^{118}Sn(p,nγ) 1992Gu12

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	K. Kitao	NDS 75,99 (1995)	1-Feb-1993

1992Gu12 E=5.5-7.5 MeV; γ, γγ coin, γ(θ), ce; Hauser-Feshbach analysis on cross section for different levels.
Other: 1974ChZC E=32-40 MeV, semi.
The level scheme is that proposed by 1992Gu12. The (α,nγ) data also reported by same authors.
For decay from 269.7 level(13.3 ns) and 969.8 level(22.6 ns), see ^{115}In(α,n),^{118}Sn(p,n)(d,2n): delayed decay.

^{118}Sb Levels

E(level)†	Jπ‡	$T_{1/2}$#	Comments
0.0	1^+	3.6 min *1*	
31.28 *5*	(2)	<15 ns	
50.803 *25*	$(3)^+$	20.6 μs *6*	
82.13 *8*	$(4)^+$		
166.167 *22*	$(2)^+$		
269.82 *4*	$(3)^-$	13.4 ns *3*	
324.327 *20*	2^+		
324.57 *7*	$(4)^+$		
398.23 *5*	$(4)^-$		
403.53 *4*	$(3)^+$		
540.63 *3*	3^+		
557.39 *10*	(3,4)		
569.93 *21*	$(4,5)^-$		
606.33 *11*	(5)		Jπ: tentatively given by authors based on excit.
618.70 *5*	$(3,4,5)^+$		
622.223 *21*	$1^+,2^+$		
629.03 *4*	$(3)^+$		
637.58 *5*	$(3,4,5)^-$		
682.88 *7*	$(3,4,5)^-$		
741.25 *3*	$(2,3)^+$		
788.33 *5*	$(2,3)^+$		
833.75 *5*	$(2,3)^-$		
852.27 *13*	$(3,4,5)^+$		
863.40 *3*	$(1,2,3)^+$		
939.07 *13*	$(3,4,5)^+$		
940.11 *5*	$(0,2,3)^+$		
985.63 *21*	(3,4)		Jπ: tentatively given by authors based on excit.
998.71 *5*	$(2,3)^+$		Jπ: tentatively given by authors based on mult of relevant transitions and excit.
1016.92 *6*	$^-$		
1019.34 *4*	$0^+,1^+,2^+$		
1024.23 *11*			
1044.35 *3*	$(2,3)^+$		
1073.1 *3*	$^-$		
1096.12 *4*	$1^+,2^+,3^+$		
1117.35 *5*	$(1,2,3)^+$		
1124.43 *11*			
1131.35 *4*	$0^+,1^+,2^+$		
1153.88 *10*			
1160.48 *5*	$^+$		
1164.6 *6*			
1168.23 *20*			
1191.81 *8*	$(2\text{ to }6)^+$		
1213.76 *6*	$^-$		
1252.11 *10*	$(1,2,3)^-$		
1262.73 *21*	$(2,3,4)^-$		

Continued on next page (footnotes at end of table)

^{118}Sn(p,nγ) 1992Gu12 (continued)

^{118}Sb Levels (continued)

E(level)†	Jπ‡	E(level)†	E(level)†
1279.73 *8*	(3,4,5)$^+$	1299.83 *11*	1327.63 *11*
1286.2 *5*		1306.93 *11*	1411.33 *11*
1294.42 *7*		1309.43 *11*	1427.73 *19*
1296.14 *11*	$^+$	1325.83 *11*	1434.33 *11*
			1497.63 *20*

† From a least-squares fit to E(γ′s).
‡ From Adopted Levels.
# From Adopted Levels.

γ(^{118}Sb)

α(K)exp were obtained from I(ce(K))/Iγ, and normalized to α(K)(324.28γ)=0.0222 *10* with the mixing ratio of δ=−0.09 *17* (1992Gu12).

