^{82}Se(^{7}Li,3nγ) 1994Wi04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Alexandru Negret, Balraj Singh	NDS 124, 1 (2015)	30-Nov-2014

Includes ^{86}Kr(p,nγ) E=2.8 MeV from 1982Fa12. Lifetime measured for the first excited state.
1994Wi04: (^{7}Li,3nγ) E=35, 32, 30 MeV. Measured Eγ, Iγ, γγ, γ(θ), γ(lin pol), γγ(θ)(dc). Lifetimes from Doppler shift attenuation method.

^{86}Rb Levels

E(level)	J$^{\pi}$ †	$T_{1/2}$ ‡	Comments
0.0	2⁻		
487.9 *10*	1⁺	2.4 ps *3*	E(level),$T_{1/2}$: from (p,nγ) (1982Fa12); half-life from DSAM.
556.07 *18*	6⁻	1.017 min *3*	
780.36 *21*	7⁻		
1558.49 *22*	7⁺		
1683.72 *23*	8⁺		
2416.52 *25*	9⁺	0.28 ps *7*	
3137.5 *4*	(9⁺)	0.55 ps *14*	$T_{1/2}$: from DSAM for 1453.7+1452.7 doublet.
3281.9 *3*	10⁺	0.69 ps *14*	
3411.8 *3*	11⁺	5.5 ps *14*	$T_{1/2}$: from line shapes of 865.4γ and 1598.2γ in γγ spectrum gated by 129.9γ.
3578.4 *3*	(10⁺)	0.28 ps *+7−14*	
3743.3 *3*	12⁺	1.32 ps *14*	
3866.1 *4*	(11⁺)	1.25 ps *35*	
4717.0 *5*	13⁺	0.08 ps *+4−5*	
5293.6 *4*	(12⁻)	0.35 ps *+7−14*	
5557.4 *4*	(13⁻)	0.76 ps *+14−21*	
6113.6 *5*	(14⁻)	0.28 ps *+7−14*	
6455.8 *6*	(14⁺)	0.035 ps *+42−28*	
6799.5 *6*	(15⁻)	0.21 ps *+7−14*	
7413.1 *6*	(15)	0.42 ps *+7−14*	
7860.1 *7*	(16)	0.69 ps *+14−21*	

† As proposed by 1994Wi04, based on γ(θ), γγ(θ)(DCO) and γ(lin pol) data.
‡ From DSAM. The quoted uncertainty includes 10% uncertainty for the stopping power and 0.1 ps for the side-feeding time.

γ(^{86}Rb)

DCO ratios given in comments correspond to gate on ΔJ=1, dipole 125.2γ. The second ratio, when given, corresponds to gate on ΔJ=2, quadrupole 1598γ.

Eγ †	Iγ	E_i(level)	J^{π}_i	E_f	J^{π}_f	Mult.&	α a	Comments
125.2 *1*	62‡ *6*	1683.72	8⁺	1558.49	7⁺	M1	0.0783	α(K)=0.0691 *10*; α(L)=0.00777 *11*; α(M)=0.001286 *19*; α(N+..)=0.0001513 *22* α(N)=0.0001452 *21*; α(O)=6.17×10^{-6} *9* A_2=−0.28 *2*, A_4=−0.04 *3*, POL=−0.35 *8*. R(DCO)=0.71 *3* (gate at 1598γ).
129.9 *1*	34‡ *3*	3411.8	11⁺	3281.9	10⁺	M1	0.0709	α(K)=0.0626 *9*; α(L)=0.00703 *10*; α(M)=0.001163 *17*; α(N+..)=0.0001369 *20* α(N)=0.0001313 *19*; α(O)=5.58×10^{-6} *8* A_2=−0.28 *2*, A_4=−0.04 *4*, POL=−0.36 *11*. R(DCO)=1.00 *2*, 0.68 *2*.

