^{82}Se(^{7}Li,4nγ) 1995Sc04,1989Wi22

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 116, 1 (2014)	31-Dec-2013

1995Sc04: E=32, 35 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, $\gamma\gamma(\theta)$(DCO), $\gamma\gamma$(particle) coin, lifetimes by DSAM using six Ge detectors and 14 Si detectors at OSIRIS Cube in Cologne. Shell-model interpretation. 1995Sc48 is from the same group.

1989Wi22, 1989Wi01 (same lab as 1995Sc04): E=35 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, γ(lin pol), lifetimes by DSA. 1989Wi01 reported lifetime and g factor measurement of 2826-keV level together with $\gamma(\theta)$ and γ(lin pol) data for eight transitions in the yrast cascade.

1982Ze02: E=25-36 MeV. Also ^{82}Se(^{6}Li,3nγ) at E=21-29 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, excitation functions. Authors also give ratios of gamma-ray intensities at E(^{7}Li)=34 MeV and 28 MeV.

^{85}Rb Levels

E(level)[†]	J$^{\pi}$[@]	T$_{1/2}$[‡]	Comments
0.0	5/2$^-$		
151.10[#] *10*	3/2$^-$		
280.9[#] *4*	1/2$^-$		
514.00 *9*	9/2$^+$	1.015 μs *1*	T$_{1/2}$: from Adopted Levels.
868.65 *9*	(7/2$^-$)		
919.5[#] *5*	(5/2$^-$)		
951.50 *14*	(5/2$^-$)		E(level): level from 1982Ze02.
1293.32 *11*	13/2$^+$	6.2 ps *+21−14*	T$_{1/2}$: the value measured by 1989Wi22 might be too small since only <3% of the total intensity of the 779γ in the spectrum is shifted by the Doppler effect.
1383.2 *5*			E(level): level from 1982Ze02.
1444.97 *9*	9/2$^{(-)}$		
1747.84 *15*	(11/2$^+$)		
2083.30 *12*	11/2$^{(-)}$		
2120.91 *15*	11/2$^{(+)}$		
2238.92 *16*			
2364.40 *12*	13/2$^+$		
2476.72 *14*	17/2$^+$	0.76 ps *+21−14*	
2511.38 *13*	13/2$^{(-)}$		
2622.62 *21*	(11/2)		
2658.86 *15*	(11/2$^+$)		
2685.66 *13*	(15/2$^+$)		
2826.52 *16*	19/2$^-$	12.5 ns *6*	g factor ≤ 0.17 (1989Wi01). T$_{1/2}$,g: from 1989Wi01, (beam)γ(t) and TDPAD method. J$^{\pi}$: (15/2$^+$) In 1982Ze02.
2843.61 *14*	15/2$^{(-)}$		
2981.09 *15*	15/2$^{(-)}$		
3016.94 *20*	(17/2$^-$)		
3042.10 *17*	15/2$^{(-)}$		
3054.53 *17*	21/2$^-$		J$^{\pi}$: (17/2$^+$) In 1982Ze02.
3073.2 *9*	(17/2 to 21/2)		E(level): level from 1982Ze02 only.
3198.25 *15*	17/2$^{(-)}$		
3203.31 *20*	(17/2$^+$)		
3491.12 *17*	21/2$^+$	5.5 ps *14*	
3562.52 *23*	(19/2)		
3717.1[#] *5*	(23/2,25/2)		
3813.16 *17*	19/2$^{(-)}$		
4135.38[#] *19*	(23/2)$^+$	0.069 ps *28*	
4311.04 *19*	21/2$^{(-)}$		

Continued on next page (footnotes at end of table)

^{82}Se(^{7}Li,4nγ) 1995Sc04,1989Wi22 (continued)

^{85}Rb Levels (continued)