E_γ †	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	δ [a]	α [c]	Comments
31.2‡ *2*		31.28	(2)	0.0	1^+				E_γ: from delayed decay (1985Di07).
50.82 *5*	9.0 *10*	50.803	$(3)^+$	0.0	1^+				
103.65 *3*	4.6 *2*	269.82	$(3)^-$	166.167	$(2)^+$	D			δ: +0.11 *10*.
[x]109.0 *3*	<1.7								
112.22 *3*	2.8 *1*	741.25	$(2,3)^+$	629.03	$(3)^+$				
115.37 *3*	92.7 *20*	166.167	$(2)^+$	50.803	$(3)^+$	M1		0.418	α(K)exp=0.34 *3*. α(K)=0.360. δ: +0.02 *15*.
128.38 *3*	8.5 *2*	398.23	$(4)^-$	269.82	$(3)^-$	M1(+E2)	−0.01 *7*	0.310 *2*	α(K)exp=0.21 *8*. α(K)=0.267 *2*.
153.8 *2*	1.7 *1*	557.39	(3,4)	403.53	$(3)^+$				
158.2 *1*	1.6 *1*	324.327	2^+	166.167	$(2)^+$				
171.7 *2*	2.0 *5*	569.93	$(4,5)^-$	398.23	$(4)^-$				
187.8 *1*	5.3 *3*	269.82	$(3)^-$	82.13	$(4)^+$	E1	*b*	0.0322	α(K)exp=0.023 *4*. α(K)=0.0279. δ −0.01 *19*.
208.1 *1*	1.2 *3*	606.33	(5)	398.23	$(4)^-$				
216.26 *3*	3.8 *2*	540.63	3^+	324.327	2^+	M1(+E2)	+0.06 *5*	0.0745 *3*	α(K)exp=0.0626 *20*. α(K)=0.0644 *2*.
232.8 *1*	0.7 *1*	557.39	(3,4)	324.57	$(4)^+$				
237.34 *5*	20 *5*	403.53	$(3)^+$	166.167	$(2)^+$				
238.54 *3*	90 *20*	269.82	$(3)^-$	31.28	(2)	D			Mult.: from γ(θ). δ: +0.02 *8*.
273.6 *1*	22 *3*	324.327	2^+	50.803	$(3)^+$				
273.7 *1*	28 *4*	324.57	$(4)^+$	50.803	$(3)^+$				
278.10 *3*	3.3 *2*	1019.34	$0^+,1^+,2^+$	741.25	$(2,3)^+$	M1(+E2)		0.043 *5*	α(K)exp=0.032 *4*. α(K)=0.036 *4*.
284.4 *1*	0.9 *5*	682.88	$(3,4,5)^-$	398.23	$(4)^-$				
294.1 *1*	2.2 *1*	618.70	$(3,4,5)^+$	324.57	$(4)^+$	M1(+E2)		0.036 *4*	α(K)exp=0.022 *8*. α(K)=0.0308 *22*.
297.92 *3*	1.9 *1*	622.223	$1^+,2^+$	324.327	2^+	D(+Q)			δ: −0.31 *19* for γ(2^+ to 2^+).
304.3 *3*	4.8 *5*	629.03	$(3)^+$	324.57	$(4)^+$				
304.7 *1*	2.5 *5*	629.03	$(3)^+$	324.327	2^+				
317.88 *6*	3.6 *1*	940.11	$(0,2,3)^+$	622.223	$1^+,2^+$				
324.28 *3*	41.7 *5*	324.327	2^+	0.0	1^+	M1(+E2)	−0.09 *17*	0.0257 *2*	Mult.,δ: from γ(θ) and K/L.
352.6 *2*	2.7 *1*	403.53	$(3)^+$	50.803	$(3)^+$				
367.75 *3*	8.0 *2*	637.58	$(3,4,5)^-$	269.82	$(3)^-$	M1,E2		0.0190 *4*	α(K)exp=0.0141 *20*. α(K)=0.0163 *1*.
374.51 *3*	9.0 *2*	540.63	3^+	166.167	$(2)^+$	M1,E2		0.0181 *3*	α(K)exp=0.0139 *20*. α(K)=0.0155. δ: −0.06 *5* for γ(3^+ to 2^+).
380.00 *3*	2.8 *1*	1213.76	−	833.75	$(2,3)^-$	M1,E2		0.0174 *2*	α(K)exp=0.014 *4*. α(K)=0.0149.
384.85 *6*	2.0 *1*	788.33	$(2,3)^+$	403.53	$(3)^+$	M1,E2		0.0168 *1*	α(K)exp=0.012 *6*. α(K)=0.0144 *1*.
[x]388.9 *1*	2.1 *1*								
413.15 *6*	3.0 *3*	682.88	$(3,4,5)^-$	269.82	$(3)^-$	M1,E2		0.0138 *2*	α(K)exp=0.010 *4*. α(K)=0.0118 *3*.
416.92 *8*	1.3 *1*	741.25	$(2,3)^+$	324.327	2^+	M1,E2		0.0134 *2*	α(K)exp=0.011 *6*. α(K)=0.0115 *3*.

