	3.7 3	1799.30	(19/2+)	940.03	17/2−	D	Mult.: R=0.74 5; level scheme requires E1.
870.4	0.6 1	8626.3	63/2−	7755.9	59/2−		
872.8 2	0.8 1	8185.7	61/2−	7312.9	57/2−		
876.3 2	2.4 3	6414.0	53/2−	5537.6	49/2−		
880.0 5	<0.3	9741.5		8861.5			
881.8 2	0.5 1	7398.3	(57/2+)	6516.5	(53/2+)		
886.5 2	1.4 1	7755.9	59/2−	6869.5	55/2−		
886.8 2	1.6 2	886.83	13/2−	0.0	9/2−	Q	Mult.: R=0.9 1.
887.6 2	0.3 1	1510.03		622.46	15/2−		
893.0# 5	<0.3	7838.0?	(59/2+)	6945.0	(55/2+)		
894.0 2	0.4 1	9812.6	69/2−	8918.6	65/2−		
895.2 2	1.0 1	8311.6	(63/2+)	7416.4	(59/2+)		
896.4 2	2.1 2	6869.5	55/2−	5973.2	51/2−		
898.9 2	1.6 2	7312.9	57/2−	6414.0	53/2−		
911.1 5	<0.3	10307.0	71/2+	9395.9	67/2+		
918.0# 5	<0.3	8316.3?	(61/2+)	7398.3	(57/2+)		
934.9 2	0.7 1	8778.6	(65/2+)	7843.7	(61/2+)		
943.2 5	<0.3	10755.8	73/2−	9812.6	69/2−		
960.2 2	5.5 5	1342.92	(15/2+)	382.70	13/2−		Mult.: R=0.41 5 d.
979.0 5	<0.3	11286.0	75/2+	10307.0	71/2+		
984.1 5	<0.3	9295.7	(67/2+)	8311.6	(63/2+)		
1000.9 2	5.7 4	1623.39	(17/2+)	622.46	15/2−	D	Mult.: R=0.52 5.
1009.0 5	<0.3	11764.8	77/2−	10755.8	73/2−		
1041.0 2	3.2 4	1663.45	17/2+	622.46	15/2−		Mult.: R=0.71 9; level scheme requires E1.
1127.3 5	<0.3	1510.03		382.70	13/2−		

† Photon intensity relative to I(240γ)=100.

‡ Assigned by evaluator based on R, the ratio of summed Iγ from the 5 rings of detectors nearest to 90° (71°, 81°, 90°, 99°, 101°) to that from detectors At backward angles (122°, 130°, 143°, 148°, 163°), normalized so known pure D (ΔJ=1) and pure Q (ΔJ=2) transitions have values of R=0.6 and 1.0, respectively.