E(level)[†]	J$^{\pi}$[@]	T$_{1/2}$[‡]	Comments
4356.50 *23*	21/2$^{(-)}$	0.28 ps *7*	T$_{1/2}$: From DSAM (1995Sc04).
4379.7[#] *6*	(25/2 to 29/2)		
4757.18[#] *24*	(25/2)$^{+}$	0.21 ps *7*	
4846.9 *3*			
4940.4 *5*		0.49 ps *14*	T$_{1/2}$: effective half-life from DSAM (1995Sc04), not corrected for side feeding.
5312.22[#] *22*	(25/2)$^{+}$	0.28 ps *+28−14*	
5419.27[#] *21*	(27/2)$^{+}$	>7 ps	
5611.77[#] *23*	(29/2)$^{+}$	3.5 ps *+14−7*	
6335.9[#] *3*	(31/2^{+})	0.14 ps *7*	
7107.1[#] *5*	(33/2^{+})	0.042 ps *+35−21*	

[†] From least-squares fit to Eγ data, assuming 0.3 keV uncertainty when not stated.
[‡] From DSAM (1989Wi22) unless otherwise stated.
[#] Level and associated γ transition(S) from 1989Wi22.
[@] From $\gamma\gamma(\theta)$(DCO) and $\gamma(\theta)$ data in 1995Sc04.

^{82}Se(^{7}Li,4nγ) 1995Sc04,1989Wi22 (continued)

$\gamma(^{85}Rb)$

DCO values correspond to angles of 45° and 90° and are for ΔJ=2, quadrupole gates, unless otherwise stated. All values are from 1995Sc04.