$^{118}_{51}Sb_{67}$-3

^{118}Sn(p,nγ) 1992Gu12 (continued)

γ(^{118}Sb) (continued)

E_γ [†]	I_γ [#]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [&]	δ [a]	α [c]	Comments
456.05 *3*	18.4 *3*	622.223	$1^+,2^+$	166.167	$(2)^+$	M1+E2		0.0105 *4*	α(K)exp=0.0095 *8*. α(K)=0.0091 *5*. δ: +0.25 for γ(1^+ to 2^+), −0.40 *18* for γ(2^+ to 2^+). α(K)exp=0.0095 *8*.
462.88 *5*	11.7 *3*	629.03	$(3)^+$	166.167	$(2)^+$	M1+E2	−0.04 *5*	0.0105	α(K)exp=0.0083 *16*. α(K)=0.0091.
463.9 *1*	0.3 *2*	788.33	$(2,3)^+$	324.327	2^+				
473.90 *6*	1.6 *1*	1096.12	$1^+,2^+,3^+$	622.223	$1^+,2^+$				
488.33 *4*	2.9 *1*	1117.35	$(1,2,3)^+$	629.03	$(3)^+$				
506.7 *2*	4.8 *5*	557.39	(3,4)	50.803	$(3)^+$				
518.6 *2*	1.5 *5*	788.33	$(2,3)^+$	269.82	$(3)^-$				
527.7 *1*	2.2 *1*	852.27	$(3,4,5)^+$	324.57	$(4)^+$	M1,E2			α(K)exp=0.0055 *20*. α(K)=0.0062 *5*.
538.6 *2*	1.4 *2*	1160.48	$^+$	622.223	$1^+,2^+$				
538.7 *2*	0.7 *1*	863.40	$(1,2,3)^+$	324.327	2^+				
540.7 *4*	0.7 *1*	540.63	3^+	0.0	1^+				
563.92 *4*	13.2 *4*	833.75	$(2,3)^-$	269.82	$(3)^-$	M1+E2			α(K)exp=0.0049 *6*. α(K)=0.0052 *5*. δ: 0.08 *8* for γ(2^- to 3^-), −0.62 *16* for γ(3^- to 3^-).
567.90 *4*	3.3 *2*	618.70	$(3,4,5)^+$	50.803	$(3)^+$				
571.42 *3*	5.8 *3*	622.223	$1^+,2^+$	50.803	$(3)^+$	M1,E2			α(K)exp=0.0049 *10*. 0.0050 *5*. δ: −0.05 for M1+E2 γ (2^+ to 3^+).
575.08 *3*	4.2 *2*	741.25	$(2,3)^+$	166.167	$(2)^+$	M1+E2			E_γ: from authors′ drawing; 575.80 in the authors′ table appears to be a misprint. α(K)exp=0.0055 *10*. α(K)=0.0050 *5*. δ: −0.34 *21* if 2^+ to 2^+, 0.17 *10* if 3^+ to 2^+.
578.2 *2*	1.5 *1*	629.03	$(3)^+$	50.803	$(3)^+$	M1,E2			α(K)exp=0.0069 *20*. α(K)=0.0049 *5*.
594.7 *5*	[@]	1164.6		569.93	$(4,5)^-$				
614.5 *1*	5.3 *3*	939.07	$(3,4,5)^+$	324.57	$(4)^+$	M1(+E2)			α(K)exp=0.0047 *4*. α(K)=0.0042 *4*.
620.7 *1*	0.6 *1*	1024.23		403.53	$(3)^+$				
622.19 *4*	4.1 *2*	622.223	$1^+,2^+$	0.0	1^+	M1(+E2)			α(K)exp=0.0046 *4*. α(K)=0.0041 *4*. δ: +0.16 if 1^+ to 1^+, +0.30 *11* if 2^+ to 1^+.
633.7 *2*	2.3 *1*	1262.73	$(2,3,4)^-$	629.03	$(3)^+$	E1			α(K)exp=0.0009 *4*. α(K)=0.00128.
640.78 *4*	0.8 *1*	1044.35	$(2,3)^+$	403.53	$(3)^+$	M1(+E2)			α(K)exp=0.0040 *20*. α(K)=0.0038 *4*.
674.4 *1*	1.8 *1*	998.71	$(2,3)^+$	324.327	2^+	M1,E2			α(K)exp=0.0039 *10*. α(K)=0.0033 *4*.
690.44 *10*	16.7 *4*	741.25	$(2,3)^+$	50.803	$(3)^+$	M1(+E2)			α(K)exp=0.00333 *20*. α(K)=0.0032 *4*. δ: −0.08 *17* if 2^+ to 3^+, −0.65 *16* if 3^+ to 3^+, and 0.10 if 4^+ to 3^+.
692.0 *5*	[@]	1096.12	$1^+,2^+,3^+$	403.53	$(3)^+$				
694.6 *5*	2.3 *1*	1019.34	$0^+,1^+,2^+$	324.327	2^+				
697.22 *4*	9.7 *3*	863.40	$(1,2,3)^+$	166.167	$(2)^+$	M1(+E2)			α(K)exp=0.0036 *4*. α(K)=0.0031 *4*.
715.8 *2*	3.5 *1*	985.63	(3,4)	269.82	$(3)^-$				
719.89 *6*	2.1 *1*	1044.35	$(2,3)^+$	324.327	2^+	M1,E2			α(K)exp=0.0027 *6*. α(K)=0.0029 *3*.
737.51 *8*	9.3 *2*	788.33	$(2,3)^+$	50.803	$(3)^+$	M1+E2	0.9 *+11−6*		α(K)exp=0.00271 *20*. α(K)=0.0032 *3*. δ: from α(K)exp. Others: 0.22 *18* if 2^+ to 3^+, −0.14 *17* if 3^+ to 3^+ from γ(θ).
747.09 *4*	2.7 *1*	1016.92	$^-$	269.82	$(3)^-$	M1,E2			α(K)exp=0.0026 *4*. α(K)=0.0026 *3*.

