^{144}Sm(^{30}Si,p2nγ) 1989Ba49

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin, E. A. Mccutchan	NDS 151, 334 (2018)	30-Jun-2018

Other: 1989Ba29.

1989Ba49: ^{144}Sm(^{30}Si,p2nγ), E(^{30}Si)=145 MeV; ^{140}Ce(^{35}Cl,4nγ), E(^{35}Cl)=170 MeV; measured Eγ, Iγ (HPGe, low-energy photon spectrometer, planar Ge, Compton-suppressed spectrometer), $\gamma\gamma$ coin, $\gamma(\theta)$ (θ=0°, 33°, 57°, 90°), excitation functions, relative γ-ray yields. Used particle-rotor and cranked shell model calculations to interpret level structure.

^{171}Re Levels

E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]
0.0[#]	$9/2^-$	996.9+x[a] *6*	$15/2^+$	2039.7+x[c] *6*	$25/2^+$	3356.8[#] *4*	$37/2^-$
0.0+x[@]	$5/2^-$	1047.2+y[&] *5*	$(15/2^+)$	2072.9[#] *3*	$25/2^-$	3509.9+x[c] *7*	$37/2^+$
0.0+y[&]	$(3/2^+)$	1137.5+x[@] *4*	$21/2^-$	2203.1+x[c] *7*	$27/2^+$	3535.4+x[b] *7*	$37/2^+$
42.2+x[a] *6*	$5/2^+$	1162.95[#] *24*	$19/2^-$	2256.2+x[@] *5*	$29/2^-$	3637.9[#] *5*	$39/2^-$
95.7+x[@] *2*	$9/2^-$	1204.4+x[a] *6*	$17/2^+$	2344.5[#] *3*	$27/2^-$	3828.1+x[c] *7*	$39/2^+$
157.34[#] *20*	$11/2^-$	1235.1+x[b] *6*	$17/2^+$	2403.8+x[c] *7*	$29/2^+$	3880.9+x[@] *6*	$41/2^-$
192.6+x[a] *6*	$7/2^+$	1442.6+x[a] *6*	$19/2^+$	2422.9+x[b] *6*	$29/2^+$	3939.4[#] *5*	$41/2^-$
273.9+y[&] *3*	$(7/2^+)$	1445.8+y[&] *5*	$(19/2^+)$	2547.2[#] *4*	$29/2^-$	4151.5+x[c] *7*	$41/2^+$
325.0+x[@] *3*	$13/2^-$	1474.9[#] *3*	$21/2^-$	2641.3+x[c] *7*	$31/2^+$	4163.4+x[b]	$(41/2^+)$
364.4+x[a] *6*	$9/2^+$	1544.4+x[b] *5*	$21/2^+$	2706.1[#] *4*	$31/2^-$	4268.7[#] *5*	$43/2^-$
381.18[#] *18*	$13/2^-$	1673.2+x[@] *5*	$25/2^-$	2819.1+x[@] *6*	$33/2^-$	4497.8+x[@] *7*	$(45/2^-)$
568.9+x[a] *6*	$11/2^+$	1675.9+x[a] *6*	$21/2^+$	2890.5[#] *4*	$33/2^-$	4608.3[#] *5*	$45/2^-$
614.73[#] *21*	$15/2^-$	1758.8[#] *3*	$23/2^-$	2907.8+x[c] *7*	$33/2^+$	4969.7[#] *5*	$47/2^-$
651.5+y[&] *4*	$(11/2^+)$	1872.0+y[&] *6*	$(23/2^+)$	2952.6+x[b] *6*	$33/2^+$	5180.9+x[@] *8*	$(49/2^-)$
680.0+x[@] *4*	$17/2^-$	1915.7+x[a] *6*	$23/2^+$	3108.3[#] *4*	$35/2^-$	5329.7[#] *6*	$49/2^-$
771.9+x[a] *6*	$13/2^+$	1916.9+x[c] *6*	$23/2^+$	3198.1+x[c] *7*	$35/2^+$		
894.64[#] *23*	$17/2^-$	1950.3+x[b] *6*	$25/2^+$	3330.4+x[@] *6*	$37/2^-$		

† From least-squares adjustment of Eγ. 1989Ba49 estimate "X" to be$\leq$200 keV from absence of connecting transitions between bandheads, and from relative populations of high-spin states in each band. From Adopted Levels, the energy offset "X"=189.8 *4* and "Y"=576.6 *15*.

‡ From γ-ray multipolarities (inferred, but not reported), coincidence data, and rotational structure; bandhead assignments, except for g.s. band, were based on systematics of odd-proton nuclei (1989Ba49). See ^{171}Re Adopted Levels for evaluator′s assignments.

Band(A): 9/2[514] band.

@ Band(B): 1/2[541] band. ($h_{9/2}$ band).

& Band(C): 1/2[411] band. Discrepancies exist between the level scheme and γ-ray table in 1989Ba49; the γ placements adopted here are those from fig. 2 of 1989Ba49, consistent with a subsequent (HI,xnγ) study (viz., 1993Ca02).

a Band(D): 5/2[402] band.

b Band(E): 1/2[660] band ($i_{13/2}$ band).

c Band(F): π=+, 3-quasiparticle band. Feeds into 5/2[402] band. Note, however, that in a subsequent (HI,xnγ) study (1993Ca02) involving one of the authors of 1989Ba49, all but the J=23/2 member were shown as part of an extension of the 5/2[402] band; it is that scenario which appears in Adopted Levels.