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$^{82}Se(^{7}Li,3n\gamma)$ 1994Wi04 (continued)

$\gamma(^{86}Rb)$ (continued)

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[a]	Comments
144.4 *3*	2.6[‡] *3*	3281.9	10^+	3137.5	(9^+)	M1	0.0534	α(K)=0.0471 *7*; α(L)=0.00528 *8*; α(M)=0.000873 *14*; α(N+..)=0.0001028 *16* α(N)=9.86×10^{-5} *15*; α(O)=4.20×10^{-6} *7* Mult.: from RUL. A_2=−0.3 *2*. R(DCO)=0.99 *6*.
224.3 *1*	100[‡] *10*	780.36	7^-	556.07	6^-	D+Q		A_2=−0.41 *5*, A_4=+0.04 *8*. R(DCO)=0.99 *3*, 0.63 *2*.
263.8 *3*	4.0[#] *6*	5557.4	(13^-)	5293.6	(12^-)	D		Mult.: RUL marginally favors M1 over E1. R(DCO)=0.94 *6*, 0.58 *7*.
287.7 *3*	1.4[‡] *1*	3866.1	(11^+)	3578.4	(10^+)	D		Mult.: RUL marginally favors M1 over E1. A_2=−0.4 *1*. R(DCO)=0.91 *8*.
331.5 *1*	28[#] *4*	3743.3	12^+	3411.8	11^+	M1	0.00634 *9*	α=0.00634 *9*; α(K)=0.00561 *8*; α(L)=0.000613 *9*; α(M)=0.0001013 *15*; α(N+..)=1.198×10^{-5} *17* α(N)=1.148×10^{-5} *16*; α(O)=4.96×10^{-7} *7* A_2=−0.31 *4*, A_4=0.00 *5*, POL=−0.40 *20*. R(DCO)=0.97 *5*, 0.65 *3*.
447.0 *3*	1.4[‡] *1*	7860.1	(16)	7413.1	(15)	D		Mult.: RUL excludes E2 or M2. R(DCO)=0.7 *2*, 0.4 *3*.
487.9		487.9	1^+	0.0	2^-			
556.07 *18*		556.07	6^-	0.0	2^-	(E4)		E_γ,Mult.: from Adopted Gammas.
556.2 *3*	5.6[#] *8*	6113.6	(14^-)	5557.4	(13^-)	D		R(DCO)=0.95 *8*, 0.6 *2*.
685.9 *3*	2.3[#] *3*	6799.5	(15^-)	6113.6	(14^-)	D		Mult.: RUL excludes E2 or M2.
732.8 *1*	42[‡] *4*	2416.52	9^+	1683.72	8^+	D		A_2=−0.25 *7*. R(DCO)=0.89 *7*.
778.1 *1*	63[‡] *6*	1558.49	7^+	780.36	7^-	D		A_2=+0.46 *11*, A_4=+0.3 *2*. R(DCO)=1.54 *5*, 1.2 *2*. Mult.: γ(θ) and DCO are consistent with ΔJ=0, dipole; however, sign of A_4 should be negative for ΔJ=0 transitions.
865.4 *2*	17[‡] *2*	3281.9	10^+	2416.52	9^+	D		A_2=−0.34 *5*. R(DCO)=1.05 *6*.
903.6 *3*	6.5[‡] *7*	1683.72	8^+	780.36	7^-	D		A_2=−0.2 *1*, A_4=+0.1 *2*. R(DCO)=0.9 *2* (gate at 1598γ).
957.3 *3*	1.5[#] *2*	7413.1	(15)	6455.8	(14^+)	D		R(DCO)=1.3 *3*.
973.7 *3*	8.5[#] *13*	4717.0	13^+	3743.3	12^+	D		R(DCO)=1.0 *1*, 0.6 *2*.
995.4 *3*	2.5[#] *4*	3411.8	11^+	2416.52	9^+			R(DCO)=1.3 *2*.
1002.4 *2*	12[‡] *1*	1558.49	7^+	556.07	6^-	D		A_2=−0.17 *5*, A_4=+0.06 *8*. R(DCO)=0.99 *3*, 0.8 *2*.
1161.8 *3*	4.9[‡] *5*	3578.4	(10^+)	2416.52	9^+	D		R(DCO)=0.9 *1*.
1427.5 *3*	0.5[#] *1*	5293.6	(12^-)	3866.1	(11^+)			
[x]1452.7 *3*	1.63[@] *24*							From γγ, this transition feeds the 9^+, 2416 level.
1453.7 *3*	4.9[@] *8*	3137.5	(9^+)	1683.72	8^+			R(DCO)=0.6 *1* for doublet.