$^{118}_{51}Sb_{67}$-4

^{118}Sn(p,nγ) 1992Gu12 (continued)

γ(^{118}Sb) (continued)

E_γ[†]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
755.5 *1*	0.6 *1*	1296.14	$^+$	540.63	3^+	M1,E2	α(K)exp=0.0032 *20*. α(K)=0.0025 *3*.
771.85 *4*	6.0 *1*	1096.12	$1^+,2^+,3^+$	324.327	2^+	M1,E2	α(K)exp=0.0030 *6*. α(K)=0.0024 *3*.
773.6 *5*	1.4 *1*	940.11	$(0,2,3)^+$	166.167	$(2)^+$		
788.2 *3*	1.8 *2*	788.33	$(2,3)^+$	0.0	1^+	M1,E2	α(K)exp=0.0025 *4*. α(K)=0.0027 *3*.
789.5 *5*	0.8 *4*	1427.73		637.58	$(3,4,5)^-$		
793.1 *1*	2.7 *1*	1117.35	$(1,2,3)^+$	324.327	2^+	M1,E2	α(K)exp=0.0022 *6*. α(K)=0.0023 *3*.
803.3 *3*	4.3 *1*	1073.1	$^-$	269.82	$(3)^-$	M1,E2	α(K)exp=0.0019 *6*. α(K)=0.0022 *3*.
807.03 *4*	3.3 *1*	1131.35	$0^+,1^+,2^+$	324.327	2^+	M1,E2	α(K)exp=0.0023 *4*. α(K)=0.0022 *3*.
[x]821.2 *1*	2.7 *1*						
829.2 *4*	2.2 *1*	1153.88		324.327	2^+		
832.54 *4*	2.4 *1*	998.71	$(2,3)^+$	166.167	$(2)^+$	M1,E2	α(K)exp=0.0023 *6*. α(K)=0.00202 *23*.
843.9 *2*	2.0 *10*	1168.23		324.327	2^+		
847.2 *2*	1.2 *1*	1117.35	$(1,2,3)^+$	269.82	$(3)^-$		
854.6 *1*	1.5 *1*	1124.43		269.82	$(3)^-$		
[x]860.7 *1*	2.1 *1*						
863.42 *4*	3.0 *1*	863.40	$(1,2,3)^+$	0.0	1^+	M1,E2	α(K)exp=0.0016 *6*. α(K)=0.00216 *24*.
867.23 *4*	3.2 *1*	1191.81	$(2\text{ to }6)^+$	324.57	$(4)^+$	M1,E2	α(K)exp=0.0015 *4*. α(K)=0.00184 *21*.
878.10 *6*	1.5 *1*	1044.35	$(2,3)^+$	166.167	$(2)^+$	M1,E2	α(K)exp=0.0019 *6*. α(K)=0.00179 *21*.
901.6 *1*	0.9 *1*	1299.83		398.23	$(4)^-$		
908.7 *1*	0.9 *1*	1306.93		398.23	$(4)^-$		
[x]910.6 *1*	2.1 *2*						
927.7 *1*	3.0 *2*	1252.11	$(1,2,3)^-$	324.327	2^+		
940.12 *6*	2.2 *1*	940.11	$(0,2,3)^+$	0.0	1^+		
943.97 *8*	3.3 *2*	1213.76	$^-$	269.82	$(3)^-$	M1,E2	α(K)exp=0.0015 *4*. α(K)=0.00152 *18*.
955.15 *3*	7.1 *2*	1279.73	$(3,4,5)^+$	324.57	$(4)^+$	M1(+E2)	α(K)exp=0.0019 *4*. α(K)=0.00148 *17*.
[x]957.5 *1*	2.5 *2*						
961.9 *5*	[@]	1286.2		324.327	2^+		