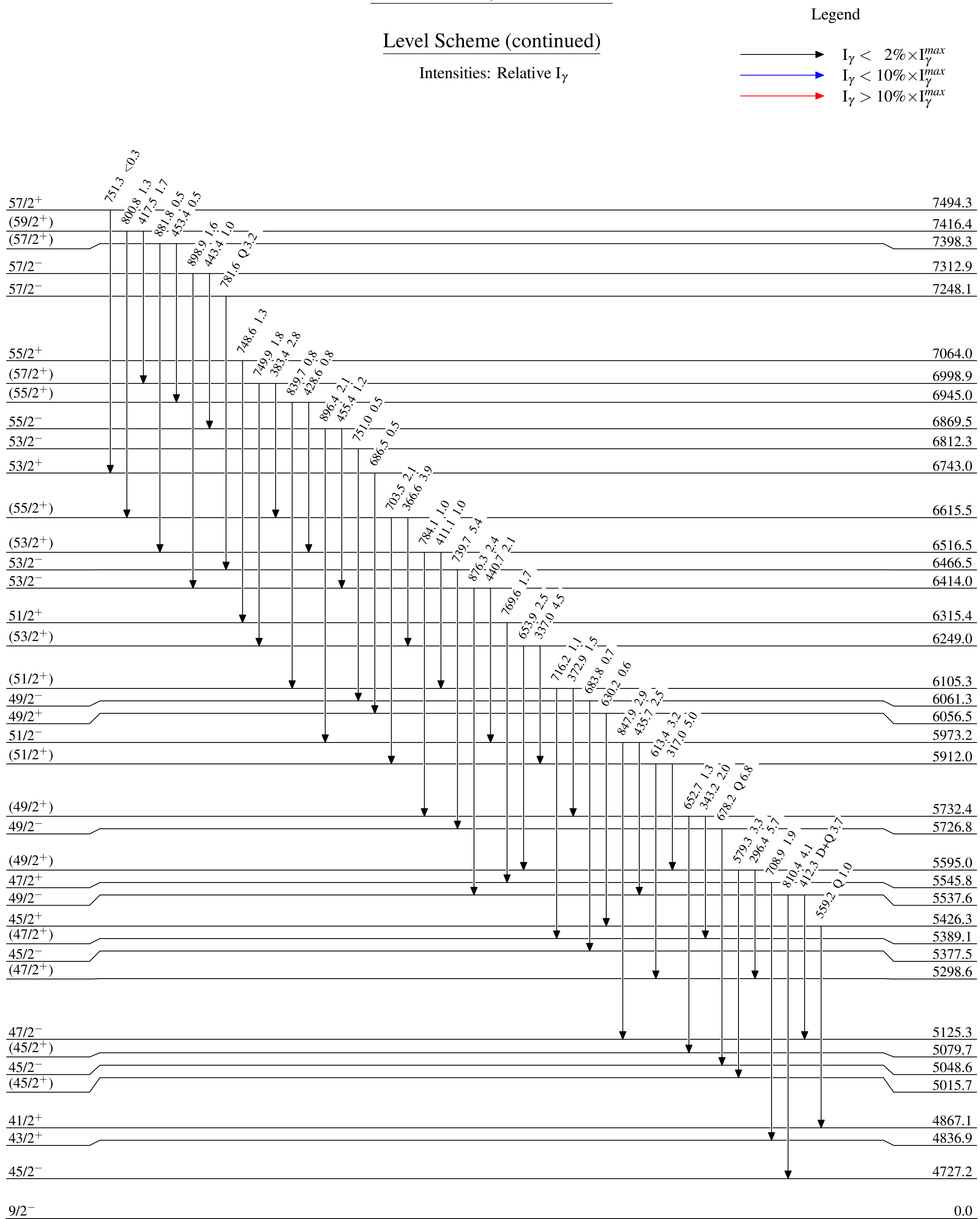
Placement of transition in the level scheme is uncertain.


^{118}Sn(^{55}Mn,4nγ) 2013Ha02
Level Scheme
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
γ Decay (Uncertain)
77/2− 11764.8
75/2+ 11286.0
73/2− 10755.8
71/2+ 10307.0
69/2− 9812.6
9741.5
67/2+ 9395.9
(67/2+) 9295.7
(65/2+) 9137.6
65/2− 8918.6
8861.5
(65/2+) 8778.6
63/2− 8626.3
63/2+ 8554.2
(61/2+) 8316.3
(63/2+) 8311.6
61/2+ 8298.5
61/2− 8185.7
61/2− 8062.1
8024.0
(61/2+) 7843.7
(59/2+) 7838.0
59/2+ 7785.4
59/2− 7755.9
57/2− 7635.2
57/2+ 7494.3
(59/2+) 7416.4
(57/2+) 7398.3
57/2− 7312.9
57/2− 7248.1
55/2+ 7064.0
(57/2+) 6998.9
(55/2+) 6945.0
55/2− 6869.5
53/2− 6812.3
9/2− 0.0
1009.0 <0.3
979.0 <0.3
943.2 <0.3
911.1 <0.3
894.0 0.4
880.0 <0.3
841.7 0.4
984.1 <0.3
839.0 <0.3
856.5 0.9
837.5 <0.3
799.3 <0.3
934.9 0.7
467.0 0.5
870.4 0.6
768.8 0.8
918.0 <0.3
895.2 1.0
467.9 0.6
804.2 <0.3
872.8 0.8
429.7 0.6
814.0 Q 1.9
775.9 <0.3
844.8 1.0
427.3 1.3
893.0 <0.3
721.4 1.0
886.5 1.4
443.0 0.5
822.9 0.3
$^{169}_{75}Re_{94}$

$^{118}Sn(^{55}Mn,4n\gamma)$ 2013Ha02

Level Scheme (continued)

