Coulomb excitation 2003Ha15,1974Ba80

History

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

2003Ha15: Pb(^{78}Se,^{78}Se′γ) E=320 MeV, measured γ rays with an array of 11 HPGe detectors with BGO anti-Compton suppressors. Deduced B(E2), B(M1) and diagonal matrix elements using the least-square analysis code GOSIA.

1974Ba80: ^{78}Se(^{16}O,^{16}O′) E=30.2 MeV and ^{78}Se(α,α′) E=6.6 and 7.3 MeV, measured γ, $\gamma(\theta)$, deduced B(E2) values.

Others:

1998Sp03: Ta(^{78}Se,^{78}Se′) E=230 MeV, measured $\gamma(\theta$,H) In polarized Gd following projectile Coul. ex. deduced g-factor by transient field technique.

1977Le11: (^{16}O,^{16}O′) E=30 to 34 MeV, measured Q by reorientation effect, same laboratory As 1974Ba80.

1969He11: (^{16}O,^{16}O′) E=33 to 38 MeV, measured $\gamma\gamma(\theta)$, deduced g-factor for first 2$^+$ state.

1964By02: (^{16}O,^{16}O′), E=37 MeV.

1962Ga13: (α,α′), E=8.5 MeV and (^{14}N,^{14}N′), E=36 MeV.

1962Mc03: (α,α′), E=8 MeV.

1962St02: (α,α′), E=5-8 MeV.

1960An07: (^{14}N,^{14}N′), E=36 MeV.

^{78}Se Levels

E(level)†	J$^\pi$‡	T$_{1/2}$#	Comments
0.0	0$^+$		<Q^2>=0.33 *5*, β_{rms}=0.27 *2* (2003Ha15).
613.80 *11*	2$^+$	9.81 ps *21*	g=0.384 *25* (1998Sp03) Q=−0.20 *7* (2003Ha15) B(E2)↑=0.331 *7* Q: others: −0.26 *9* (1977Le11), −0.30 *11* (1976VoZY). <Q^2>=0.26 *14*, β_{rms}=0.24 *6* (2003Ha15). g: other: +0.35 *9* (1969He11 using T$_{1/2}$=10.1 ps *3*). B(E2)↑: weighted average of 0.325 *45* (2003Ha15), 0.327 *7* (1977Le11), 0.385 *35* (1962St02), 0.35 *3* (1962Ga13), 0.36 *7* (1960Le07) and 0.36 *5* (1956Te26). E2 matrix element=+0.57 *4* (2003Ha15). E2 diagonal matrix element=−0.27 *9* (2003Ha15). Other: −0.34 *12* (1977Le11).
1308.75 *15*	2$^+$	4.2 ps *3*	g=0.33 *11* (1998Sp03) Q=+0.17 *9* B(E2)↑=0.0105 *5* (1974Ba80) <Q^2>=0.09 *7*, β_{rms}=0.14 *5* (2003Ha15). B(E2)↑: from g.s.. B(E2)↑: others: 0.0065 *15* (2003Ha15), 0.0105 *35* (1962Mc03), 0.0140 (1962Ga13). B(E2)(from 613.8,2$^+$)=0.205 *36*. from 613.8,2$^+$: E2 matrix element=+0.45 *4*; M1 matrix element=+0.07 *1* (2003Ha15). from g.s.: E2 matrix element=+0.08 *1* (2003Ha15). E2 diagonal matrix element=+0.23 *12* (2003Ha15).
1498.6 *5*	0$^+$	45 ps *8*	B(E2)↑=0.0116 *20* (1974Ba80) from 613.8,2$^+$: E2 matrix element=+0.18 *6* (2003Ha15). B(E2): from 613.8,2$^+$. Other: B(E2)(from 613.8,2$^+$)=0.0065 *+50−36* (2003Ha15).
1502.4 *3*	4$^+$	1.05 ps *5*	g=0.39 *12* (1998Sp03) Q=−0.68 *15* (2003Ha15) B(E2)↑=0.175 *7* (1974Ba80) B(E2): from 613.8,2$^+$. Other: B(E2)(from 613.8,2$^+$)=0.131 *+20−18* (2003Ha15). from 613.8,2$^+$: E2 matrix element=+0.81 *6* (2003Ha15). E2 diagonal matrix element-0.90 *20* (2003Ha15).
1997.5 *6*	2$^+$	4.6 ps *+32−14*	B(E2)↑=8.5×10^{-5} *35* (1974Ba80)
2507.65 *22*	3$^-$		B(E3)↑=0.027 *3* (1974Ba80) B(E3):0$^+$ to 3$^-$.