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	Comments
107.0 *1*	2.7[@] *3*	5419.27	(27/2)$^+$	5312.22	(25/2)$^+$	D		A_2=−0.28 *5* (1989Wi22). Additional information 14.
129.8[@]		280.9	1/2$^-$	151.10	3/2$^-$			E_γ: 129.5γ seen In $\gamma\gamma$ coin In (^{6}Li,3nγ) reaction (1982Ze02).
137.3 *4*	0.19 *4*	2981.09	15/2$^{(-)}$	2843.61	15/2$^{(-)}$			
151.1[&] *1*	6.2[&] *3*	151.10	3/2$^-$	0.0	5/2$^-$			A_2=−0.31 *6*, A_4=0.00 *1* (1982Ze02).
156.2 *2*	0.62 *12*	3198.25	17/2$^{(-)}$	3042.10	15/2$^{(-)}$	D+Q	−0.19 *16*	DCO=0.88 *13* (ΔJ=1,dipole gated).
173.3 *4*	0.15 *3*	3016.94	(17/2$^-$)	2843.61	15/2$^{(-)}$	D+Q	−0.32 *21*	DCO=0.59 *9*.
181.6 *4*	0.15[#] *3*	3198.25	17/2$^{(-)}$	3016.94	(17/2$^-$)			
192.5 *1*	2.7[@] *3*	5611.77	(29/2)$^+$	5419.27	(27/2)$^+$	D+Q		Additional information 17. A_2=−0.30 *6*, A_4=+0.11 *8* (1982Ze02).
198.6 *4*	0.31 *6*	3042.10	15/2$^{(-)}$	2843.61	15/2$^{(-)}$			
217.2 *2*	0.93 *19*	3198.25	17/2$^{(-)}$	2981.09	15/2$^{(-)}$	D+Q	−0.32 *20*	DCO=0.93 *11* (ΔJ=1,dipole gated), 0.59 *8* (ΔJ=2,Q gated).
228.0 *1*	18[@] *1*	3054.53	21/2$^-$	2826.52	19/2$^-$	M1		Mult.: from A_2=−0.27 *1*, A_4=+0.02 *2*, POL=−0.21 *7* (1989Wi01). Additional information 8.
243.4 *2*	0.68 *14*	2364.40	13/2$^+$	2120.91	11/2$^{(+)}$	D		DCO=0.94 *7* (ΔJ=1,dipole gated).
258.2 *4*	0.37 *7*	2622.62	(11/2)	2364.40	13/2$^+$	(D+Q)	−1.5 *15*	DCO=0.83 *9*.
294.8 *4*	0.46 *9*	2658.86	(11/2$^+$)	2364.40	13/2$^+$	(M1+E2)	≥+0.3	DCO=0.52 *5*.
321.3 *2*	1.5 *2*	2685.66	(15/2$^+$)	2364.40	13/2$^+$	D+Q	−0.34 *16*	DCO=0.64 *12*, 0.50 *2*.
332.2 *4*	0.44[#] *9*	2843.61	15/2$^{(-)}$	2511.38	13/2$^{(-)}$	D(+Q)	0.00 *12*	DCO=1.02 *12* (ΔJ=1,dipole gated).
349.8 *1*	27[@] *2*	2826.52	19/2$^-$	2476.72	17/2$^+$	E1		Mult.: from A_2=−0.25 *1*, A_4=+0.01 *2*, POL=+0.26 *5* (1989Wi01). Additional information 7.
354.6 *2*	1.0 *1*	3198.25	17/2$^{(-)}$	2843.61	15/2$^{(-)}$	D+Q	−0.38 *26*	DCO=0.52 *4*.
428.0 *2*	1.3 *1*	2511.38	13/2$^{(-)}$	2083.30	11/2$^{(-)}$	D(+Q)	−0.10 *10*	DCO=0.96 *4* (ΔJ=1,dipole gated). A_2=−0.48 *13*, A_4=−0.04 *20* (1995Sc04). δ: from DCO. Other: −0.20 *13* from A_2 and A_4.
436.6 *2*	2.7[@] *3*	3491.12	21/2$^+$	3054.53	21/2$^-$	D		Mult.: from A_2=+0.50 *10*, A_4=−0.10 *10* (1989Wi01). Additional information 9.
454.6 *2*	1.0[#] *1*	1747.84	(11/2$^+$)	1293.32	13/2$^+$			
463.7[&] *2*	2.0[&] *2*	1383.2		919.5	(5/2$^-$)			
469.7 *2*	0.73 *15*	2981.09	15/2$^{(-)}$	2511.38	13/2$^{(-)}$	D(+Q)	−0.06 *8*	DCO=0.93 *8* (ΔJ=1,dipole gated).
479.2 *1*	2.5 *3*	2843.61	15/2$^{(-)}$	2364.40	13/2$^+$	D(+Q)	−0.07 *7*	DCO=0.60 *8*, 0.58 *2*. A_2=−0.25 *5*, A_4=+0.11 *7* (1995Sc04). δ: from DCO. Other: 0.00 *5* from A_2.
497.8 *2*	1.2 *1*	4311.04	21/2$^{(-)}$	3813.16	19/2$^{(-)}$	D(+Q)	−0.2 *6*	DCO=0.64 *16*, 0.42 *7*.
505.6 *4*	0.42[#] *8*	3016.94	(17/2$^-$)	2511.38	13/2$^{(-)}$	Q		DCO=2.1 *5* (ΔJ=1,dipole gated).
507.9 *2*	1.3[#] *1*	3562.52	(19/2)	3054.53	21/2$^-$	D(+Q)	+0.02 *6*	DCO=1.03 *6* (ΔJ=1,dipole gated).

$^{85}_{37}Rb_{48}$-3

^{82}Se(^{7}Li,4nγ) 1995Sc04,1989Wi22 (continued)