962.1 *1*	1.5 *3*	1044.35	$(2,3)^+$	82.13	$(4)^+$		
982.6 *2*	5.0 *2*	1252.11	$(1,2,3)^-$	269.82	$(3)^-$	M1,E2	α(K)exp=0.0012 *3*. α(K)=0.00138 *16*.
994.29 *4*	5.7 *2*	1160.48	$^+$	166.167	$(2)^+$	M1,E2	α(K)exp=0.00140 *20*. α(K)=0.00135 *16*.
1003.3 *1*	1.8 *2*	1327.63		324.327	2^+		
1019.32 *6*	6.1 *2*	1019.34	$0^+,1^+,2^+$	0.0	1^+	M1(+E2)	α(K)exp=0.00166 *20*. α(K)=0.00128 *15*.
1024.59 *6*	1.8 *1*	1294.42		269.82	$(3)^-$		
[x]1030.2 *1*	3.2 *3*						
[x]1033.5 *1*	4.5 *3*						
1039.6 *1*	2.6 *3*	1309.43		269.82	$(3)^-$		
1044.49 *4*	3.9 *2*	1044.35	$(2,3)^+$	0.0	1^+		
1056.0 *1*	4.1 *5*	1325.83		269.82	$(3)^-$		
[x]1068.3 *1*	2.9 *2*						
[x]1080.8 *1*	4.2 *2*						
1095.8 *1*	1.9 *2*	1096.12	$1^+,2^+,3^+$	0.0	1^+		
1117.1 *2*	1.6 *2*	1117.35	$(1,2,3)^+$	0.0	1^+		
[x]1120.9 *1*	4.6 *3*						

$^{118}_{51}Sb_{67}$-5

^{118}Sn(p,nγ) 1992Gu12 (continued)

$\gamma(^{118}Sb)$ (continued)

E_γ †	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	I_γ #	E_i(level)
1131.3 *1*	5.0 *4*	1131.35	$0^+,1^+,2^+$	0.0	1^+	[x]1180.9 *1*	6.6 *3*	
[x]1136.5 *1*	2.9 *2*					[x]1234.6 *1*	3.0 *3*	
1141.5 *1*	2.8 *3*	1411.33		269.82	$(3)^-$	[x]1239.6 *1*	3.5 *3*	
1153.9 *1*	1.5 *1*	1153.88		0.0	1^+	[x]1267.5 *1*	2.7 *2*	
1158.0 *2*	1.5 *3*	1427.73		269.82	$(3)^-$	[x]1286.9 *1*	2.6 *2*	
1164.5 *1*	3.2 *2*	1434.33		269.82	$(3)^-$	[x]1292.4 *2*	2.8 *2*	
1173.3 *2*	1.4 *5*	1497.63		324.327	2^+	[x]1305.2 *2*	3.2 *2*	

† From 1992Gu12, unless otherwise noted.
‡ From 1985Di07, no intensity was given by authors.
# From 1992Gu12. Relative intensities at E(p)=6.0 MeV were given.
@ Weak intensity, but no value was given by authors.
& From α(K)exp (1992Gu12), except as noted.
[a] From $\gamma(\theta)$ (1992Gu12), except as noted.
[b] Mixing ratio had obtained from $\gamma(\theta)$, but M2 admixture considered only for >25%.
[c] 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.
[x] γ ray not placed in level scheme.