Intensities: Relative I_γ

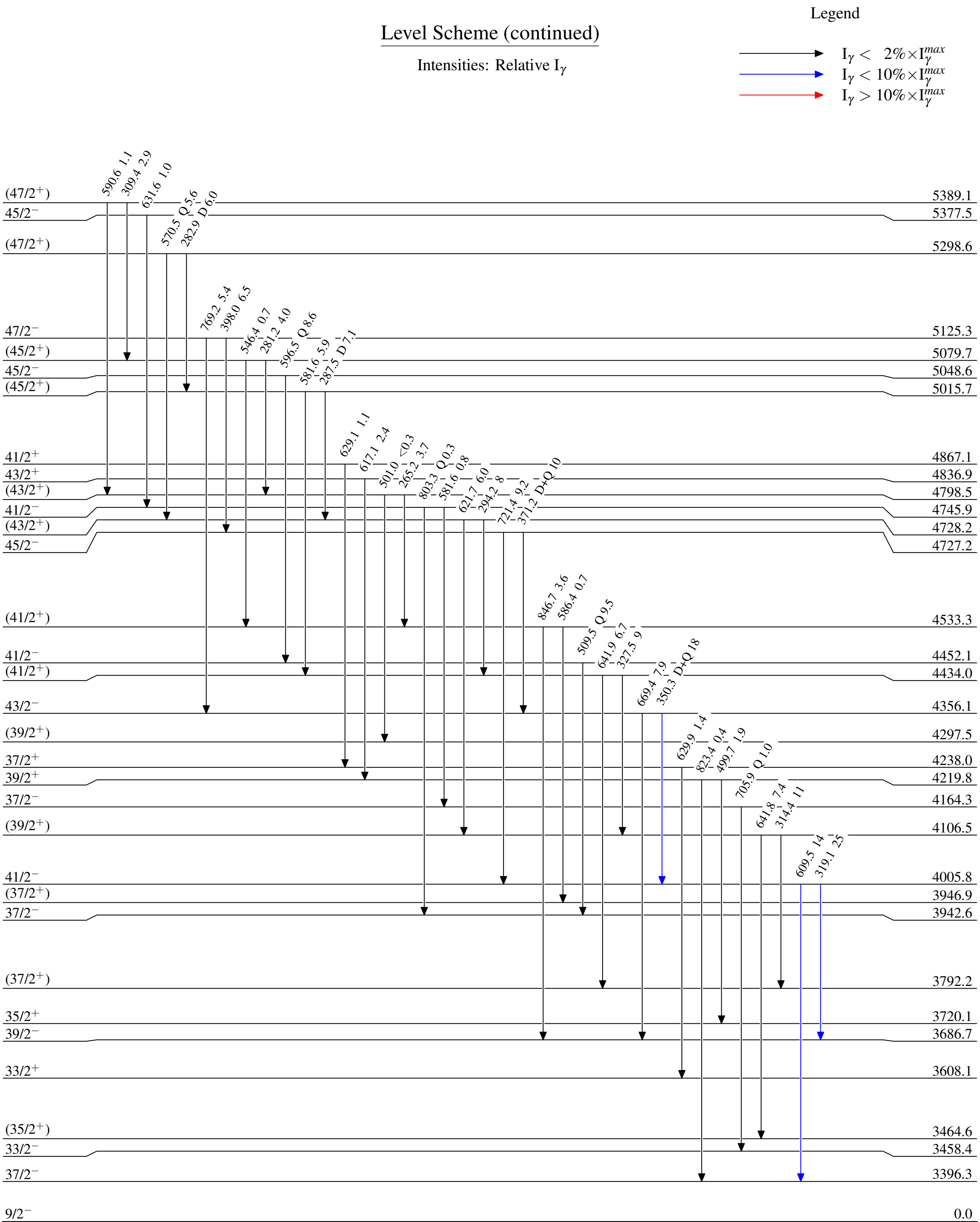


$^{169}_{75}Re_{94}$

$^{118}Sn(^{55}Mn,4n\gamma)$ 2013Ha02

Level Scheme (continued)

Intensities: Relative I_γ



$^{169}_{75}Re_{94}$

^{118}Sn(^{55}Mn,4nγ) 2013Ha02

Level Scheme (continued)