$\gamma(^{85}Rb)$ (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	Comments
512.5 *2*	1.3[#] *1*	3198.25	17/2$^{(-)}$	2685.66	(15/2$^+$)	D		DCO=1.54 *10* (ΔJ=1,dipole gated), 0.71 *12* (ΔJ=2,Q gated).
514.0 *1*	100.0	514.00	9/2$^+$	0.0	5/2$^-$	M2		Mult.: from Adopted Gammas. A_2=0.00 *1* (1989Wi22). Additional information 1.
517.6 *4*	0.35[#] *7*	3203.31	(17/2$^+$)	2685.66	(15/2$^+$)			
530.7 *2*	1.0 *1*	3042.10	15/2$^{(-)}$	2511.38	13/2$^{(-)}$	D+(Q)	−0.07 *14*	DCO=0.93 *14*, 0.88 *21* (ΔJ=1,dipole gated).
535.9 *2*	0.50[#] *10*	4846.9		4311.04	21/2$^{(-)}$			
540.3 *2*	1.2[#] *1*	3016.94	(17/2$^-$)	2476.72	17/2$^+$			
543.5 *2*	0.89 *18*	4356.50	21/2$^{(-)}$	3813.16	19/2$^{(-)}$	D(+Q)	≤−0.1	DCO=0.45 *12*.
576.2 *2*	0.68[#] *14*	1444.97	9/2$^{(-)}$	868.65	(7/2$^-$)			
583.9 *4*	0.26[#] *5*	4940.4		4356.50	21/2$^{(-)}$			
596.5[&] *8*	0.8[&] *1*	3073.2	(17/2 to 21/2)	2476.72	17/2$^+$			from $\gamma\gamma$ only (1982Ze02).
614.9 *1*	2.3[#] *2*	3813.16	19/2$^{(-)}$	3198.25	17/2$^{(-)}$	D+Q	−0.5 *3*	DCO=0.49 *7*.
616.6 *2*	0.65[#] *13*	2364.40	13/2$^+$	1747.84	(11/2$^+$)			
616.7 *2*	0.65[#] *13*	2981.09	15/2$^{(-)}$	2364.40	13/2$^+$	D+Q	−0.4 *3*	DCO=0.48 *6*.
621.9 *2*	6.1[@] *5*	4757.18	(25/2)$^+$	4135.38	(23/2)$^+$	D		A_2=−0.27 *12* (1989Wi22). Additional information 12.
638.4 *4*	0.15[#] *3*	2083.30	11/2$^{(-)}$	1444.97	9/2$^{(-)}$			
644.3 *1*	15[@] *1*	4135.38	(23/2)$^+$	3491.12	21/2$^+$	D		A_2=−0.31 *4* (1989Wi22). Additional information 11.
662.2 *2*	2.6[@] *3*	5419.27	(27/2)$^+$	4757.18	(25/2)$^+$	D		Additional information 15.
662.6[b@] *4*	1.0[b@] *3*	3717.1	(23/2,25/2)	3054.53	21/2$^-$	(D)		A_2=−0.11 *7* for 662.3γ+662.6γ+662.6γ (1989Wi22).
662.6[b@] *4*	0.6[b@] *3*	4379.7	(25/2 to 29/2)	3717.1	(23/2,25/2)			
724.1[@] *2*	2.9[@] *3*	6335.9	(31/2$^+$)	5611.77	(29/2)$^+$	D		A_2=−0.22 *9* (1989Wi22).
748.6 *4*	0.19[#] *4*	4311.04	21/2$^{(-)}$	3562.52	(19/2)			
758.9 *4*	0.12[#] *2*	3813.16	19/2$^{(-)}$	3054.53	21/2$^-$			
760.2 *4*	0.48 *10*	2843.61	15/2$^{(-)}$	2083.30	11/2$^{(-)}$	Q		DCO=2.4 *5* (ΔJ=1,dipole gated).
768.4[&] *4*	1.9[&] *4*	919.5	(5/2$^-$)	151.10	3/2$^-$			
771.2[@] *3*	1.8[@] *4*	7107.1	(33/2$^+$)	6335.9	(31/2$^+$)	D		A_2=−0.20 *14* (1989Wi22).
779.3 *1*	86[@] *4*	1293.32	13/2$^+$	514.00	9/2$^+$	E2		Mult.: from A_2=+0.22 *2*, A_4=−0.04 *2*, POL=+0.34 *8* (1989Wi01). Additional information 2.
789.9 *2*	0.57 *12*	2083.30	11/2$^{(-)}$	1293.32	13/2$^+$			
793.5 *4*	0.14[#] *3*	4356.50	21/2$^{(-)}$	3562.52	(19/2)			
794.0 *2*	0.72[#] *14*	2238.92		1444.97	9/2$^{(-)}$			
800.4[&] *1*	2.5[&] *4*	951.50	(5/2$^-$)	151.10	3/2$^-$			A_2=+0.04 *6*, A_4=−0.15 *20* (1982Ze02).
827.5 *2*	1.6[#] *2*	2120.91	11/2$^{(+)}$	1293.32	13/2$^+$			

