^{124}Sn(^{7}Li,3nγ) 2010Wa27,2012Di14

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Zoltan Elekes and Janos Timar	NDS 129, 191 (2015)	28-Feb-2015

2010Wa27: E=28, 32 MeV; measured Eγ, Iγ, γγ and γγ(θ) using a planar detector and nine BGO-Compton-suppressed Ge detectors at University of Tsukuba, Japan.

2009Zh51: E=25, 28, 32 MeV; measured Eγ, Iγ, γγ and excitation functions using an array of 14 BGO-Compton-suppressed Ge detectors at China Institute of Atomic Energy. Data are not analyzed fully, preliminary results and level scheme given.

All data are from 2010Wa27 and 2012Di14 except as noted otherwise. Level scheme from 2012Di14, which is almost identical to that of 2012Wa27, is adopted.

2012Di14: ^{7}Li beam at E=28 and 32 MeV provided by the tandem accelerator laboratory in the University of Tsukuba, Japan. Target=4 mg/cm^{2} ^{124}Sn. Gamma rays detected by an array consisting of one planar detector and nine BGO Compton-suppressed Ge detectors. Measured Eγ, Iγ, γγ-coincidence, γ(θ). Deduced levels, J, π, bands, multipolarity and configurations. Comparison with structure of doubly odd I isotopes. Same authors as 2010Wa27, almost identical results.

^{128}I Levels

E(level)[#]	J^{π}	$T_{1/2}$	Comments
167.367 *4*	(6)$^{-}$	175 ns *15*	E(level),J^{π},$T_{1/2}$: from Adopted Levels.
182.99 *25*	(7^{-})		
226.0 *4*	(5,6,7)$^{-}$		
269.57 *10*	(5,6,7)$^{-}$		
285.19[†] *23*	(8^{-})		
481.7 *4*	(7^{-})		
552.2 *5*	(8^{-})		
582.06 *14*	(8^{-})		
696.22[‡] *24*	(9^{-})		
910.83 *21*	(8^{-})		
1041.64[†] *24*	(10^{-})		
1149.9 *4*	(9^{-})		
1286.9 *6*	(9^{-})		
1291.2 *6*	(10^{-})		
1291.4 *3*	(10^{-})		
1347.0 *6*	(9^{-})		
1453.97[‡] *24*	(11^{-})		
1460.90 *24*	(9^{+})		
1562.21 *24*	(10^{+})		
1873.55[†] *25*	(12^{-})		
1964.9 *3*	(11^{+})		
1991.1 *3*	(11^{+})		
2111.4 *3*	(12^{-})		
2185.9 *3*	(12^{+})		
2302.9 *3*	(12^{+})		
2341.3[‡] *3*	(13^{-})		
2380.2 *6*	(13^{+})		
2437.8 *3*	(13^{+})		
2480.4 *6*	(12^{+})		
2520.8 *6*	(12^{+})		
2575.6 *4*	(13^{-})		
2661.6 *4*	(13^{+})		
2664.9 *3*	(14^{+})		
2691.7 *4*	(13^{+})		
2714.2 *6*	(13^{+})		
2789.2[†] *4*	(14^{-})		

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^{124}Sn(^{7}Li,3nγ) 2010Wa27,2012Di14 (continued)

^{128}I Levels (continued)

E(level)#	Jπ	E(level)#	Jπ	E(level)#	Jπ
2953.4 4	(14+)	3152.4 5	(15+)	3309.3 5	(15−)
3009.2 7	(14+)	3157.9 4	(15+)	3555.9† 6	(16−)
3115.6 5	(14−)	3158.8‡ 5	(15−)	3559.2 6	(16+)
				3621.4 5	(16+)

† Band(A): $\pi g_{7/2}\otimes\nu h_{11/2}$, α=0.
‡ Band(a): $\pi g_{7/2}\otimes\nu h_{11/2}$, α=1.
# From Adopted Levels.