Continued on next page (footnotes at end of table)

Coulomb excitation 2003Ha15,1974Ba80 (continued)

^{78}Se Levels (continued)

† From least squares-fitting to Eγ's.
‡ From Adopted Levels.
# From B(E2) values.

γ(^{78}Se)

E_i(level)	J_i^π	E_γ†	I_γ‡	E_f	J_f^π	Mult.#	δ#	α@	Comments
613.80	2^+	613.78 *12*	100	0.0	0^+	E2			B(E2)↓=0.065 *9* (2003Ha15)
1308.75	2^+	694.9 *2*	100	613.80	2^+	E2+M1	+2.7 *+6−9*	0.00103 *3*	B(E2)↓=0.041 *+8−7* (2003Ha15); B(M1)↓=0.0010 *3* (2003Ha15) α(K)=0.00092 *3*; α(L)=9.7×10^{-5} *3*; α(M)=1.51×10^{-5} *5*; α(N+..)=1.28×10^{-6} *4* α(N)=1.28×10^{-6} *4* B(E2)=0.041 *+8−7*; B(M1)=0.0010 *3* (2003Ha15). A_2=+0.179 *17*, A_4=−0.068 *21* (1974Ba80).
		1308.8 *2*	68 *2*	0.0	0^+	E2			B(E2)↓=0.0013 *3* (2003Ha15)
1498.6	0^+	884.8 *4*	100	613.80	2^+	E2			B(E2)↓=0.032 *+25−18* (2003Ha15)
1502.4	4^+	888.6 *3*	100	613.80	2^+				B(E2)↓=0.073 *+11−10* (2003Ha15) A_2=+0.40 *10*, A_4=−0.25 *13* (1964By02).
1997.5	2^+	1997.5 *6*	100	0.0	0^+				
2507.65	3^-	1005.2 *3*	50 *10*	1502.4	4^+				
		1198.9 *2*	100	1308.75	2^+				
		1893.8 *10*	56 *10*	613.80	2^+				

† From 1974Ba80.
‡ Photon branching ratios.
# From γ(θ) In 1974Ba80.
@ 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.

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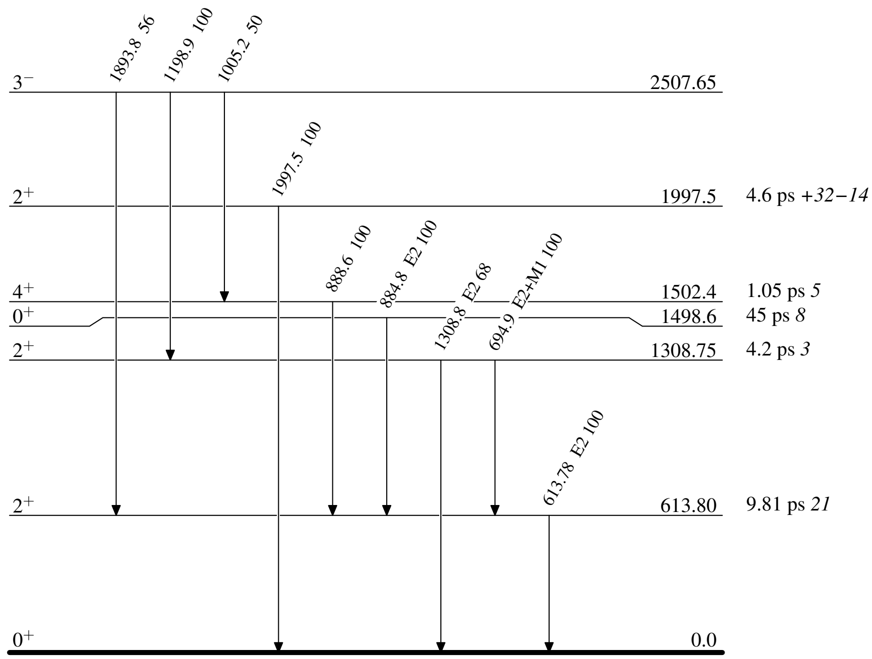
Level Scheme

Intensities: Relative photon branching from each level



$^{78}_{34}Se_{44}$