$^{85}_{37}Rb_{48}$-4

^{82}Se(^{7}Li,4nγ) 1995Sc04,1989Wi22 (continued)

$\gamma(^{85}Rb)$ (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ[a]	Comments
838.8 *4*	0.47[#] *9*	3203.31	(17/2$^+$)	2364.40	13/2$^+$	(Q)		DCO=1.2 *3*.
868.6 *1*	≈2.5	868.65	(7/2$^-$)	0.0	5/2$^-$	(M1+E2)	+1.2 *6*	DCO=2.1 *4* (ΔJ=1,dipole gated).
897.9 *4*	0.18[#] *3*	2981.09	15/2$^{(-)}$	2083.30	11/2$^{(-)}$			
911.2 *4*	0.39 *8*	2658.86	(11/2$^+$)	1747.84	(11/2$^+$)			
937.8 *2*	0.75[#] *15*	2685.66	(15/2$^+$)	1747.84	(11/2$^+$)			
951.5[&] *5*	1.1[&] *2*	951.50	(5/2$^-$)	0.0	5/2$^-$			
1014.4 *1*	21[@] *3*	3491.12	21/2$^+$	2476.72	17/2$^+$	(E2)		Mult.: from A_2=+0.14 *3*, A_4=−0.01 *4*, POL=+0.33 *19* (1989Wi01). E_γ: from $\gamma\gamma$, 1982Ze02 propose this γ to Be a doublet, the other component with an intensity of 37% of the total, No placement is suggested In the level scheme. Additional information 10.
1066.4 *2*	0.54[#] *11*	2511.38	13/2$^{(-)}$	1444.97	9/2$^{(-)}$			
1071.1 *2*	0.68 *14*	2364.40	13/2$^+$	1293.32	13/2$^+$	D		DCO=0.99 *10*; ΔJ=0, dipole transition.
1112.8 *2*	0.57 *12*	4311.04	21/2$^{(-)}$	3198.25	17/2$^{(-)}$			
1176.8[@] *2*	2.7[@] *4*	5312.22	(25/2)$^+$	4135.38	(23/2)$^+$	D+Q		A_2=−0.60 *10* (1989Wi22). Additional information 13.
1183.4 *1*	57[@] *2*	2476.72	17/2$^+$	1293.32	13/2$^+$	E2		Mult.: from A_2=+0.25 *1*, A_4=−0.04 *1*, POL=+0.54 *14* (1989Wi01). Additional information 4.
1214.5 *4*	0.46[#] *9*	2083.30	11/2$^{(-)}$	868.65	(7/2$^-$)			
1218.1 *2*	1.0 *1*	2511.38	13/2$^{(-)}$	1293.32	13/2$^+$			
1233.8 *4*	0.29[#] *6*	1747.84	(11/2$^+$)	514.00	9/2$^+$			
1256.7 *4*	0.40[#] *8*	4311.04	21/2$^{(-)}$	3054.53	21/2$^-$			
1283.9 *1*	2.6[@] *3*	5419.27	(27/2)$^+$	4135.38	(23/2)$^+$	(Q)		A_2=+0.31 *6* (1989Wi22). Additional information 16.
1301.8 *4*	0.14[#] *3*	4356.50	21/2$^{(-)}$	3054.53	21/2$^-$			
1329.3 *2*	0.68[#] *14*	2622.62	(11/2)	1293.32	13/2$^+$			
1365.5 *1*	3.1 *3*	2658.86	(11/2$^+$)	1293.32	13/2$^+$	(M1+E2)	+1.4 *10*	Additional information 5. DCO=0.50 *2*. A_2=−0.78 *9*, A_4=+0.12 *12* (1995Sc04). δ: from A_2 and A_4. Other:≥+0.6 from DCO.
1370.2 *2*	0.52[#] *10*	2238.92		868.65	(7/2$^-$)			
1392.3 *1*	3.6 *4*	2685.66	(15/2$^+$)	1293.32	13/2$^+$	D+Q	−0.4 *2*	Additional information 6. DCO=0.50 *2*. A_2=−0.79 *7*, A_4=+0.05 *9* (1995Sc04). δ: from DCO. Other: −0.43 *14* from A_2 and A_4.
1445.0 *1*	2.1 *2*	1444.97	9/2$^{(-)}$	0.0	5/2$^-$			
1569.3 *1*	2.8 *3*	2083.30	11/2$^{(-)}$	514.00	9/2$^+$	D(+Q)	−0.09 *9*	δ: from A_2=−0.32 *6*, A_4=+0.19 *9* (1995Sc04).
1606.9 *2*	1.4 *2*	2120.91	11/2$^{(+)}$	514.00	9/2$^+$			
1688.0 *4*	0.35[#] *7*	2981.09	15/2$^{(-)}$	1293.32	13/2$^+$			
1748.9 *4*	0.30 *6*	3042.10	15/2$^{(-)}$	1293.32	13/2$^+$			
1820.7[@] *3*	1.1[@] *2*	5312.22	(25/2)$^+$	3491.12	21/2$^+$	(Q)		A_2=+0.44 *15* (1989Wi22).

