Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Oct-2015

Q(β^-)=10063 *4*; S(n)=5236 *4*; S(p)=12728 *21*; Q(α)=−797×10[1] *45* 2012Wa38
S(2n)=8768 *20*, S(2p)=29330 *200* (syst), Q(β^-n)=6339 *9* (2012Wa38).
^{97}Rb isotope was identified by 1967Kl06 in ^{238}U(p,F),E=150 MeV at Orsay, later followed up at the same laboratory by 1969Am01 to the half-life and delayed-neutron emission probability. A large number of half-life and %β^-n measurements by different groups were made in subsequent years due to the interest in its beta-delayed neutron activity.
Mass measurements: 2012Si10, 2008Su19, 2007Ra23, 2006Ha23.
Additional information 1.
1981Th04: experimental mean square radius, isotope shift, μ, Q.
All measurements deal with mass separated fission products.
2013Fa05: theoretical calculation of half-life and %B$^-$n.
2010Ro31: theoretical structure calculations.
1985Me20: theoretical structure calculations, shape coexistence.

^{97}Rb Levels

Cross Reference (XREF) Flags

A ^{97}Rb IT decay (5.7 μs)
B Coulomb excitation

E(level)†	J$^\pi$‡	$T_{1/2}$	XREF	Comments
0.0	3/2$^+$	169.1 ms *6*	AB	%β^-=100; %β^-n=25.5 *9*; %β^-2n=? μ=+1.8410 *21* (1981Th04,2014StZZ) Q=+0.70 *15* (1981Th04,2013StZZ) μ,Q: atomic beam laser spectroscopy (1981Th04). Original measured value of Q=+0.581 *44* in 1981Th04 is re-evaluated to +0.70 *15* by 2013StZZ. Total of 291 implantations observed, and 164 correlated decay sequences (2012Qu01). J$^\pi$: spin from atomic beam (1981Th04). Measured magnetic moment is consistent with π3/2[431] or π3/2[301], but in the Coulomb excitation experiment, 3/2[301] is ruled out from trend of observed M1 transition rates and B(M1)/B(E2) ratios. See also theoretical calculations by 2010Ro31 which predicts prolate ground state with π3/2[431] Nilsson configuration. $T_{1/2}$: half-life determined by delayed neutron counting by 1993Ru01, 1983Re10, 1981En05, 1979Ri09, 1977Re05, 1976Ru01, 1974Ro15; β^- counting by 1979En02, 1978Wo09, 1977Re05; γ counting by 1979Pe01; ion-β correlated decay curves by 2011Ni01 and 2012Qu01. $T_{1/2}$: weighted average of 168 ms *1* (1993Ru01, earlier value of 172 ms *3* in 1976Ru01); 169 ms *2* (1987PfZX); 169 ms *1* (1986Wa17, earlier values of 169 ms *2* in 1983Re10, 167 ms *2* from neutron counting and 182 ms *7* from β^- counting in 1977Re05); 200 ms *20* (1981En05, earlier value of 187 ms *19* in 1979En02); 173 ms *3* (1979Pe01); 171 ms *4* (1979Ri09); 170 ms *2* (1978Wo09); 172.2 ms *50* (1974Ro15); 176 ms *5* (1971Tr02). Other recent but much less precise measurements: 208 ms *+42−36* (2012Qu06); 0.17 s $^{14-5}$ (2011Ni01). Value of 135 ms *10* in 1969Am01 seems discrepant. %β^-n: weighted average of 30.9 *31* (1993Ru01), 24.5 *15* (1987PfZX), 26.1 *13* (1986Wa17, earlier values of 26.9 *19* in 1983Re10 and 35.9 *26* in 1977Re05), 21.5 *25* (1981En05), 25.2 *18* (1979Ri09), 27.2 *30* (1974Ro15). Theoretical $T_{1/2}$=43.6 ms, %β^-n=13.1, %β^-2n=0 (2003Mo09).
68.1# *4*	(5/2$^+$)		B	
76.6 *2*	(1/2,3/2)$^-$	5.7 μs *6*	A	%IT=100

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Adopted Levels, Gammas (continued)

^{97}Rb Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
			$T_{1/2}$: unweighted average of 5.1 μs *4* (2013Ruo7,from ion-γ time correlation of 76.5γ) and 6.33 μs *+37−34* (2012Ka36, γ(t) method; with constant background component separately deduced). Weighted average of the two values is 5.8 μs *6* but reduced χ^2 is 5.3. J$^{\pi}$: E1 γ to 3/2$^+$. Comparison with HFB and QPRM calculations suggests π3/2[312] prolate or (π1/2[321],π3/2[321]) oblate quasiparticle state (2013Ru07), thus favoring 1/2 or 3/2. 2012Ka36, however, propose (5/2), but do not discuss orbital configuration.
191.8[#] *4*	(7/2$^+$)	B	
294.9[#] *5*	(9/2$^+$)	B	
537.6[#] *6*	(11/2$^+$)	B	
674.1[#] *6*	(13/2$^+$)	B	
1029.6[#] *7*	(15/2$^+$)	B	

[†] From Coulomb excitation data, except for the 76.6-keV isomer.
[‡] The 68.1 and all levels above 76.6 keV are assigned (2015So20) as members of π3/2[431] band.
[#] Band(A): Band built on π3/2[431]. Transitional quadrupole moment Q_0=3.9 *+7−8*, as read from Figure 3 in 2015So20.