γ(^{128}I)

R_{ADO}=I$g(37°)/I$\gamma$(90°) in a gated spectrum. Expected ratios are >1 for ΔJ=2, quadrupole and <1 for ΔJ=1, dipole. This ratio can also be >1 for ΔJ=0, dipole and for a certain δ(Q/D) admixture in ΔJ=1 transitions.

Eγ†	Iγ†	Ei(level)	Jπi	Ef	Jπf	Mult.	α‡	Comments
15.6		285.19	(8−)	269.57	(5,6,7)−			
58.5 5	5 2	226.0	(5,6,7)−	167.367	(6)−			R_{ADO}=1.7 6.
101.3 1	146 7	1562.21	(10+)	1460.90	(9+)	M1	0.721	α(exp)=0.88 21 (2012Di14) α(K)=0.620 9; α(L)=0.0811 12; α(M)=0.01634 24; α(N)=0.00331 5; α(O)=0.000387 6 R_{ADO}=0.70 8. Mult.: from α(exp).
102.2 1	≤632	269.57	(5,6,7)−	167.367	(6)−	M1	0.703	α(exp)=0.60 7 (2012Di14) α(K)=0.604 9; α(L)=0.0791 12; α(M)=0.01594 23; α(N)=0.00322 5; α(O)=0.000377 6 R_{ADO}=0.90 17. Mult.: from α(exp).
117.8 3	49 7	285.19	(8−)	167.367	(6)−			R_{ADO}=1.54 13.
194.8 1	54 3	2185.9	(12+)	1991.1	(11+)			R_{ADO}=0.69 6.
199.1 5	8 2	3152.4	(15+)	2953.4	(14+)			R_{ADO}=1.10 12.
221.0 1	106 5	2185.9	(12+)	1964.9	(11+)			R_{ADO}=0.72 6.
227.1 1	63 3	2664.9	(14+)	2437.8	(13+)			R_{ADO}=0.77 7.
229.9 5	12 4	2341.3	(13−)	2111.4	(12−)			R_{ADO}=0.62 7.
238.0 5	2 1	2111.4	(12−)	1873.55	(12−)			R_{ADO}=1.36 24.
239.0 5	8 2	1149.9	(9−)	910.83	(8−)			R_{ADO}=0.84 23.
246.6 5	3 1	3555.9	(16−)	3309.3	(15−)			R_{ADO}=0.75 17.
251.9 1	87 4	2437.8	(13+)	2185.9	(12+)			R_{ADO}=0.77 6.
255.6 5	4 1	481.7	(7−)	226.0	(5,6,7)−			R_{ADO}=0.92 20.
261.6 5	3 1	2953.4	(14+)	2691.7	(13+)			R_{ADO}=0.85 12.
282.6 5	12 4	552.2	(8−)	269.57	(5,6,7)−			R_{ADO}=0.85 12.
312.5 1	67 3	582.06	(8−)	269.57	(5,6,7)−			R_{ADO}=0.85 9.
314.3 5	6 2	481.7	(7−)	167.367	(6)−			R_{ADO}=0.91 15.
345.4 3	45 7	1041.64	(10−)	696.22	(9−)			R_{ADO}=0.89 7.
347.6 5	4 1	3009.2	(14+)	2661.6	(13+)			R_{ADO}=0.85 24.
369.5 5	8 2	3158.8	(15−)	2789.2	(14−)			R_{ADO}=0.80 10.
388.8 3	20 3	2691.7	(13+)	2302.9	(12+)			R_{ADO}=0.80 7.
397.1 5	10 3	3555.9	(16−)	3158.8	(15−)			R_{ADO}=0.96 11.
402.7 1	178 9	1964.9	(11+)	1562.21	(10+)			R_{ADO}=0.65 5.
411.0 1	468 23	696.22	(9−)	285.19	(8−)			R_{ADO}=0.65 5.
412.3 1	224 11	1453.97	(11−)	1041.64	(10−)			R_{ADO}=0.73 5.