$^{85}_{37}Rb_{48}$-5

^{82}Se(^{7}Li,4nγ) 1995Sc04,1989Wi22 (continued)

$\gamma(^{85}Rb)$ (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	Comments
1850.4 *1*	4.7 *5*	2364.40	13/2$^+$	514.00	9/2$^+$	Q	Additional information 3. A_2=+0.09 *7*, A_4=−0.09 *11* (1995Sc04). A_2=+0.30 *5*, A_4=−0.07 *6* (1982Ze02).
1910.0 *2*	1.0 *1*	3203.31	(17/2$^+$)	1293.32	13/2$^+$		

† From 1995Sc04 unless otherwise stated. Uncertainty is stated by 1995Sc04 as 0.1-0.4 keV. The evaluators have assigned the uncertainties as follows: 0.1 keV for Iγ>2, 0.2 keV for Iγ=0.5-2 and 0.4 keV for Iγ<0.5.

‡ From 1995Sc04 unless otherwise stated, uncertainties are stated by the authors as 5-20%, the evaluators assign 10% for Iγ>1 and 20% for Iγ<2.

Estimated intensity from $\gamma\gamma$ data.

@ From 1989Wi22.

& From 1982Ze02 at E=32 MeV.

[a] From γ(theta) and DCO data (1995Sc04,1982Ze02,1989Wi22); and linear polarization data for selected transitions (1989Wi01).

[b] Multiply placed with intensity suitably divided.