$^{118}_{51}Sb_{67}$-6

^{118}Sn(p,nγ) 1992Gu12

Level Scheme

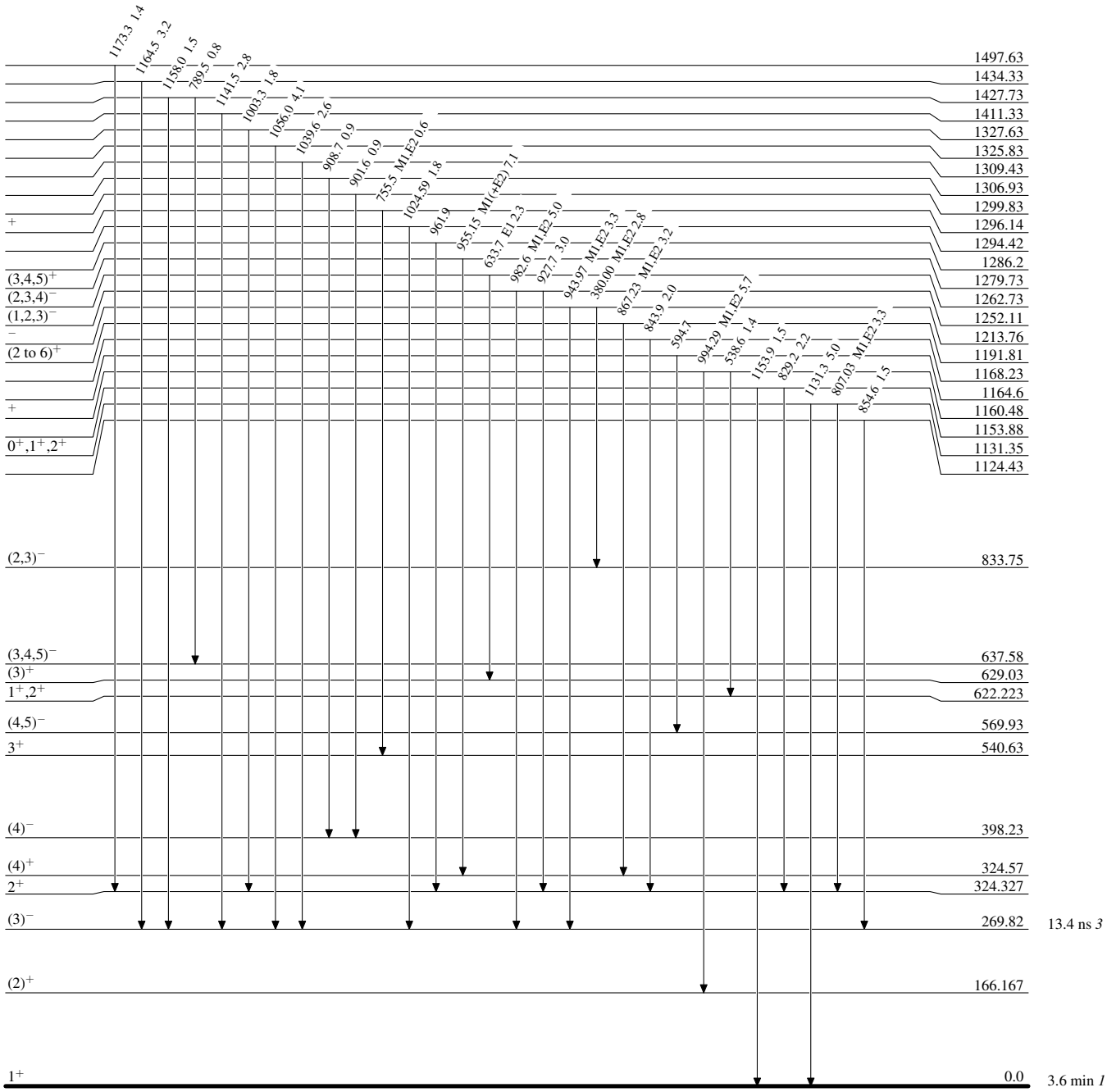
Intensities: Relative I_γ

Legend

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