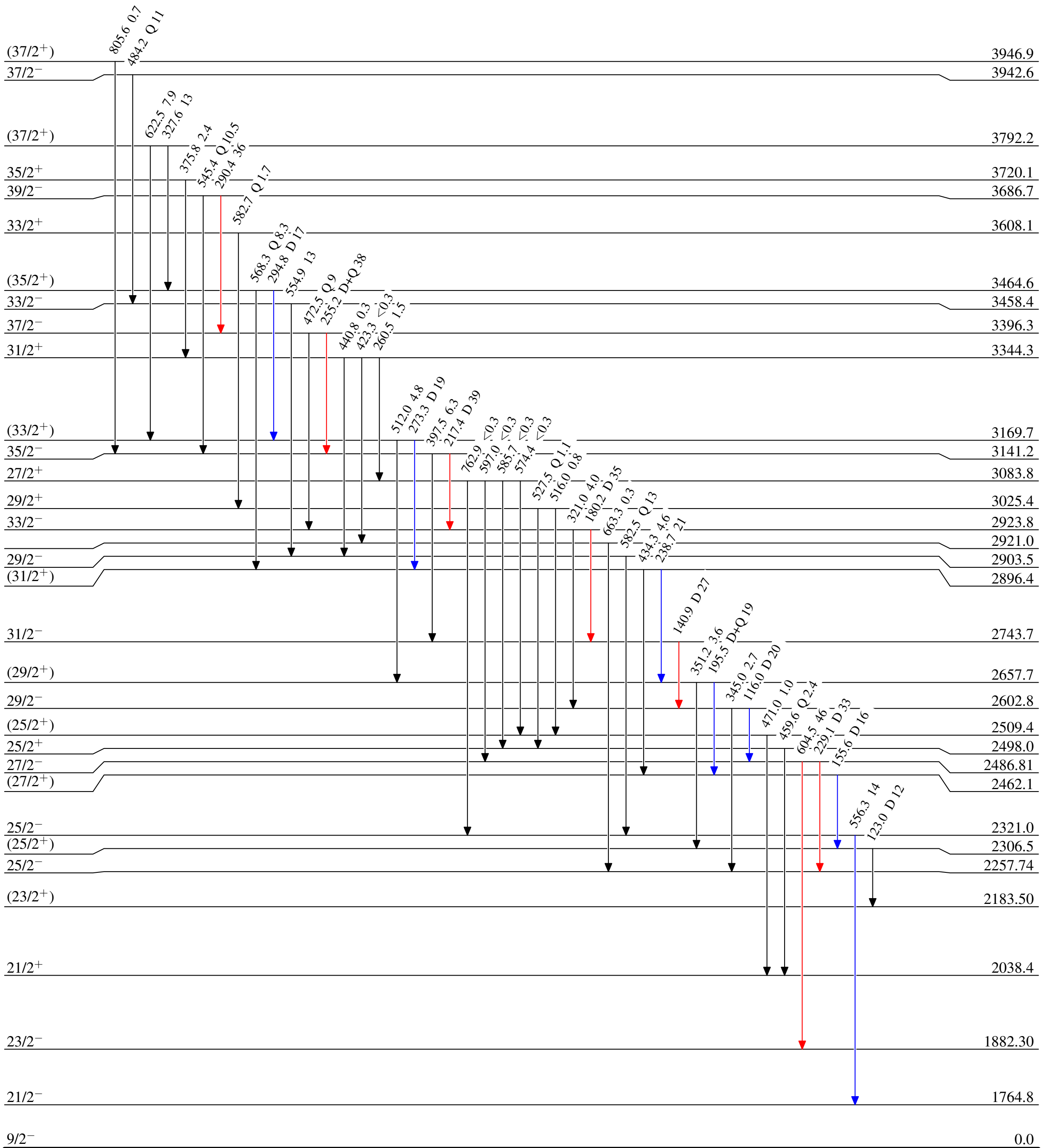
Intensities: Relative I_γ

Legend

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

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