γ(^{171}Re)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	α[a]	Comments
95.7 2	17.7[@] 15	95.7+x	9/2$^-$	0.0+x	5/2$^-$				
122.8 3	7.0[@] 15	2039.7+x	25/2$^+$	1916.9+x	23/2$^+$				
124.0 3	7.5[@] 15	2039.7+x	25/2$^+$	1915.7+x	23/2$^+$				
150.5 2	99[@] 15	192.6+x	7/2$^+$	42.2+x	5/2$^+$	(M1+E2)		1.2 4	A_2=($-$0.095 11)?.
157.3 3		157.34	11/2$^-$	0.0	9/2$^-$				
158.9 2	55[@] 6	2706.1	31/2$^-$	2547.2	29/2$^-$				
163.5 2	24.2 15	2203.1+x	27/2$^+$	2039.7+x	25/2$^+$	(M1+E2)		1.0 4	A_2=$-$0.08 4.
171.8 2	55 3	364.4+x	9/2$^+$	192.6+x	7/2$^+$	(M1+E2)		0.8 3	A_2=$-$0.001 17.
184.5 2	49[@] 4	2890.5	33/2$^-$	2706.1	31/2$^-$	(M1+E2)		0.66 25	(A_2=$-$0.094 15)?.
200.8 2	24.5 28	2403.8+x	29/2$^+$	2203.1+x	27/2$^+$	(M1+E2)		0.52 21	A_2=$-$0.02 3.
202.7 2	74[@] 13	2547.2	29/2$^-$	2344.5	27/2$^-$				
203.1 2	64[@] 9	771.9+x	13/2$^+$	568.9+x	11/2$^+$				
204.6 2	46 3	568.9+x	11/2$^+$	364.4+x	9/2$^+$				A_2=+0.014 16.
207.5 2	30.6 19	1204.4+x	17/2$^+$	996.9+x	15/2$^+$	(M1+E2)		0.47 19	A_2=$-$0.08 4.
217.8 2	39 3	3108.3	35/2$^-$	2890.5	33/2$^-$	(M1+E2)	+0.04 3	0.572 9	A_2=$-$0.20 3, A_4=$-$0.07 4.
223.9 2	82 5	381.18	13/2$^-$	157.34	11/2$^-$				A_2=+0.148 18, A_4=$-$0.028 22.
225.1 2	34.2 21	996.9+x	15/2$^+$	771.9+x	13/2$^+$	(M1+E2)		0.37 16	A_2=$-$0.01 4.
229.3 2	90 5	325.0+x	13/2$^-$	95.7+x	9/2$^-$	(E2)		0.203	A_2=+0.315 14, A_4=$-$0.109 15.
233.3 2	19[@] 9	1675.9+x	21/2$^+$	1442.6+x	19/2$^+$				
233.6 2	82[@] 16	614.73	15/2$^-$	381.18	13/2$^-$				A_2=+0.074 22 for 233.6γ+(much weaker)233.3γ.
237.4 2	23[@] 7	2641.3+x	31/2$^+$	2403.8+x	29/2$^+$				
238.2 2	15.3[@] 25	1442.6+x	19/2$^+$	1204.4+x	17/2$^+$	[&]			A_2=$-$0.21 6, A_4=$-$0.05 7 for 238.2γ+238.3+237.4γ triplet.
238.3 3	9[@] 3	1235.1+x	17/2$^+$	996.9+x	15/2$^+$				
239.9 3	7[@] 6	1915.7+x	23/2$^+$	1675.9+x	21/2$^+$	(M1+E2)[&]		0.31 14	A_2=$-$0.06 9, A_4=+0.16 11 for 239.9γ+241.0γ (comparable strength γ's).
241.0 3	9[@] 6	1916.9+x	23/2$^+$	1675.9+x	21/2$^+$				
248.6 2	34.7[@] 19	3356.8	37/2$^-$	3108.3	35/2$^-$				
266.5 2	26 3	2907.8+x	33/2$^+$	2641.3+x	31/2$^+$				A_2=+0.22 4.
268.3 2	54 3	1162.95	19/2$^-$	894.64	17/2$^-$	(M1+E2)		0.22 10	A_2=$-$0.020 22.
271.6 2	43.6 26	2344.5	27/2$^-$	2072.9	25/2$^-$	(M1+E2)	0.01 3	0.312	A_2=$-$0.185 25, A_4=$-$0.05 3.
273.9 3		273.9+y	(7/2$^+$)	0.0+y	(3/2$^+$)				
^{x}276.1 3									
279.9 2	69 4	894.64	17/2$^-$	614.73	15/2$^-$	(M1+E2)		0.20 9	A_2=($-$0.014 24)?.
281.1 2	19.2 13	3637.9	39/2$^-$	3356.8	37/2$^-$	(M1+E2)		0.20 9	(A_2=$-$0.33 7)?.
283.9 2	33.4 19	1758.8	23/2$^-$	1474.9	21/2$^-$	(M1+E2)	0.05 3	0.276	A_2=$-$0.13 3, A_4=$-$0.07 3.
290.3 2	15.8 13	3198.1+x	35/2$^+$	2907.8+x	33/2$^+$	(M1(+E2))	+0.02 8	0.260	
^{x}300.4 3									
301.4 2	23.0 21	3939.4	41/2$^-$	3637.9	39/2$^-$	(M1+E2)		0.16 8	A_2=$-$0.39 7.
309.2 2	24.5 15	1544.4+x	21/2$^+$	1235.1+x	17/2$^+$	(E2)		0.0805	A_2=+0.14 5, A_4=$-$0.05 7.

