Coulomb excitation 1995Ka29,1974Ba80

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 105, 223 (2005)	22-Jun-2005

1995Ka29: (^{80}Se,^{80}Se′γ) at 95 MeV on a ^{48}Ti target and 312 MeV on a ^{208}Pb target. Measured γ, (particle)$\gamma(\theta)$, (particle)(particle)$\gamma(\theta)$, Coulomb-excitation cross sections. Levels at 666, 2^+; 1449, 2^+; 1479, 0^+; 1702, 4^+; 2344, (2^+) observed in the experiment. Other levels assumed in the GOSIA analysis of results are: 6^+ and 8^+ of the g.s. band; 4^+ and 6^+ states of the γ band; and 1960, 2^+ and 4^+ states of the β band; some of these levels as virtual excitations. In the analysis 231 experimental γ-ray yields were used, in addition to following data from the literature (from NDS for A=80, 1992Si19): level energies of seven excited states, four lifetimes (for first two 2^+ states, second 0^+ and first 4^+ state), and two branching ratios (for second and third 2^+ states). A total of 23 E2 matrix elements (19 transition and 4 static) and two M1 matrix elements were deduced.

1974Ba80: (α,α') E=6.6, 7.3 MeV and (^{16}O,^{16}O′γ) E=39.2 MeV. Measured γ, $\gamma(\theta)$, B(EL) values. Measurement of Q from the same laboratory is given in 1977Le11 ((^{16}O,^{16}O′) E=31-34 MeV).

Others:

1998Sp03: (^{80}Se,^{80}Se′) at 230, 236 MeV on tantalum target. Measured γ(H,θ) in polarized Gd following projectile Coul. ex. Measured g factors by transient-field technique.

1996Bu17: (^{48}Ti,^{48}Ti′γ) E=125 MeV. Measured particle-γ coin; transient-magnetic fields following Coulomb excitation.

1976VoZY: (^{40}Ca,^{40}Ca′) E=85 MeV, measured Q.

1970AgZV: (α,α') E=5.5 MeV.

1969He11: (^{16}O,^{16}O′) E=33-38 MeV, g factor measurement.

1965Ro09: (α,α') E=6-9 MeV.

1962St02, 1962Mc03: (α,α') E=5-8 MeV.

1962Ga13, 1962Ga10: (α,α') E=8.5 MeV and (^{14}N,^{14}N′) E=36 MeV.

1960An07 (also 1960An09,1960An14): (^{14}N,^{14}N′) E=36 MeV.

1956Te26: (α,α') E=6 MeV.

^{80}Se Levels

E(level)	J^π ‡	$T_{1/2}$ †	Comments
0.0	0^+		
666.34 *14*	2^+	8.56 ps *14*	g=0.435 *27* (1998Sp03) g factor from transient-field technique in Coul. ex. (1998Sp03); Others: 0.39 *12* (1969He11, IMPAC in Coul. ex.). Value given by 1969He11 has been adjusted for $T_{1/2}$(666 level)=8.56 ps. Q=−0.31 *7* (1977Le11). Other: −0.35 *12* (1976VoZY). Q measured by reorientation method in Coul. ex. B(E2)=0.252 *4* (1977Le11). Others: 0.236 *+28−24* (1995Ka29), 0.248 *5* (1974Ba80), 0.24 *3* (1970AgZV), 0.283 *25* (1962St02), 0.26 *2* (1962Ga13), 0.23 *5* (1960An07), 0.23 *3* (1956Te26). β_2=0.229 *2* (1974Ba80), 0.232 *2* (1977Le11), 0.245 (1962St02). E2 matrix element (666,2^+ to 0,0^+)=+0.486 *+28−25* (1995Ka29). Static E2 matrix element (666,2^+ to 666,2^+)=−0.26 *+4−3* (1995Ka29).
1449.50 *18*	2^+	1.95 ps *7*	g=0.35 *10* (1998Sp03) g factor from transient-field technique in Coul. ex. (1998Sp03); β_2=0.054. B(E2)(from g.s.)=0.0134 *4* (1974Ba80), 0.0112 *13* (1995Ka29). B(E2)(from 666,2^+)=0.038 *3* (1974Ba80), 0.029 *3* (1995Ka29). Others: 1962Ga13, 1962Mc03. E2 matrix element (1449,2^+ to 0,0^+)=+0.106 *6* (1995Ka29). E2 matrix element (1449,2^+ to 666,2^+)=+0.379 *+22−20* (1995Ka29). E2 matrix element (1449,2^+ to 1701,4^+)=0.09 *+4−5* (1995Ka29). Static E2 matrix element (1449,2^+ to 1449,2^+)=+0.53 *3* (1995Ka29).
1478.34 *25*	0^+	11.4 ps *17*	B(E2)(from 666,2^+)=0.0028 *4* (1974Ba80), 0.0029 *5* (1995Ka29). B(E2) (from 1449,2^+)=0.0005 *+15−2* (1995Ka29). E2 matrix element (1478,0^+ to 666,2^+)=+0.12 *1* (1995Ka29). E2 matrix element (1478,0^+ to 1449,2^+)=−0.05 *+1−5* (1995Ka29).