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

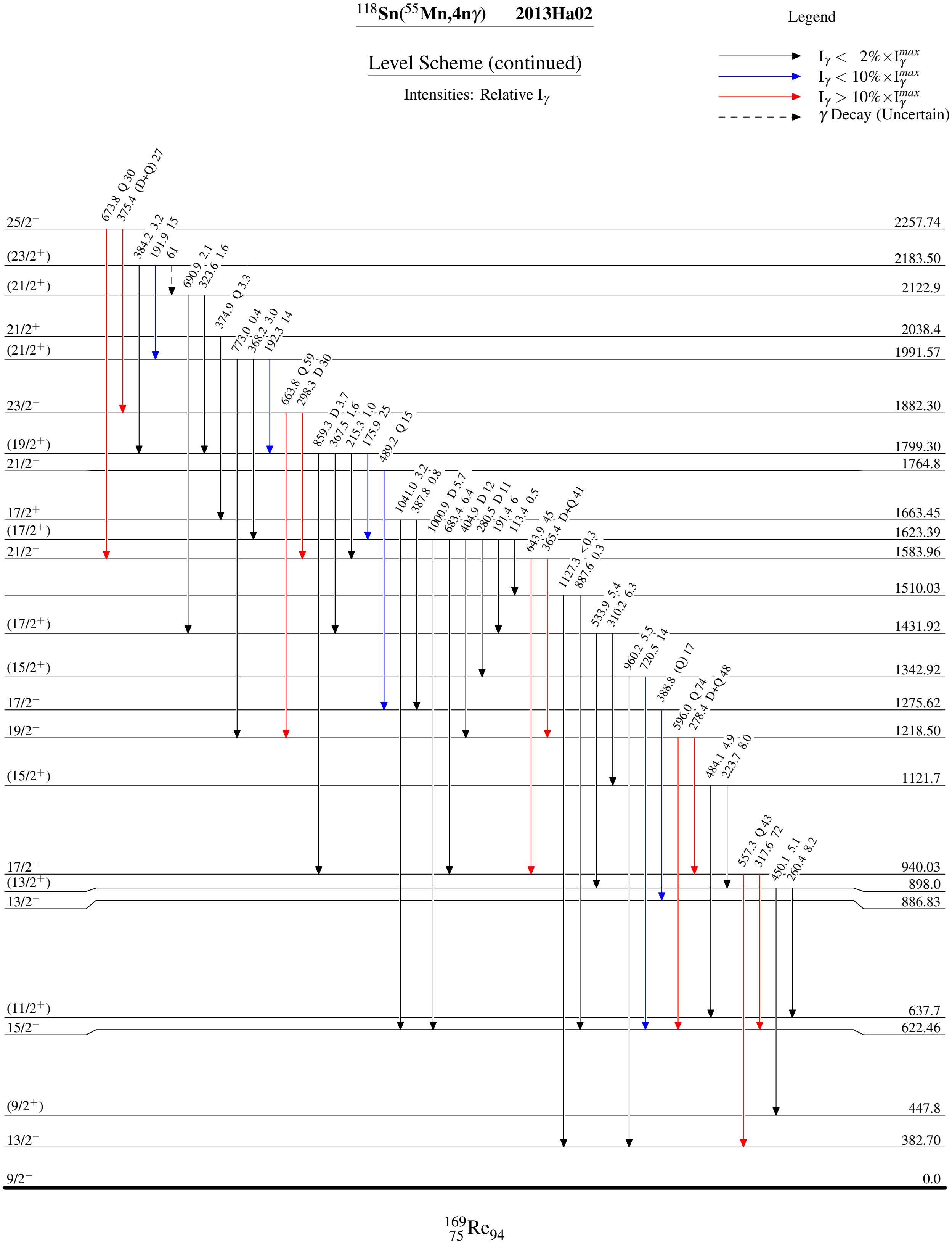


$^{169}_{75}Re_{94}$

$^{118}Sn(^{55}Mn,4n\gamma)$ 2013Ha02

Level Scheme (continued)