γ(^{171}Re) (continued)

Eγ[†]	Iγ[‡]	Ei(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	α[a]	Comments
311.9 2	39[@] 6	1474.9	21/2−	1162.95	19/2−	(M1+E2)[&]	+0.13[&] 3	0.212 4	A_2=−0.02 3, A_4=+0.03 3 for 311.9γ+(much weaker)312.0γ.
312.0 3	9.2[@] 17	3509.9+x	37/2+	3198.1+x	35/2+				
314.1 2	36.0 21	2072.9	25/2−	1758.8	23/2−	(M1+E2)	0.05 3	0.210	A_2=−0.13 3, A_4=+0.04 4.
318.3 2	10.6 17	3828.1+x	39/2+	3509.9+x	37/2+	(M1+E2)		0.14 7	A_2=−0.02 6.
322.1 2	16[@] 4	364.4+x	9/2+	42.2+x	5/2+				
323.5 3	8.7 8	4151.5+x	41/2+	3828.1+x	39/2+	(M1+E2)	+0.05 15	0.194 6	A_2=−0.15 11, A_4=+0.23 26.
329.3 2	20.4 13	4268.7	43/2−	3939.4	41/2−	(M1+E2)	+0.01 6	0.185	A_2=−0.32 6, A_4=+0.13 7.
339.6 3	8.3[@] 17	4608.3	45/2−	4268.7	43/2−				
340.1 2	23[@] 3	1544.4+x	21/2+	1204.4+x	17/2+				
343.1 3	6.8[@] 26	2890.5	33/2−	2547.2	29/2−				
355.0 2	100 6	680.0+x	17/2−	325.0+x	13/2−	(E2)		0.0541	A_2=+0.296 18, A_4=−0.145 18.
360.1 3	3.4[@] 11	5329.7	49/2−	4969.7	47/2−				
361.4 3	5.8 25	4969.7	47/2−	4608.3	45/2−	(M1+E2)	+0.25 10	0.139 5	A_2=+0.17 7, A_4=−0.11 9.
361.7 3	8.7[@] 13	2706.1	31/2−	2344.5	27/2−				Iγ: upper limit.
363.9 3	4.0[@] 17	2403.8+x	29/2+	2039.7+x	25/2+				
376.4 2	27.2 17	568.9+x	11/2+	192.6+x	7/2+	(E2)		0.0459	A_2=+0.44 6, A_4=−0.16 5.
377.6 2	34[@] 9	651.5+y	(11/2+)	273.9+y	(7/2+)				
381.2 2	22[@] 4	381.18	13/2−	0.0	9/2−				
395.7 2	19[@] 5	1047.2+y	(15/2+)	651.5+y	(11/2+)				
399.6 2	16 4	1445.8+y	(19/2+)	1047.2+y	(15/2+)	(E2)		0.0390	A_2=+0.43 5, A_4=−0.06 5.
[x]400.0 3									
402.3 3	8.7[@] 17	3108.3	35/2−	2706.1	31/2−	(E2)			A_2=+0.37 5.
405.9 2	45[@] 9	1950.3+x	25/2+	1544.4+x	21/2+	(E2)[&]		0.0374	A_2=+0.339 21, A_4=−0.079 23 for 405.9γ+(much weaker)406.9γ.
406.9 3	6.6[@] 11	1544.4+x	21/2+	1137.5+x	21/2−				
407.4 2	66 4	771.9+x	13/2+	364.4+x	9/2+	(E2)		0.0371	A_2=+0.345 18, A_4=−0.083 20.
425.2 3	6.8 9	1872.0+y	(23/2+)	1445.8+y	(19/2+)	(E2)		0.0331	A_2=+0.375 19, A_4=−0.08 17.
427.9 2	54[@] 9	996.9+x	15/2+	568.9+x	11/2+	(E2)		0.0325	(A_2=+0.31 6, A_4=−0.03 7)?.
432.5 2	59 3	1204.4+x	17/2+	771.9+x	13/2+	(E2)		0.0316	A_2=+0.283 22, A_4=−0.077 25.
438.4 3	9.6[@] 26	2641.3+x	31/2+	2203.1+x	27/2+				
445.7 2	59 4	1442.6+x	19/2+	996.9+x	15/2+	(E2)		0.0293	A_2=+0.42 6, A_4=+0.01 5.
457.3 2	43[@] 4	614.73	15/2−	157.34	11/2−				
457.5 2	83[@] 6	1137.5+x	21/2−	680.0+x	17/2−	(E2)[&]		0.0274	A_2=+0.293 10, A_4=−0.108 14 for 457.5γ+(weaker)457.3γ.
463.1 2	19.8 11	1235.1+x	17/2+	771.9+x	13/2+	(E2)		0.0265	A_2=+0.28 3, A_4=−0.08 4.
466.3 2	12.5[@] 21	3356.8	37/2−	2890.5	33/2−				
471.5 2	23[@] 5	1675.9+x	21/2+	1204.4+x	17/2+	(E2)[&]		0.0253	A_2=+0.298 8, A_4=−0.099 11 for γ contaminated by Q γ in ^{172}Os.
472.6 2	32[@] 7	2422.9+x	29/2+	1950.3+x	25/2+				