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

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

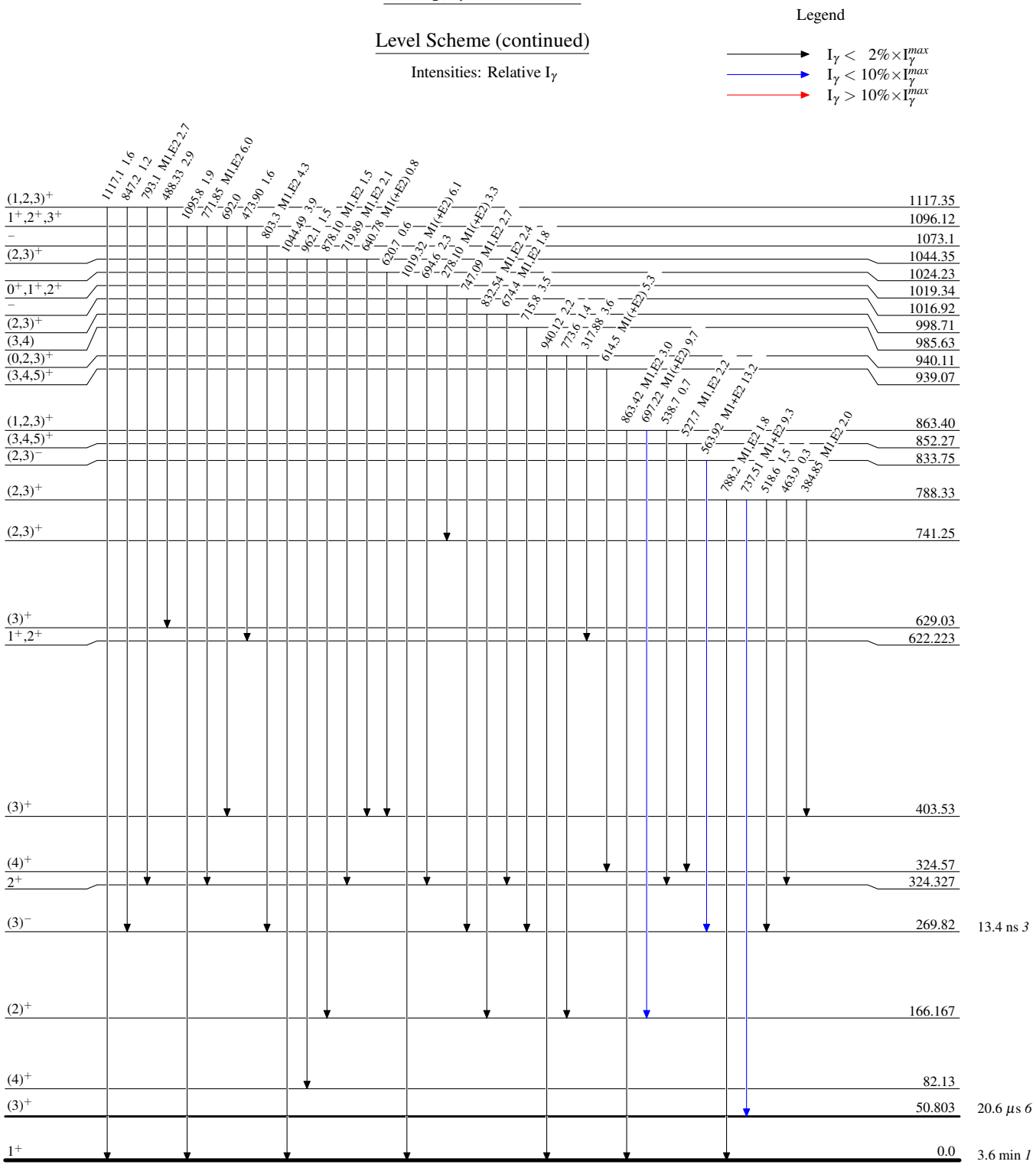


$^{118}_{51}Sb_{67}$

^{118}Sn(p,nγ) 1992Gu12

Level Scheme (continued)