γ(^{97}Rb)

B(E2) and B(M1) matrix elements deduced from Coulomb excitation experiment (2015So20) are listed in the COULOMB EXCITATION dataset.

E$_i$(level)	J$_i^{\pi}$	E$_{\gamma}$	I$_{\gamma}$	E$_f$	J$_f^{\pi}$	Mult.	α[†]	Comments
68.1	(5/2$^+$)	68.1	100	0.0	3/2$^+$	[M1+E2]	2.2 *18*	α(K)=1.8 *15*; α(L)=0.34 *30*; α(M)=0.056 *49*; α(N)=0.0056 *49*; α(O)=1.31×10^{-4} *98*
76.6	(1/2,3/2)$^-$	76.6 *2*	100	0.0	3/2$^+$	E1	0.211 *4*	α(K)=0.187 *3*; α(L)=0.0206 *4*; α(M)=0.00337 *6*; α(N)=0.000370 *6*; α(O)=1.441×10^{-5} *23* Mult.: from α(K)(exp). α: from BrIcc code.
191.8	(7/2$^+$)	123.7	100 *3*	68.1	(5/2$^+$)	[M1+E2]	0.26 *19*	α(K)=0.23 *16*; α(L)=0.031 *23*; α(M)=0.0051 *38*; α(N)=5.4×10^{-4} *40*; α(O)=1.8×10^{-5} *12*
		191.8	7.4 *3*	0.0	3/2$^+$	[E2]	0.0888	α(K)=0.0773 *11*; α(L)=0.00974 *14*; α(M)=0.001605 *23*; α(N)=0.0001735 *25*; α(O)=6.21×10^{-6} *9*
294.9	(9/2$^+$)	103.1	100.0 *19*	191.8	(7/2$^+$)	[M1+E2]	0.50 *37*	α(K)=0.43 *31*; α(L)=0.063 *50*; α(M)=0.0104 *82*; α(N)=0.00109 *84*; α(O)=3.3×10^{-5} *23*
		226.8	23.9 *10*	68.1	(5/2$^+$)	[E2]	0.0485	α(K)=0.0424 *6*; α(L)=0.00518 *8*; α(M)=0.000853 *12*; α(N)=9.30×10^{-5} *13*; α(O)=3.45×10^{-6} *5*
537.6	(11/2$^+$)	242.7	100 *3*	294.9	(9/2$^+$)	[M1+E2]	0.026 *13*	α(K)=0.023 *11*; α(L)=0.0027 *14*; α(M)=4.4×10^{-4} *22*; α(N)=4.9×10^{-5} *24*; α(O)=1.91×10^{-6} *83*
		345.8	40.0 *21*	191.8	(7/2$^+$)	[E2]	0.01118	α(K)=0.00983 *14*; α(L)=0.001137 *16*; α(M)=0.000187 *3*; α(N)=2.07×10^{-5} *3*; α(O)=8.23×10^{-7} *12*
674.1	(13/2$^+$)	136.5	61 *11*	537.6	(11/2$^+$)	[M1+E2]	0.19 *13*	α(K)=0.16 *11*; α(L)=0.021 *16*;

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Adopted Levels, Gammas (continued)

$\gamma(^{97}Rb)$ (continued)