$^{171}_{75}Re_{96}$-3

γ(^{171}Re) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[a]	Comments
473.1 *2*	32[@] *22*	1915.7+x	23/2$^+$	1442.6+x	19/2$^+$	(E2)[&]	0.0251	A_2=+0.31 *3*, A_4=−0.13 *4* for 473.1γ+472.6γ (comparable strength γ's).
474.2[b] *2*	28[b@] *16*	1916.9+x	23/2$^+$	1442.6+x	19/2$^+$	[&]		
474.2[b] *2*	25[b@] *4*	2547.2	29/2$^-$	2072.9	25/2$^-$	[&]		Coincidence data used to divide Iγ. A_2=+0.31 *3*, A_4=−0.13 *4* for doublet (comparable strength γ's).
504.0 *2*	12.5[@] *25*	2907.8+x	33/2$^+$	2403.8+x	29/2$^+$			
511.3 *2*	30.0[@] *26*	3330.4+x	37/2$^-$	2819.1+x	33/2$^-$			
513.5 *2*	46[@] *6*	894.64	17/2$^-$	381.18	13/2$^-$			
529.6 *2*	13.0[@] *23*	3637.9	39/2$^-$	3108.3	35/2$^-$			
529.7 *2*	18[@] *5*	2952.6+x	33/2$^+$	2422.9+x	29/2$^+$	(E2)	0.0190	(A_2=+0.37 *8*, A_4=−0.11 *9*)?.
535.7 *2*	60[@] *5*	1673.2+x	25/2$^-$	1137.5+x	21/2$^-$	(E2)	0.0185	(A_2=+0.24 *4*, A_4=−0.11 *5*)?.
548.2 *2*	47 *3*	1162.95	19/2$^-$	614.73	15/2$^-$	(E2)	0.01748	A_2=+0.323 *27*, A_4=−0.06 *3*.
550.5 *2*	28.3 *19*	3880.9+x	41/2$^-$	3330.4+x	37/2$^-$			A_2=+0.16 *4*.
554.7[c] *3*		1235.1+x	17/2$^+$	680.0+x	17/2$^-$			Shown on level scheme, but not listed in γ-ray table.
556.8 *2*	17[@] *4*	3198.1+x	35/2$^+$	2641.3+x	31/2$^+$	(E2)	0.01684	(A_2=+0.47 *7*, A_4=+0.01 *8*)?.
562.9 *2*	36[@] *3*	2819.1+x	33/2$^-$	2256.2+x	29/2$^-$	(E2)	0.01641	(A_2=+0.363 *25*, A_4=−0.074 *26*)?.
580.3 *2*	47.4 *28*	1474.9	21/2$^-$	894.64	17/2$^-$	(E2)	0.01527	A_2=+0.28 *3*, A_4=−0.02 *4*.
582.7 *3*	7.5 *19*	3939.4	41/2$^-$	3356.8	37/2$^-$			
582.8 *2*	132[@] *4*	3535.4+x	37/2$^+$	2952.6+x	33/2$^+$	(E2)	0.01512	A_2=+0.25 *2*.
583.0 *2*	46[@] *4*	2256.2+x	29/2$^-$	1673.2+x	25/2$^-$	(E2)	0.01511	A_2=+0.267 *18*, A_4=−0.071 *19*.
585.6 *2*	61 *4*	2344.5	27/2$^-$	1758.8	23/2$^-$	(E2)	0.01495	A_2=+0.31 *3*, A_4=−0.12 *3*.
595.9 *2*	57 *8*	1758.8	23/2$^-$	1162.95	19/2$^-$	(E2)	0.01436	A_2=+0.285 *16*, A_4=−0.190 *18*.
598.0 *2*	51 *3*	2072.9	25/2$^-$	1474.9	21/2$^-$	(E2)	0.01424	A_2=+0.30 *3*, A_4=−0.07 *3*.
601.9 *2*	13.6[@] *28*	3509.9+x	37/2$^+$	2907.8+x	33/2$^+$			
616.9 *3*	8.7[@] *17*	4497.8+x	(45/2$^-$)	3880.9+x	41/2$^-$			
628	8[@] *3*	4163.4+x	(41/2$^+$)	3535.4+x	37/2$^+$			
630.1 *2*	13[@] *3*	3828.1+x	39/2$^+$	3198.1+x	35/2$^+$			
630.8 *3*	8.9[@] *19*	4268.7	43/2$^-$	3637.9	39/2$^-$			
641.6 *3*	7.9[@] *21*	4151.5+x	41/2$^+$	3509.9+x	37/2$^+$			
668.8 *3*	7.7[@] *21*	4608.3	45/2$^-$	3939.4	41/2$^-$			
683.1 *3*	5.5[@] *11*	5180.9+x	(49/2$^-$)	4497.8+x	(45/2$^-$)			
701.0 *3*	7.5[@] *19*	4969.7	47/2$^-$	4268.7	43/2$^-$			I_γ: upper limit.
721.4 *3*	7.4[@] *19*	5329.7	49/2$^-$	4608.3	45/2$^-$			

[†] ΔE=0.2 keV for strong transitions (estimated by evaluator to be those with I$\gamma \geq$10); ΔE=0.3 keV for others. ΔE estimates were not reported in 1989Ba49, but were taken from similar work by same authors (1988Dr06).