Intensities: Relative I_γ

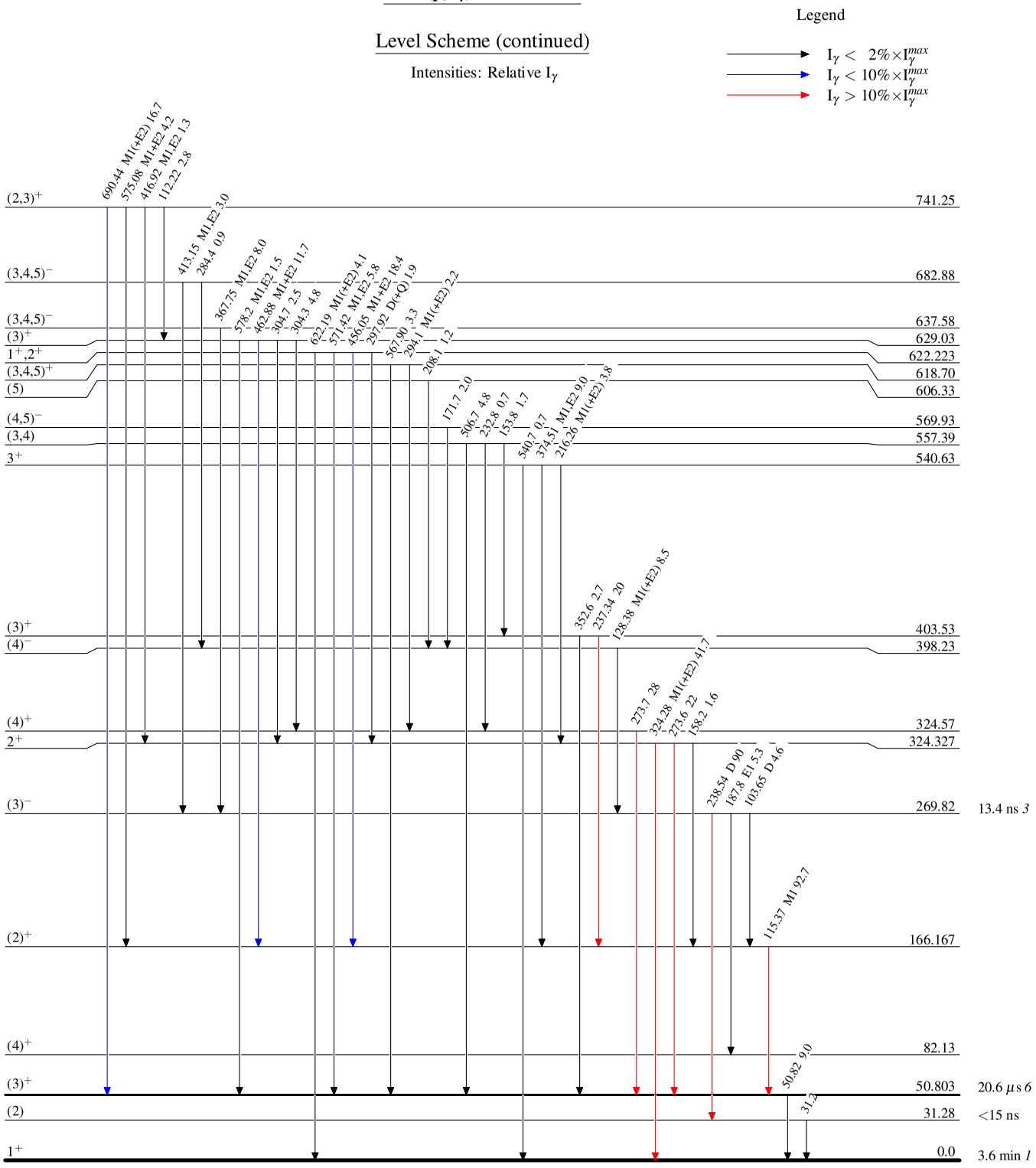


$^{118}_{51}Sb_{67}$

^{118}Sn(p,nγ) 1992Gu12

Level Scheme (continued)

Intensities: Relative I_γ



$^{118}_{51}Sb_{67}$