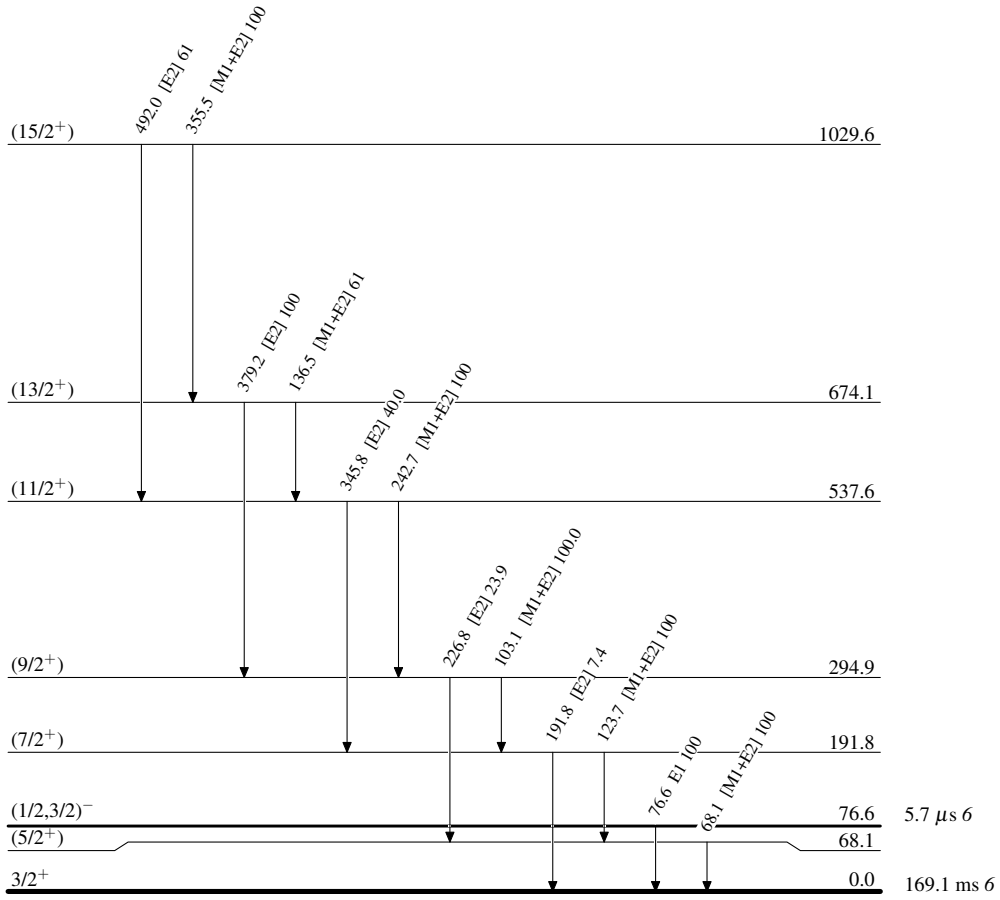
E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α[†]	Comments
								α(M)=0.0035 *25*; α(N)=3.8×10^{-4} *27*; α(O)=1.28×10^{-5} *79*
674.1	(13/2$^+$)	379.2	100 *9*	294.9	(9/2$^+$)	[E2]	0.00823	α(K)=0.00725 *11*; α(L)=0.000830 *12*; α(M)=0.0001368 *20*; α(N)=1.52×10^{-5} *2*; α(O)=6.10×10^{-7} *9*
1029.6	(15/2$^+$)	355.5	100 *17*	674.1	(13/2$^+$)	[M1+E2]	0.0078 *25*	α(K)=0.0068 *22*; α(L)=7.7×10^{-4} *26*; α(M)=1.28×10^{-4} *43*; α(N)=1.43×10^{-5} *47*; α(O)=5.8×10^{-7} *17*
		492.0	61 *11*	537.6	(11/2$^+$)	[E2]	0.00360	α(K)=0.00318 *5*; α(L)=0.000357 *5*; α(M)=5.88×10^{-5} *9*; α(N)=6.58×10^{-6} *10*; α(O)=2.71×10^{-7} *4*

[†] From BrIcc v2.3b (16-Dec-2014) 2008Ki07, "Frozen Orbitals" appr. Value overlaps M1 and E2 for mult=[M1+E2].

Adopted Levels, Gammas

Level Scheme

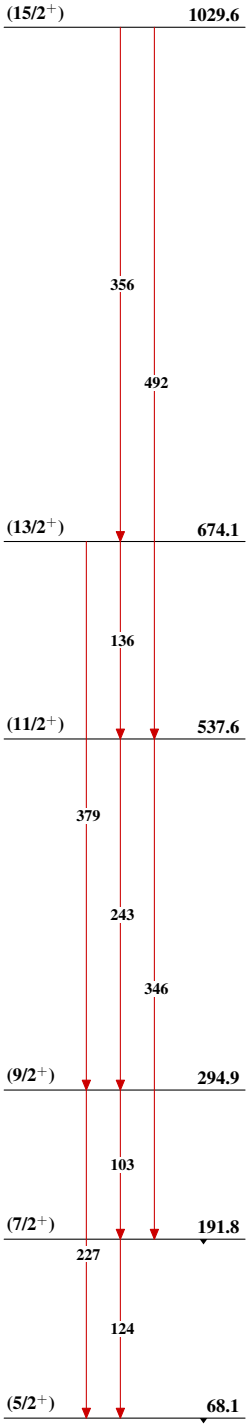
Intensities: Relative photon branching from each level



$^{97}_{37}Rb_{60}$

Adopted Levels, Gammas

Band(A): Band built on π3/2[431]



$^{97}_{37}Rb_{60}$