From ENSDF

γ(^{171}Re) (continued)

‡ Relative to Iγ=100 *6* for 355.0γ.

Inferred from $\gamma(\theta)$ data; A_2 and A_4 data are given in in comments on the relevant transitions, and those shown as uncertain may be unreliable due to low-intensity contamination or a difficult background correction. Stretched Q assignments (shown as (E2)) were based on large positive A_2, and D+Q assignments (shown as (M1+E2)), on negative A_2 and placement relative to cascading E2 γ's.

@ Estimate from coincidence data (peak contaminated in singles spectra).

& Reported A_2 and/or A_4 is for complex peak.

[a] 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.

[b] Multiply placed with intensity suitably divided.

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

[x] γ ray not placed in level scheme.

$^{171}_{75}$Re$_{96}$-5

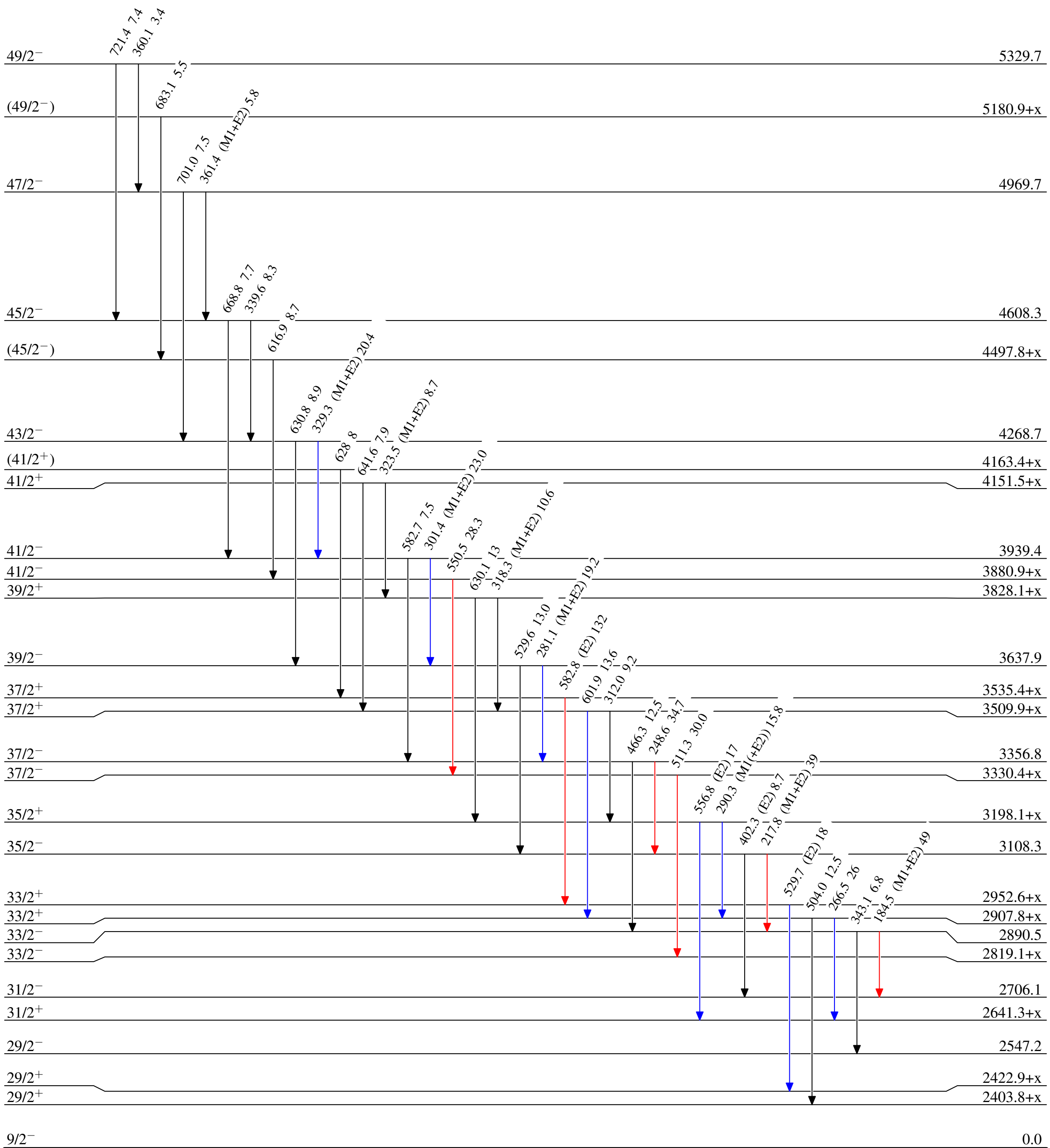
$^{144}Sm(^{30}Si,p2n\gamma)$ 1989Ba49

Legend

Level Scheme

Intensities: Relative I_γ

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



$^{171}_{75}Re_{96}$

$^{144}Sm(^{30}Si,p2n\gamma)$ 1989Ba49

Level Scheme (continued)