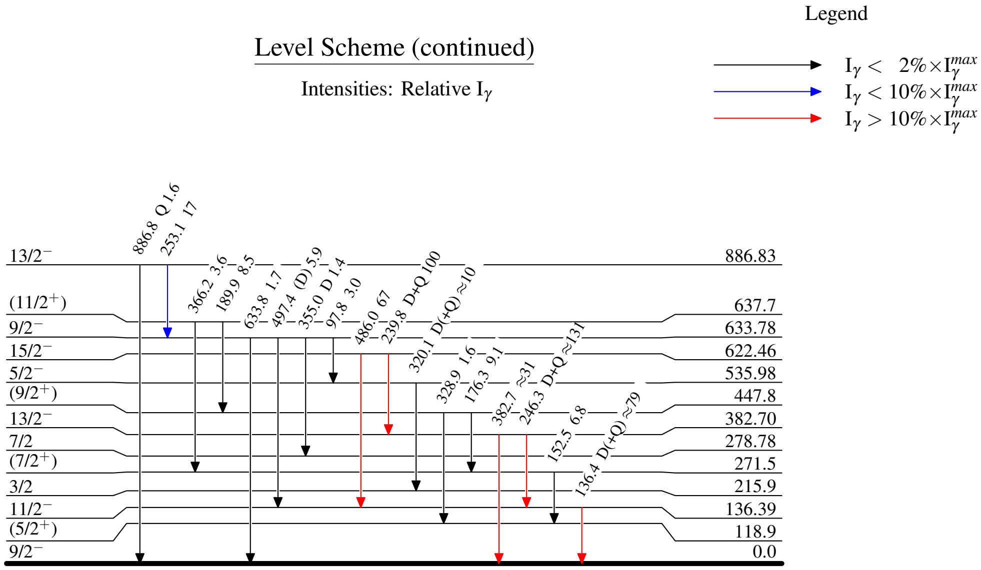
Intensities: Relative I_γ



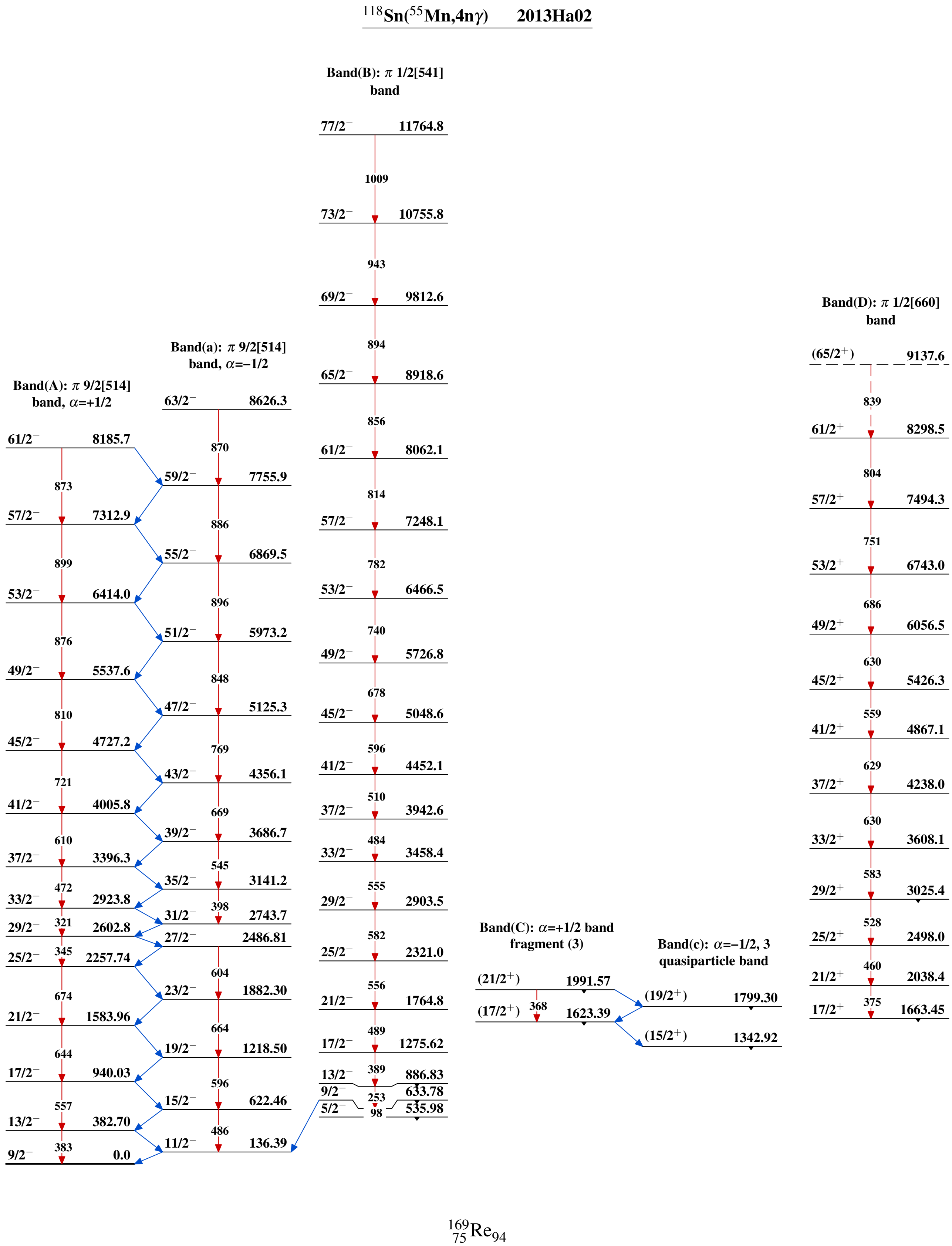
$^{118}Sn(^{55}Mn,4n\gamma)$ 2013Ha02

Level Scheme (continued)

