^{78}Br IT decay (119.4 μs) 1977DaZS,1972Ch34,1970De46

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ameenah R. Farhan, Balraj Singh	NDS 110, 1917 (2009)	30-Jun-2009

Parent: ^{78}Br: E=180.9 *5*; J$^\pi$=(4$^+$); T$_{1/2}$=119.4 μs *10*; %IT decay=100.0

Others: 1974FoYO, 1973Pl07, 1973BaYF, 1971Br31, 1971Br50, 1971In04, 1970Ru08, 1968Io01, 1967Iv03, 1965Mc03, 1961Sc11, 1961Ri02 and 1958Du80.

Total decay energy of 166 keV *13* calculated (by RADLIST code) from level scheme agrees with the expected value of 181 keV *1*.

^{78}Br Levels

E(level)	J$^\pi$†	T$_{1/2}$	Comments
0.0	1$^+$		
32.3 *1*	(2$^-$)	14.2 ns *3*	T$_{1/2}$: pulsed beam technique (1972Ch34). g-factor=−0.56 *2* (1973Pl07). This has been deduced with reference to g-factor for 198 keV level in ^{19}F=+1.442 *3* (by differential perturbed angular distribution method). 1973BaYF get −0.56 *2*.
180.9 *5*	(4$^+$)	119.4 μs *10*	T$_{1/2}$: from 'Adopted Levels'. In ^{78}Br it decay measured values from γ(t) are: 119.2 μs *10* (1970De46,pulsed beam), 80 μs *2* (1971In04), 111 μs *10* (1969Ru10), 123 μs *25* (1968Io01), 124 μs *25* (1967Iv03), 127 μs (1965Mc03), 118 μs (1961Sc11), 127 μs *5* (1958Du80). g-factor=+1.028 *3* (1974FoYO), NMR-PAC method in ^{78}Se(p,n). Others: +1.02 *2* (1972Ch34) by differential perturbed angular distribution and stroboscopic observation of perturbed angular distribution of γ-rays; 1.025 *3* (1971Br31) by NMR-PAC.

† From 'Adopted Levels'.

γ(^{78}Br)

Iγ normalization: from Ti(148γ)=100. Ti(32γ)=100 gives 0.61. The evaluators use the value for 148γ since there could Be detector efficiency problems At low energies.

E$_\gamma$	I$_\gamma$‡	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.†	α@	I$_{(\gamma+ce)}$#	Comments
32.3 *1*	50	32.3	(2$^-$)	0.0	1$^+$	(E1)	2.29	100	ce(K)/(γ+ce)=0.614 *6*; ce(L)/(γ+ce)=0.0705 *14*; ce(M)/(γ+ce)=0.01098 *23*; ce(N+)/(γ+ce)=0.000949 *20* ce(N)/(γ+ce)=0.000949 *20* α(N)=0.00312 *6* I$_\gamma$: the measured intensity is too high as compared to that of 148.6γ. Expected intensity=30, from level scheme.
148.6 *5*	100	180.9	(4$^+$)	32.3	(2$^-$)	(M2)	0.295 *6*	100	ce(K)/(γ+ce)=0.198 *3*; ce(L)/(γ+ce)=0.0251 *5*; ce(M)/(γ+ce)=0.00403 *8*; ce(N+)/(γ+ce)=0.000368 *7* ce(N)/(γ+ce)=0.000368 *7* α(N)=0.000477 *9*

† The ratio Iγ(148γ)/Iγ(32γ) suggests (E1,M1) for 32γ and (E2,M2) for 148γ. γ(θ) of 32γ in in-beam γ-ray studies rules out J=0 for 32$^-$ keV level. Thus J$^\pi$=(1$^-$,2$^-$) for 32 level and J$^\pi$=(1$^-$, 2$^-$, 3$^-$, 4) for 181 level. Long half-life of 181 level suggests M2 rather than E2. γ to 32 level and no γ decay to g.s. from 181 level supports J$^\pi$=(4$^+$) for 181 level, and J$^\pi$=(2$^-$) for 32 level. This implies E1 for 32.3γ and M2 for 148.6γ. These assignments remain tentative in the absence of a direct measurement.

‡ For absolute intensity per 100 decays, multiply by 0.77.

\# Absolute intensity per 100 decays.

Continued on next page (footnotes at end of table)

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$\gamma(^{78}Br)$ (continued)

@ 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.