Intensities: Relative I_γ

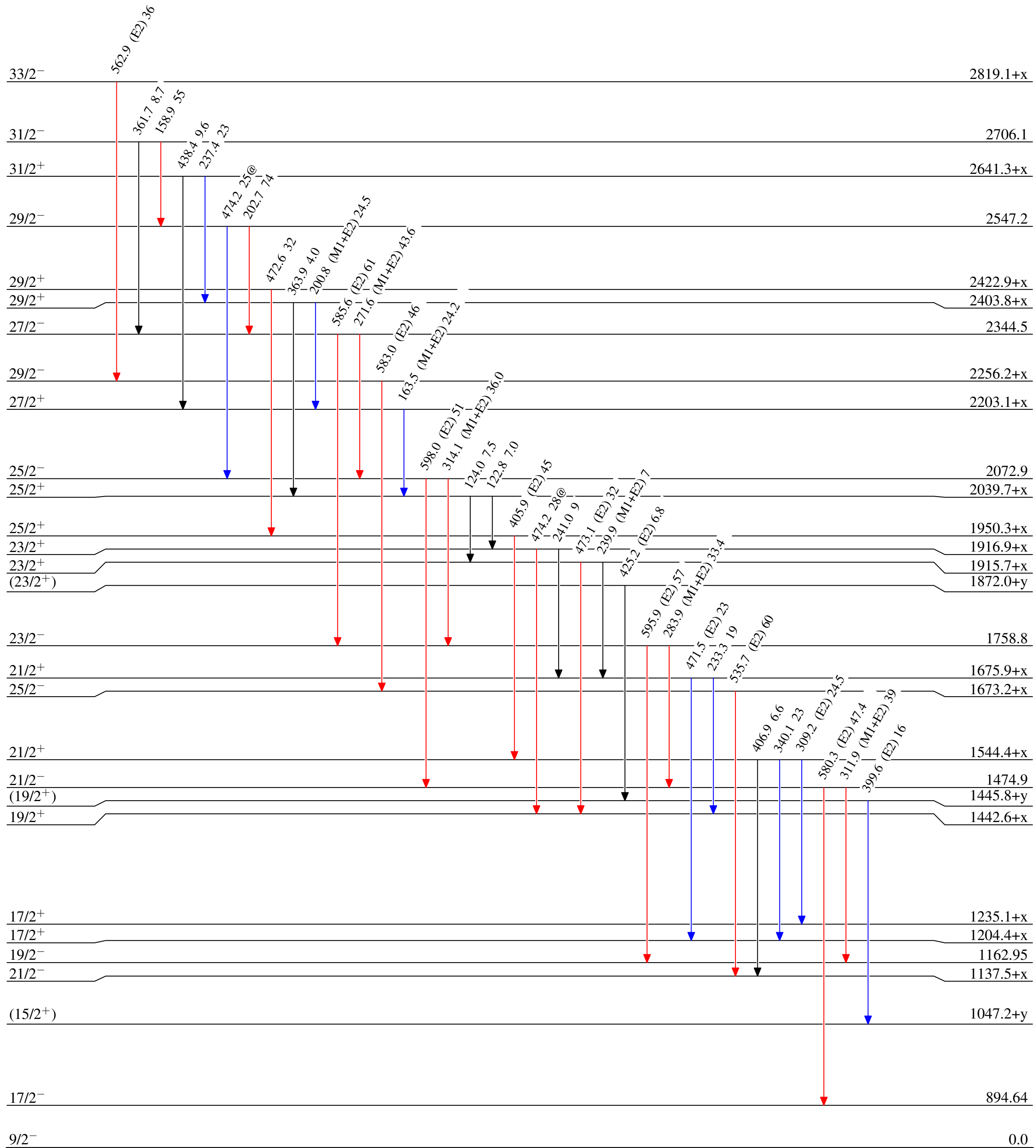
@ Multiply placed: intensity suitably divided