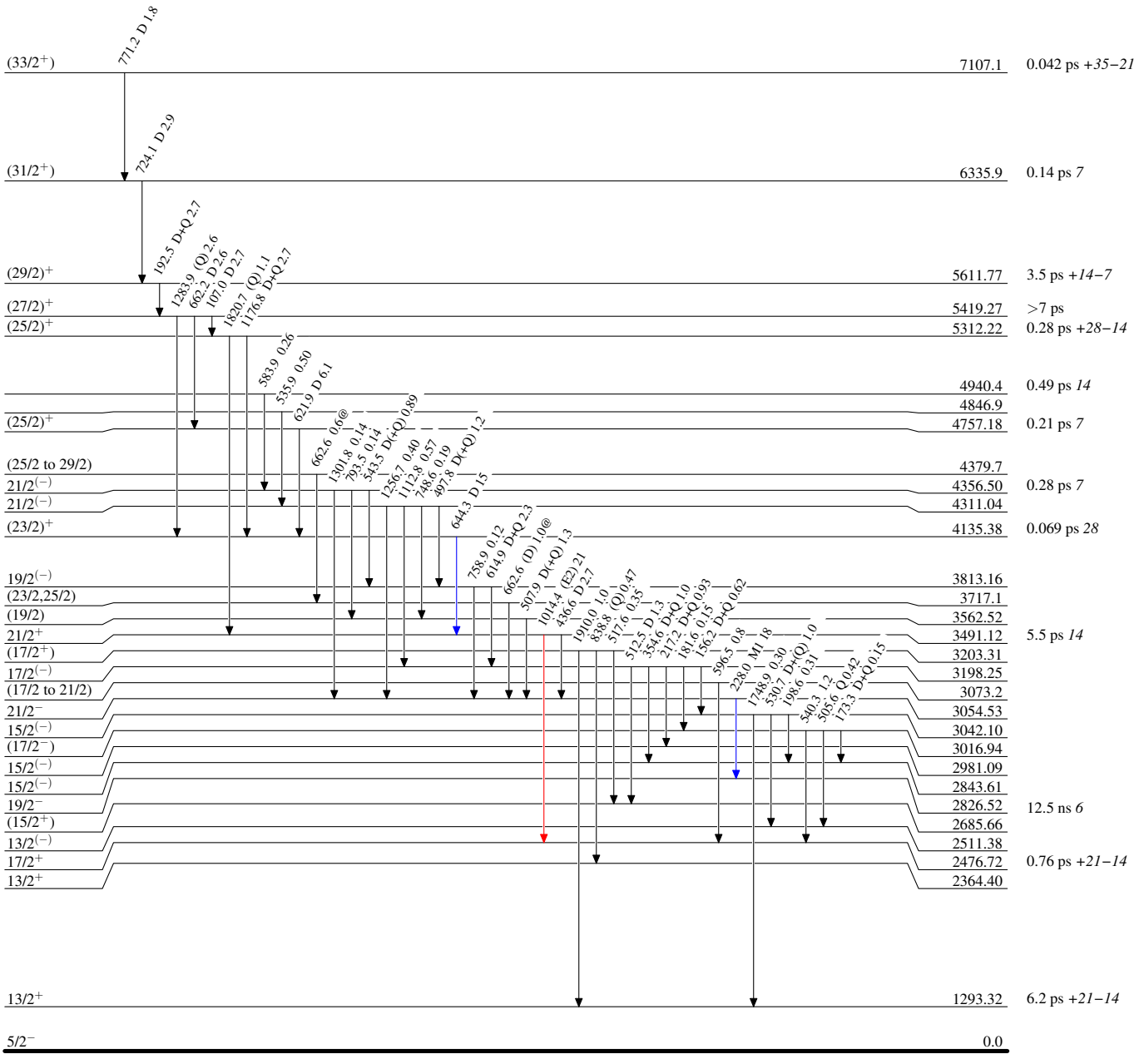
$^{85}_{37}Rb_{48}$-6

^{82}Se(^{7}Li,4nγ) 1995Sc04,1989Wi22

Level Scheme

Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

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