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^{124}Sn(^{7}Li,3nγ) 2010Wa27,2012Di14 (continued)

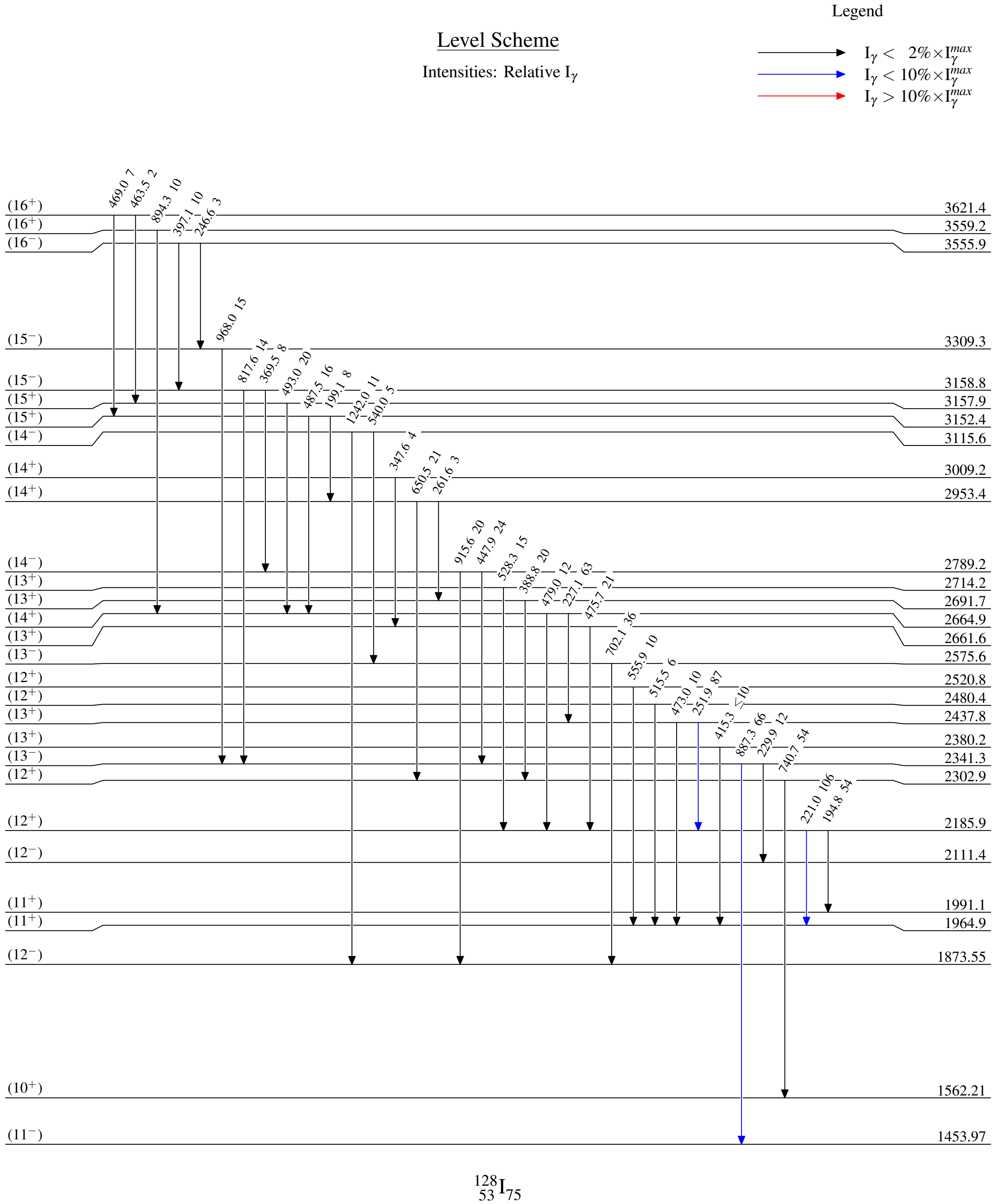
γ(^{128}I) (continued)