Legend

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

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

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



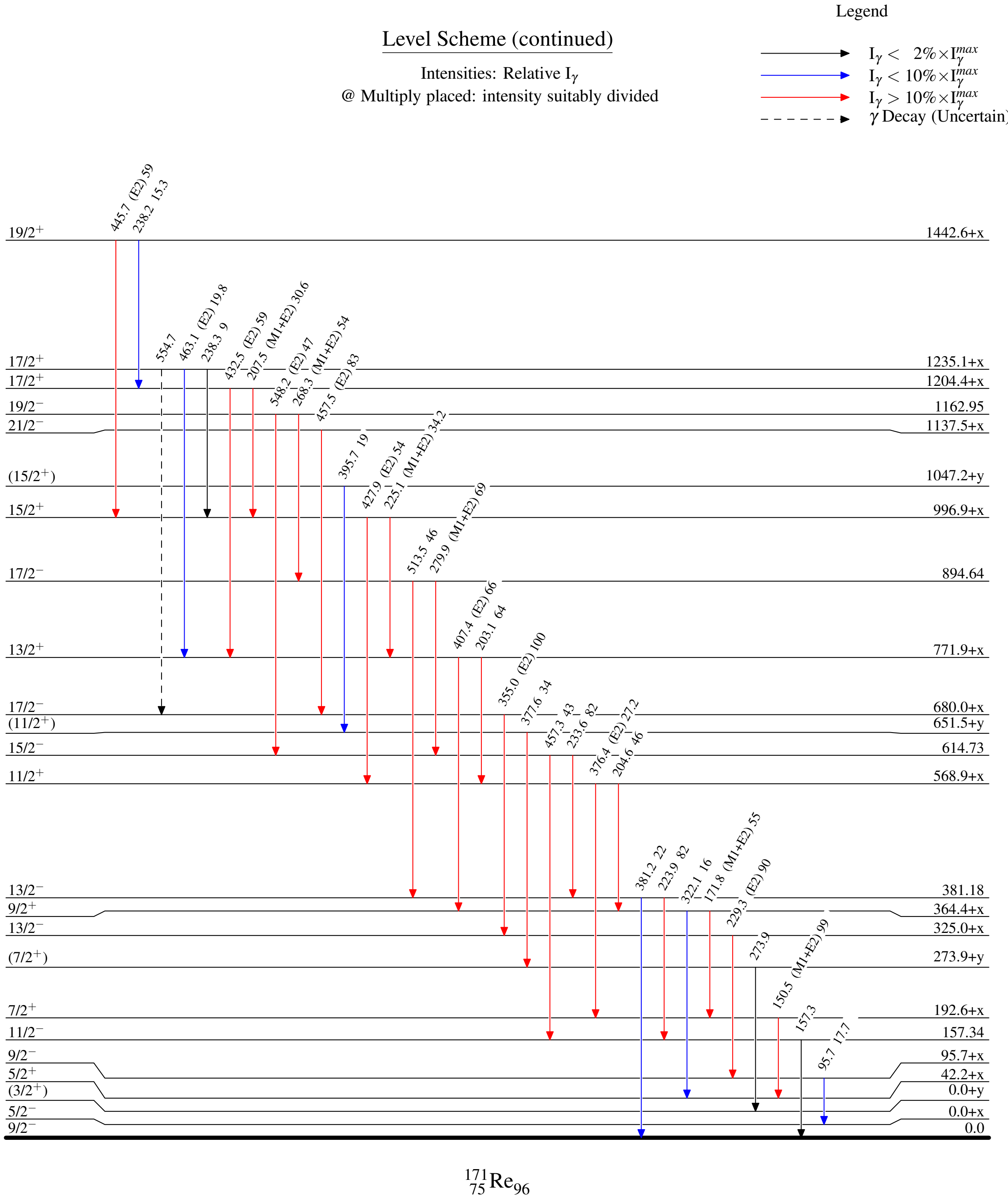
$^{171}_{75}Re_{96}$

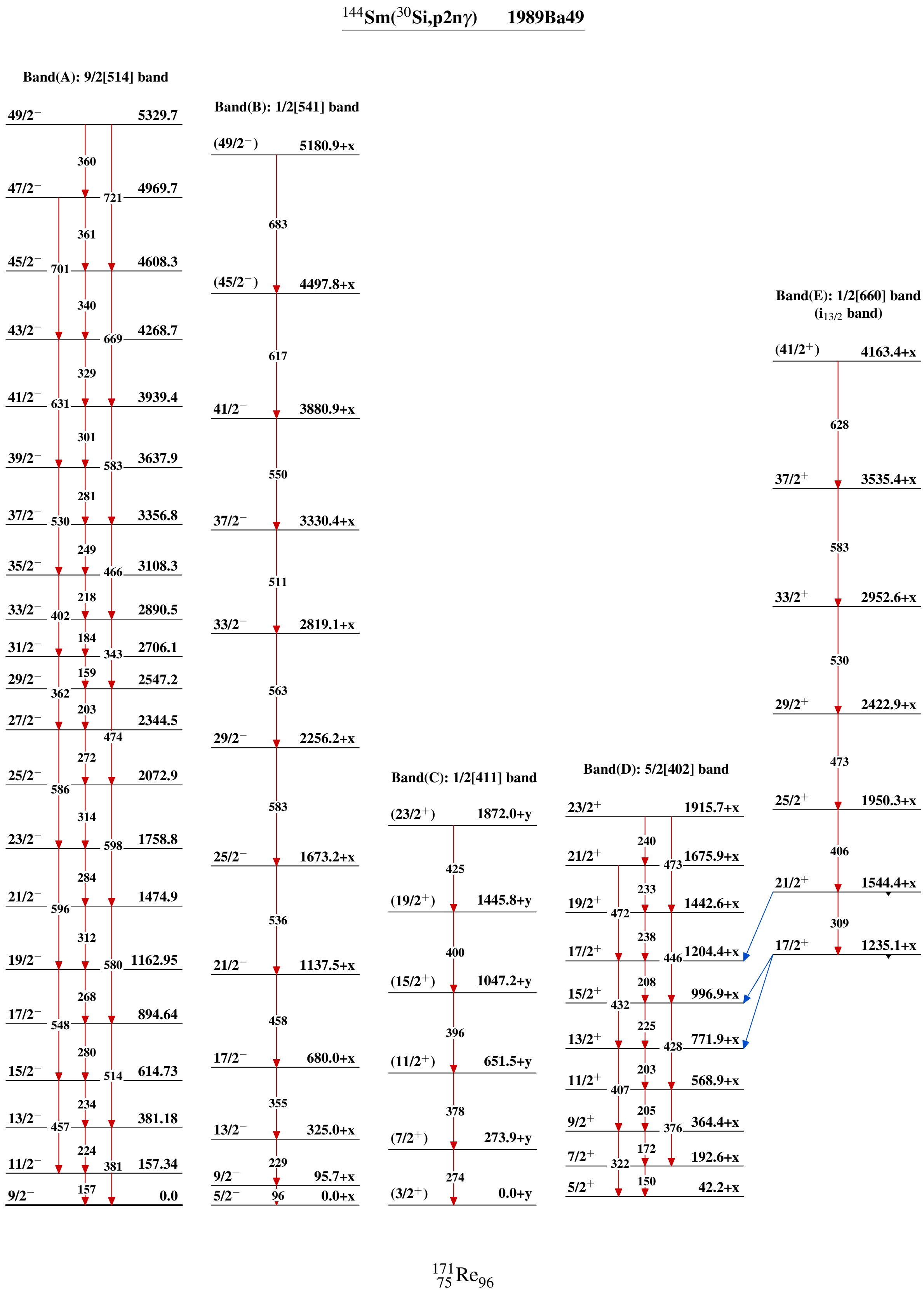
$^{144}Sm(^{30}Si,p2n\gamma)$ 1989Ba49

Level Scheme (continued)

Intensities: Relative I_γ

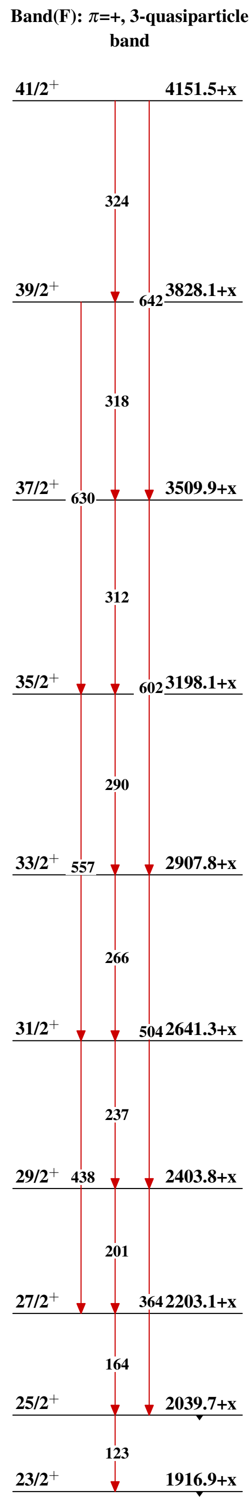
@ Multiply placed: intensity suitably divided





$^{144}Sm(^{30}Si,p2n\gamma)$ 1989Ba49
Band(A): 9/2[514] band
Band(B): 1/2[541] band
Band(C): 1/2[411] band
Band(D): 5/2[402] band
Band(E): 1/2[660] band ($i_{13/2}$ band)
49/2⁻ 5329.7
47/2⁻ 4969.7
45/2⁻ 4608.3
43/2⁻ 4268.7
41/2⁻ 3939.4
39/2⁻ 3637.9
37/2⁻ 3356.8
35/2⁻ 3108.3
33/2⁻ 2890.5
31/2⁻ 2706.1
29/2⁻ 2547.2
27/2⁻ 2344.5
25/2⁻ 2072.9
23/2⁻ 1758.8
21/2⁻ 1474.9
19/2⁻ 1162.95
17/2⁻ 894.64
15/2⁻ 614.73
13/2⁻ 381.18
11/2⁻ 157.34
9/2⁻ 0.0