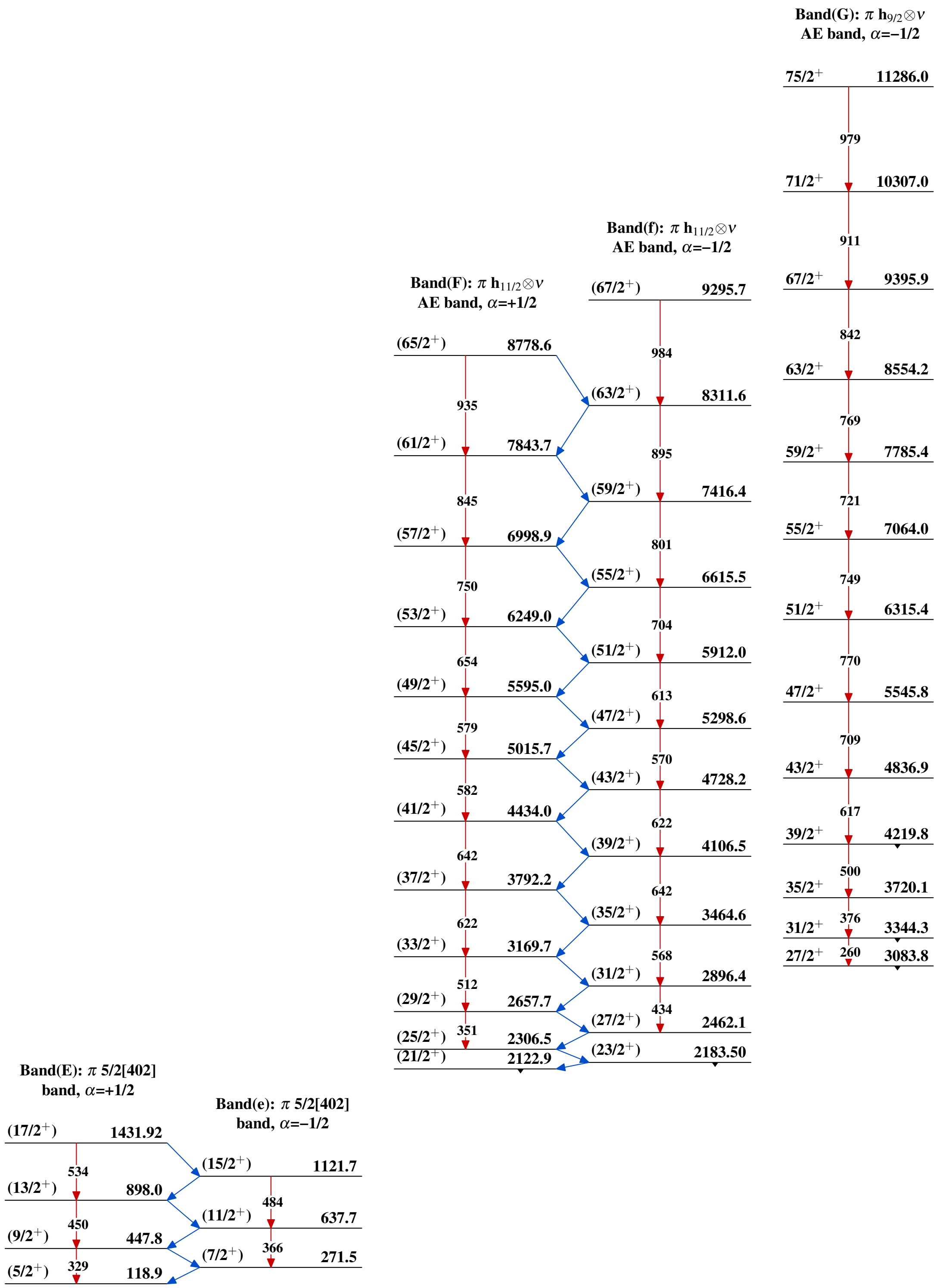
Intensities: Relative I_γ



$^{169}_{75}Re_{94}$

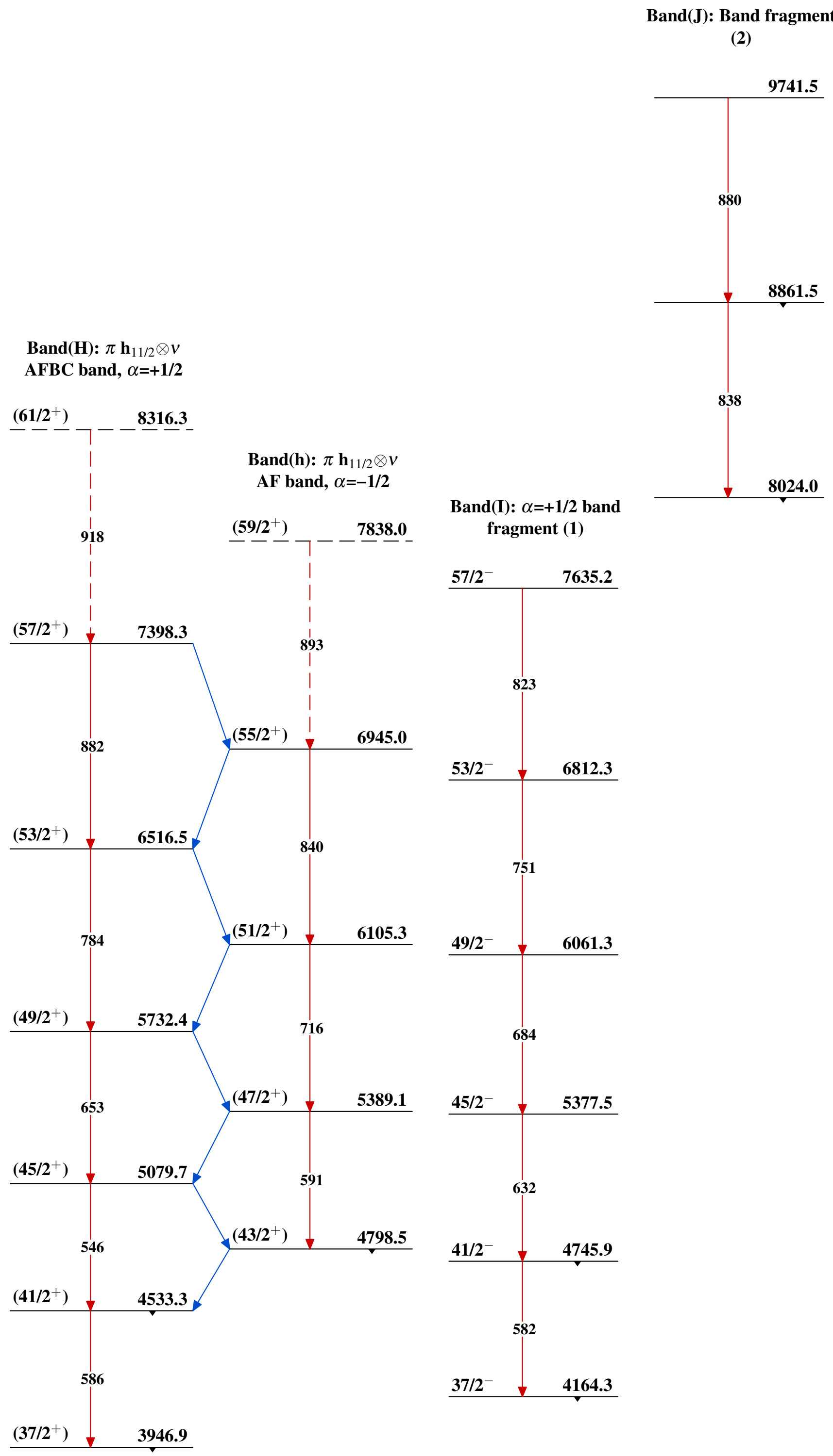

118Sn(55Mn,4nγ) 2013Ha02
Band(B): π 1/2[541] band
Band(a): π 9/2[514] band, α=−1/2
Band(A): π 9/2[514] band, α=+1/2
Band(D): π 1/2[660] band
Band(C): α=+1/2 band fragment (3)
Band(c): α=−1/2, 3 quasiparticle band
77/2− 11764.8
1009
73/2− 10755.8
943
69/2− 9812.6
894
65/2− 8918.6
856
61/2− 8062.1
814
57/2− 7248.1
782
53/2− 6466.5
740
49/2− 5726.8
678
45/2− 5048.6
596
41/2− 4452.1
510
37/2− 3942.6
484
33/2− 3458.4
555
29/2− 2903.5
582
25/2− 2321.0
556
21/2− 1764.8
489
17/2− 1275.62
389
13/2− 886.83
253
9/2− 633.78
98
5/2− 535.98
63/2− 8626.3
870
59/2− 7755.9
886
55/2− 6869.5
896
51/2− 5973.2
848
47/2− 5125.3
769
43/2− 4356.1
669
39/2− 3686.7
545