E_γ†	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Comments
412.3 *5*	9 *3*	1562.21	(10+)	1149.9	(9−)	R_{ADO}=0.8 *3*.
415.3 *5*	≤10	2380.2	(13+)	1964.9	(11+)	R_{ADO}=1.21 *23*.
419.5 *1*	55 *3*	1873.55	(12−)	1453.97	(11−)	R_{ADO}=0.81 *6*.
428.9 *1*	97 *5*	1991.1	(11+)	1562.21	(10+)	R_{ADO}=0.70 *6*.
429.1 *5*	11 *3*	910.83	(8−)	481.7	(7−)	R_{ADO}=0.60 *12*.
447.9 *3*	24 *3*	2789.2	(14−)	2341.3	(13−)	R_{ADO}=0.79 *7*.
463.5 *5*	2 *1*	3621.4	(16+)	3157.9	(15+)	R_{ADO}=0.67 *10*.
469.0 *5*	7 *2*	3621.4	(16+)	3152.4	(15+)	R_{ADO}=0.79 *11*.
473.0 *5*	10 *3*	2437.8	(13+)	1964.9	(11+)	R_{ADO}=1.6 *4*.
475.7 *3*	21 *3*	2661.6	(13+)	2185.9	(12+)	R_{ADO}=1.04 *17*.
479.0 *5*	12 *3*	2664.9	(14+)	2185.9	(12+)	R_{ADO}=1.52 *17*.
487.5 *5*	16 *5*	3152.4	(15+)	2664.9	(14+)	R_{ADO}=0.83 *8*.
493.0 *3*	20 *3*	3157.9	(15+)	2664.9	(14+)	R_{ADO}=0.79 *7*.
515.5 *5*	6 *2*	2480.4	(12+)	1964.9	(11+)	R_{ADO}=0.67 *12*.
528.3 *5*	15 *4*	2714.2	(13+)	2185.9	(12+)	R_{ADO}=0.77 *14*.
540.0 *5*	5 *2*	3115.6	(14−)	2575.6	(13−)	R_{ADO}=0.64 *10*.
550.1 *3*	34 *5*	1460.90	(9+)	910.83	(8−)	R_{ADO}=0.84 *19*.
555.9 *5*	10 *3*	2520.8	(12+)	1964.9	(11+)	R_{ADO}=0.78 *13*.
567.9 *5*	≤12	1149.9	(9−)	582.06	(8−)	R_{ADO}=0.65 *11*.
595.2 *1*	63 *3*	1291.4	(10−)	696.22	(9−)	R_{ADO}=0.85 *15*.
641.2 *5*	13 *4*	910.83	(8−)	269.57	(5,6,7)−	R_{ADO}=0.66 *15*.
650.5 *3*	21 *3*	2953.4	(14+)	2302.9	(12+)	R_{ADO}=1.47 *17*.
657.4 *5*	4 *1*	2111.4	(12−)	1453.97	(11−)	
702.1 *3*	36 *5*	2575.6	(13−)	1873.55	(12−)	R_{ADO}=0.72 *7*.
704.8 *5*	≤18	1286.9	(9−)	582.06	(8−)	R_{ADO}=0.55 *6*.
709.1 *5*	≤13	1291.2	(10−)	582.06	(8−)	R_{ADO}=1.46 *19*.
740.7 *1*	54 *3*	2302.9	(12+)	1562.21	(10+)	R_{ADO}=1.22 *10*.
743.5 *3*	22 *3*	910.83	(8−)	167.367	(6)−	R_{ADO}=1.4 *4*.
756.5 *1*	396 *20*	1041.64	(10−)	285.19	(8−)	R_{ADO}=1.47 *11*.
757.7 *1*	60 *3*	1453.97	(11−)	696.22	(9−)	R_{ADO}=1.32 *14*.
764.7 *1*	257 *13*	1460.90	(9+)	696.22	(9−)	R_{ADO}=1.45 *11*.
764.9 *5*	≤18	1347.0	(9−)	582.06	(8−)	R_{ADO}=0.69 *10*.
817.6 *5*	14 *4*	3158.8	(15−)	2341.3	(13−)	R_{ADO}=1.33 *11*.
820.0 *5*	7 *2*	2111.4	(12−)	1291.4	(10−)	
832.0 *1*	56 *3*	1873.55	(12−)	1041.64	(10−)	R_{ADO}=1.22 *11*.
866.0 *1*	100 *5*	1562.21	(10+)	696.22	(9−)	R_{ADO}=0.97 *8*.
887.3 *1*	66 *3*	2341.3	(13−)	1453.97	(11−)	R_{ADO}=1.39 *11*.
894.3 *5*	10 *3*	3559.2	(16+)	2664.9	(14+)	R_{ADO}=1.3 *3*.
915.6 *3*	20 *3*	2789.2	(14−)	1873.55	(12−)	R_{ADO}=1.21 *18*.
968.0 *5*	15 *5*	3309.3	(15−)	2341.3	(13−)	R_{ADO}=1.23 *12*.
1069.7 *3*	24 *4*	2111.4	(12−)	1041.64	(10−)	R_{ADO}=1.36 *13*.
1175.5 *3*	23 *3*	1460.90	(9+)	285.19	(8−)	R_{ADO}=0.98 *9*.
1242.0 *5*	11 *3*	3115.6	(14−)	1873.55	(12−)	R_{ADO}=1.22 *21*.