(49/2⁻) 5180.9+x
(45/2⁻) 4497.8+x
41/2⁻ 3880.9+x
37/2⁻ 3330.4+x
33/2⁻ 2819.1+x
29/2⁻ 2256.2+x
25/2⁻ 1673.2+x
21/2⁻ 1137.5+x
17/2⁻ 680.0+x
13/2⁻ 325.0+x
9/2⁻ 95.7+x
5/2⁻ 0.0+x
(23/2⁺) 1872.0+y
(19/2⁺) 1445.8+y
(15/2⁺) 1047.2+y
(11/2⁺) 651.5+y
(7/2⁺) 273.9+y
(3/2⁺) 0.0+y
23/2⁺ 1915.7+x
21/2⁺ 1675.9+x
19/2⁺ 1442.6+x
17/2⁺ 1204.4+x
15/2⁺ 996.9+x
13/2⁺ 771.9+x
11/2⁺ 568.9+x
9/2⁺ 364.4+x
7/2⁺ 192.6+x
5/2⁺ 42.2+x
(41/2⁺) 4163.4+x
37/2⁺ 3535.4+x
33/2⁺ 2952.6+x
29/2⁺ 2422.9+x
25/2⁺ 1950.3+x
21/2⁺ 1544.4+x
17/2⁺ 1235.1+x
360 361 340 329 301 281 249 218 184 159 203 272 314 284 312 268 280 234 224 157
721 701 669 631 583 530 466 402 343 362 474 586 598 596 580 548 514 457 381
683 617 550 511 563 583 536 458 355 229 96
425 400 396 378 274
240 473 233 472 238 446 208 432 225 428 203 407 205 376 172 322 150
628 583 530 473 406 309
$^{171}_{75}Re_{96}$

^{144}Sm(^{30}Si,p2nγ) 1989Ba49 (continued)



$^{171}_{75}Re_{96}$