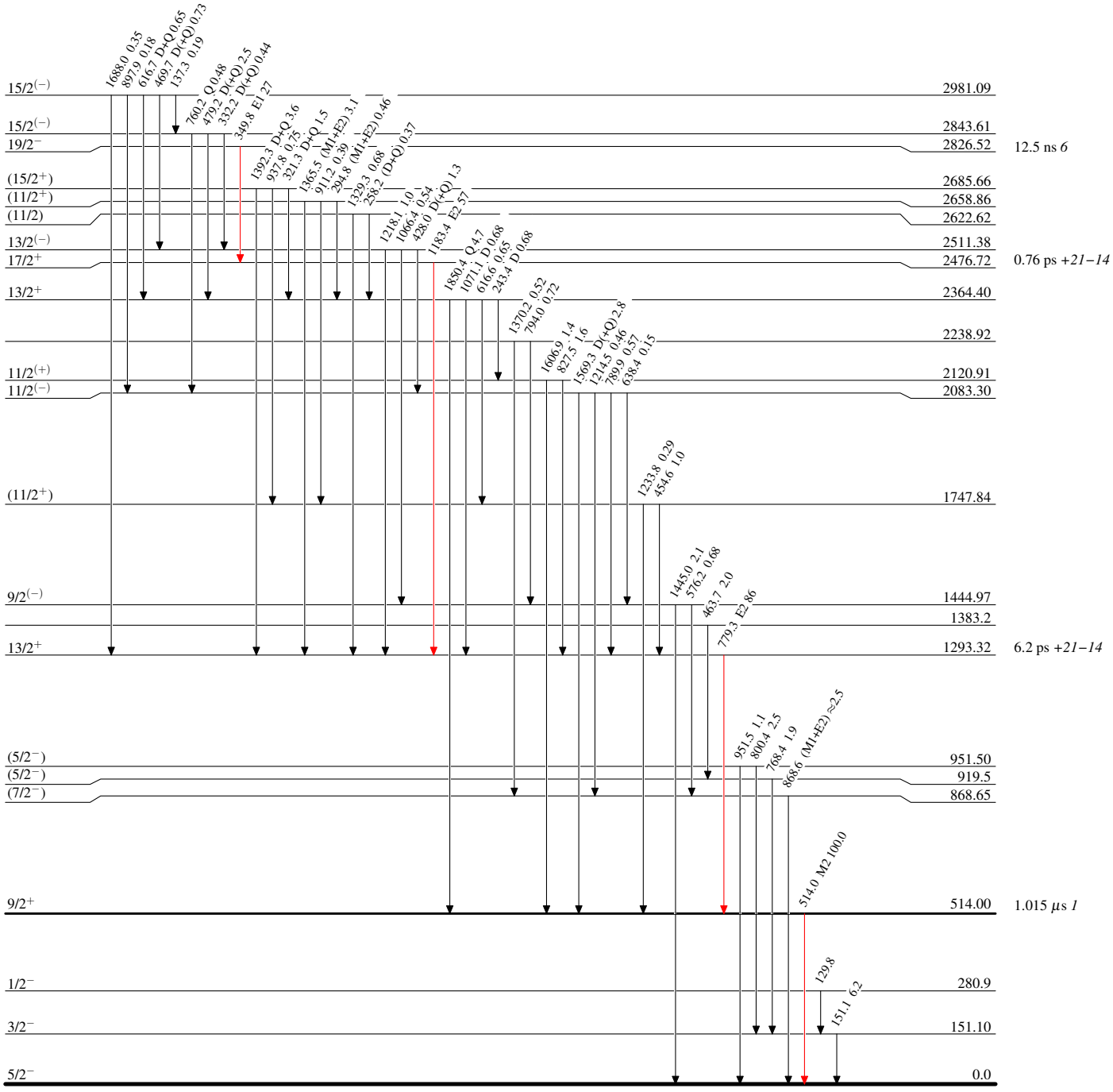
$^{85}_{37}Rb_{48}$

^{82}Se(^{7}Li,4nγ) 1995Sc04,1989Wi22

Level Scheme (continued)

Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

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



$^{85}_{37}Rb_{48}$