† From e-mail reply of Aug 24, 2010 received from one of the authors (Y.-H. Zhang) of 2010Wa27. The authors state uncertainty of 0.1-0.5 keV in energy and 5-30% in intensity. Evaluator assigns as follows in energy and intensity, respectively: 0.1 keV and 5% for Iγ>50, 0.3 keV and 15% for Iγ=20-50, 0.5 keV and 30% for Iγ<20.

‡ 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.

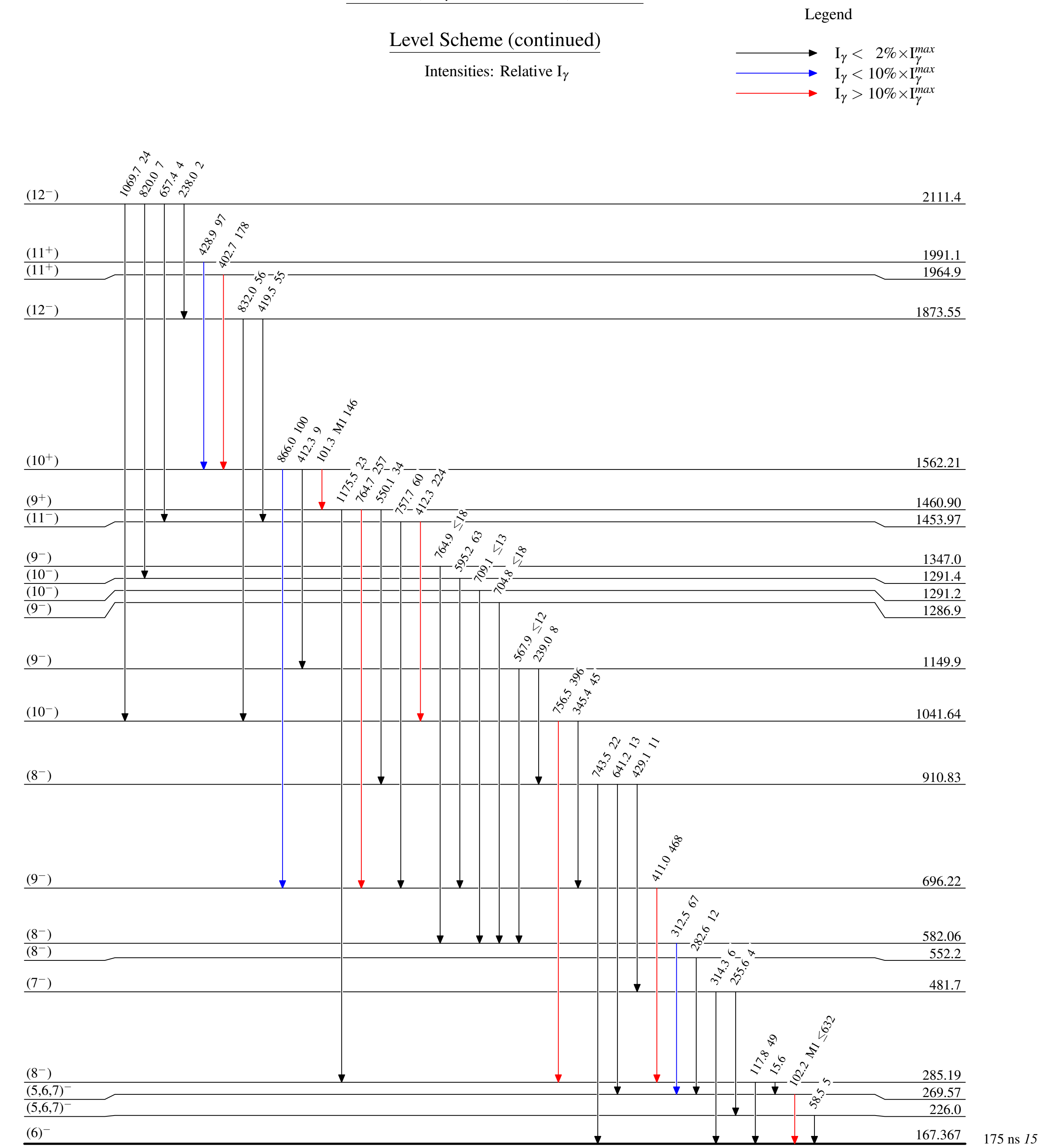
^{124}Sn(^{7}Li,3nγ) 2010Wa27,2012Di14



$^{124}Sn(^{7}Li,3n\gamma)$ **2010Wa27,2012Di14**

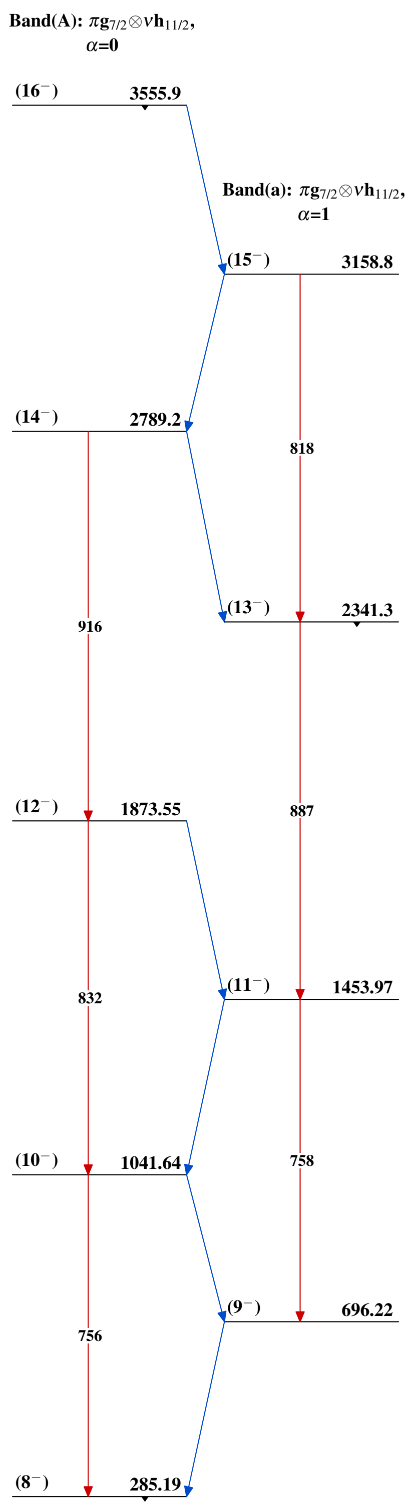
Level Scheme (continued)

Intensities: Relative I_γ



$^{128}_{53}I_{75}$

$^{124}Sn(^7Li,3n\gamma)$ 2010Wa27,2012Di14



$^{128}_{53}I_{75}$