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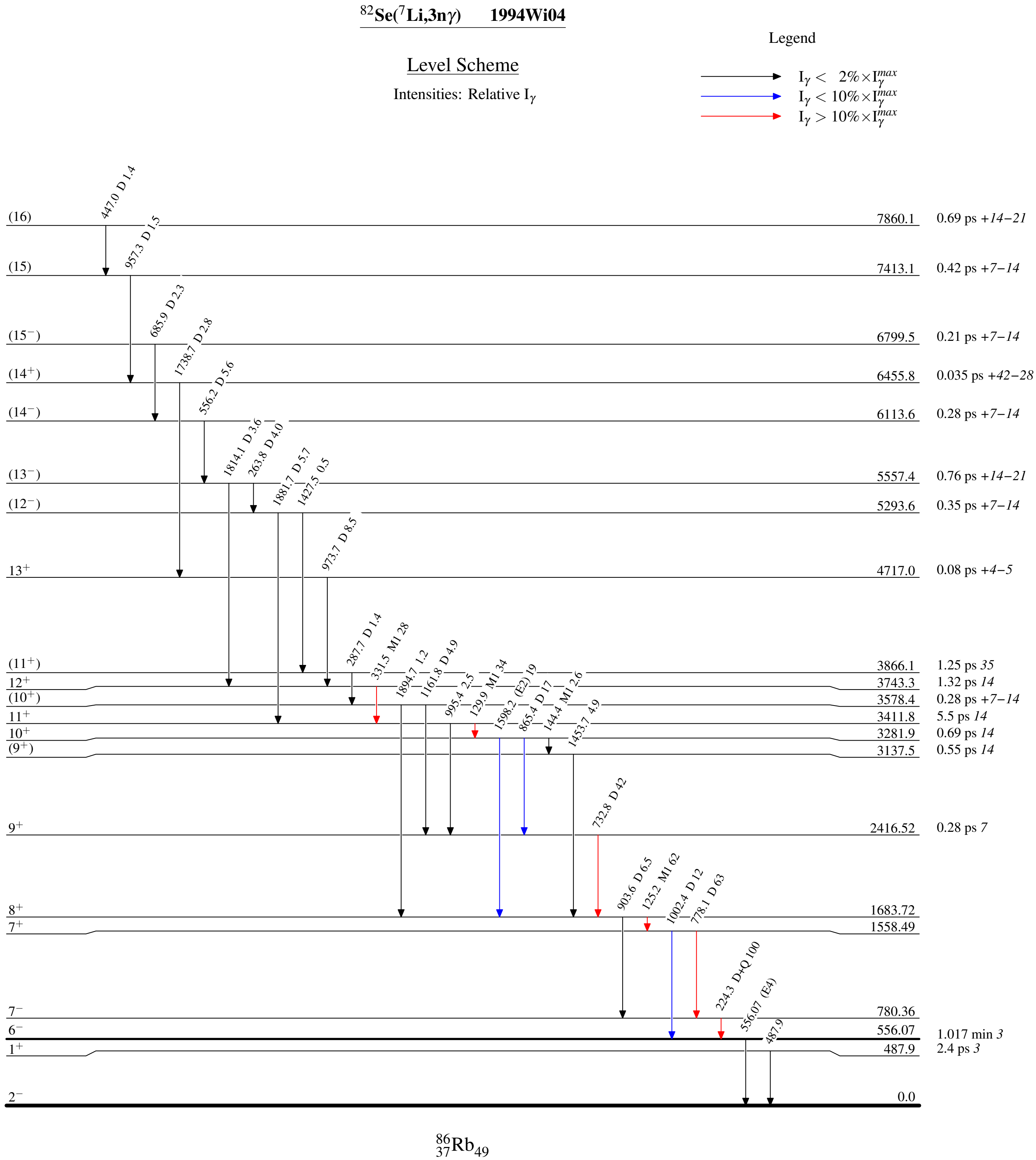
^{82}Se(^{7}Li,3nγ) 1994Wi04 (continued)