35/2− 3141.2
398
31/2− 2743.7
27/2− 2486.81
604
23/2− 1882.30
664
19/2− 1218.50
596
15/2− 622.46
486
11/2− 136.39
61/2− 8185.7
873
57/2− 7312.9
899
53/2− 6414.0
876
49/2− 5537.6
810
45/2− 4727.2
721
41/2− 4005.8
610
37/2− 3396.3
472
33/2− 2923.8
321
29/2− 2602.8
345
25/2− 2257.74
674
21/2− 1583.96
644
17/2− 940.03
557
13/2− 382.70
383
9/2− 0.0
(21/2+) 1991.57
368
(17/2+) 1623.39
(19/2+) 1799.30
(15/2+) 1342.92
(65/2+) 9137.6
839
61/2+ 8298.5
804
57/2+ 7494.3
751
53/2+ 6743.0
686
49/2+ 6056.5
630
45/2+ 5426.3
559
41/2+ 4867.1
629
37/2+ 4238.0
630
33/2+ 3608.1
583
29/2+ 3025.4
528
25/2+ 2498.0
460
21/2+ 2038.4
375
17/2+ 1663.45
169 75 Re 94

^{118}Sn(^{55}Mn,4nγ) 2013Ha02 (continued)



$^{169}_{75}Re_{94}$

$^{118}Sn(^{55}Mn,4n\gamma)$ 2013Ha02 (continued)



$^{169}_{75}Re_{94}$