γ(^{86}Rb) (continued)

E_γ[†]	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	α[a]	Comments
1598.2 *2*	19[‡] *2*	3281.9	10+	1683.72	8+	(E2)	0.000321 *5*	α=0.000321 *5*; α(K)=0.0001750 *25*; α(L)=1.86×10^{-5} *3*; α(M)=3.07×10^{-6} *5*; α(N+..)=0.0001247 *1* α(N)=3.48×10^{-7} *5*; α(O)=1.520×10^{-8} *22*; α(IPF)=0.0001243 *18* A_2=+0.07 *12*, A_4=−0.2 *2*. R(DCO)=1.59 *7*.
1738.7 *3*	2.8[#] *4*	6455.8	(14+)	4717.0	13+	D		R(DCO)=1.4 *3*.
1814.1 *3*	3.6[#] *5*	5557.4	(13−)	3743.3	12+	D		R(DCO)=1.0 *2*.
1881.7 *3*	5.7[#] *9*	5293.6	(12−)	3411.8	11+	D		R(DCO)=0.8 *2*, 0.5 *2*.
1894.7 *3*	1.2[#] *2*	3578.4	(10+)	1683.72	8+			

[†] Uncertainty of 0.1 keV for Iγ>20, 0.2 keV for Iγ=10-20 and 0.3 keV for Iγ<10 assigned (evaluator) based on a general comment by 1994Wi04.
[‡] From singles measurements. Uncertainty=5-10%.
[#] From γγ coin. Uncertainty=10-15%.
[@] Combined Iγ for 1453.7+1452.7=6.5. Individual intensity deduced from γγ coin.
[&] From γ(θ) and γγ(θ)(DCO) ratios. Mult=M1 or E2 is from γ(lin pol) data and/or RUL.
[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.
[x] γ ray not placed in level scheme.


82Se(7Li,3nγ) 1994Wi04
Level Scheme
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
(16) 7860.1 0.69 ps +14−21
(15) 7413.1 0.42 ps +7−14
(15−) 6799.5 0.21 ps +7−14
(14+) 6455.8 0.035 ps +42−28
(14−) 6113.6 0.28 ps +7−14
(13−) 5557.4 0.76 ps +14−21
(12−) 5293.6 0.35 ps +7−14
13+ 4717.0 0.08 ps +4−5
(11+) 3866.1 1.25 ps 35
12+ 3743.3 1.32 ps 14
(10+) 3578.4 0.28 ps +7−14
11+ 3411.8 5.5 ps 14
10+ 3281.9 0.69 ps 14
(9+) 3137.5 0.55 ps 14
9+ 2416.52 0.28 ps 7
8+ 1683.72
7+ 1558.49
7− 780.36
6− 556.07 1.017 min 3
1+ 487.9 2.4 ps 3
2− 0.0
447.0 D 1.4
957.3 D 1.5
685.9 D 2.3
1738.7 D 2.8
556.2 D 5.6
1814.1 D 3.6
263.8 D 4.0
1881.7 D 5.7
1427.5 0.5
973.7 D 8.5
287.7 D 1.4
331.5 M1 28
1894.7 1.2
1161.8 D 4.9
995.4 2.5
129.9 M1 34
1598.2 (E2) 19
865.4 D 17
144.4 M1 2.6
1453.7 4.9
732.8 D 42
903.6 D 6.5
125.2 M1 62
1002.4 D 12
778.1 D 63
224.3 D+Q 100
556.07 (E4)
487.9
86 37Rb49