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Coulomb excitation 1995Ka29,1974Ba80 (continued)

^{80}Se Levels (continued)

E(level)	Jπ‡	$T_{1/2}$†	Comments
1701.1 *4*	4^+	0.66 ps *2*	g=0.68 *25* (1998Sp03) g factor from transient-field technique in Coul. ex. (1998Sp03); B(E2)(from 666,2^+)=0.130 *4* (1974Ba80), 0.134 *13* (1995Ka29). B(E2)(from 1449,2^+)=0.0009 *+10−7* (1995Ka29). E2 matrix element (1701,4^+ to 666,2^+)=+0.82 *4* (1995Ka29). Static E2 matrix element (1701,4^+ to 1701,4^+)=−0.85 *+11−6* (1995Ka29).
1960.3 *4*	2^+	7 ps *+23−3*	B(E2)(from g.s.)=0.00045 *25* (estimated,1974Ba80), 0.0012 *+3−4* (1995Ka29). B(E2)(from 666,2^+)=0.0020 *15* (1974Ba80), 0.0020 *+9−10* (1995Ka29). B(E2)(from 1479,0^+)=0.053 *+25−48* (1995Ka29). B(E2)(from 1449,2^+)=0.0010 *+40−8* (1995Ka29). β_2=0.010. E2 matrix element (1960,2^+ to 0,0^+)=+0.034 *+4−6* (1995Ka29). E2 matrix element (1960,2^+ to 1478,0^+)=+0.23 *+5−16* (1995Ka29). E2 matrix element (1960,2^+ to 666,2^+)=+0.10 *+2−3* (1995Ka29). E2 matrix element (1960,2^+ to 1449,2^+)=0.07 *+9−10* (1995Ka29).
2121?#	(4+)#		Jπ: (3^+) In Adopted Levels. B(E2)(from 666,2^+)=0.00002 to 0.004 (1995Ka29). B(E2)(from 1449,2^+)=0.09 *+2−4* (1995Ka29). E2 matrix element (2121,4^+ to 666,2^+)=0.01 *+13−6* (1995Ka29). E2 matrix element (2121,4^+ to 1449,2^+)=+0.67 *+8−18* (1995Ka29).
2344?#	(2+)#		Jπ: (1^+,2^+) In Adopted Levels. B(E2)(from g.s.)=0.0009 *+7−5* (1995Ka29). B(E2)(from 666,2^+)=0.0016 *+13−6* (1995Ka29). B(E2)(from 1479,0^+)=0.18 *+3−10* (1995Ka29). B(E2)(from 1449,2^+)=0.026 *+13−15* (1995Ka29). B(E2)(from 1701,4^+)=0.010 *+13−9* (1995Ka29). B(E2)(from third 4^+)=0.18 *+5−3* (1995Ka29). E2 matrix element (2344,2^+ to 0,0^+)=+0.486 *+28−25* (1995Ka29). E2 matrix element (2344,2^+ to 666,2^+)=+0.486 *+28−25* (1995Ka29). E2 matrix element (2344,2^+ to 1479,0^+)=+0.486 *+28−25* (1995Ka29). E2 matrix element (2344,2^+ to 1449,2^+)=+0.486 *+28−25* (1995Ka29). E2 matrix element (2344,2^+ to 1701,4^+)=+0.486 *+28−25* (1995Ka29). E2 matrix element (2344,2^+ to third 4^+)=+1.28 *+17−12* (1995Ka29). Static E2 matrix element (2344,2^+ to 2344,2^+)=−0.76 *+24−22* (1995Ka29).
2717.7 *10*	3^-		B(E3)=0.0084 *14* (1974Ba80). β_3=0.083.

† From B(E2) values.
‡ From 'Adopted Levels', unless otherwise stated.
# Level not observed In Coulomb excitation; assumed for the analysis of Coulomb-excitation cross sections (1995Ka29). Energy taken from Adopted Levels, although Jπ assumed by 1995Ka29 is different In Adopted Levels.

γ(^{80}Se)

E_i(level)	J_i^π	E_γ	I_γ†	E_f	J_f^π	Mult.	δ	Comments
666.34	2^+	666.33 *15*	100	0.0	0^+	E2		
1449.50	2^+	783.15 *15*	68 *3*	666.34	2^+	E2+M1	−5.0 *+20−60*	Mult.,δ: from A_2=−0.17 *4*, A_4=0.02 *4* and $T_{1/2}$(1450 level). δ=−0.71 *+12−17* is also possible but less likely from systematics of first 2^+ states in even-even nuclei. Other: δ=−2.5 *9* from M1 and E2 matrix elements given by 1995Ka29.

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Coulomb excitation 1995Ka29,1974Ba80 (continued)

$\gamma(^{80}Se)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Mult.	δ	Comments
								M1 matrix element (1449,2^+ to 666,2^+)=−0.10 *+2−5* (1995Ka29).
1449.50	2^+	1449.5 *3*	100	0.0	0^+			
1478.34	0^+	812.0 *2*	100	666.34	2^+			
1701.1	4^+	1034.8 *3*	100	666.34	2^+			
1960.3	2^+	1294.0 *4*	100	666.34	2^+	(M1+E2)	−1.1 *+6−11*	δ: from M1 and E2 matrix elements of 1995Ka29. M1 matrix element (1960,2^+ to 666,2^+)=−0.10 *+4−3* (1995Ka29).
		(1960.3)	55	0.0	0^+			E_γ,I_γ: from 'adopted gammas', not reported in Coul. ex.
2717.7	3^-	2051.3 *10*		666.34	2^+			

[†] Photon Branching.

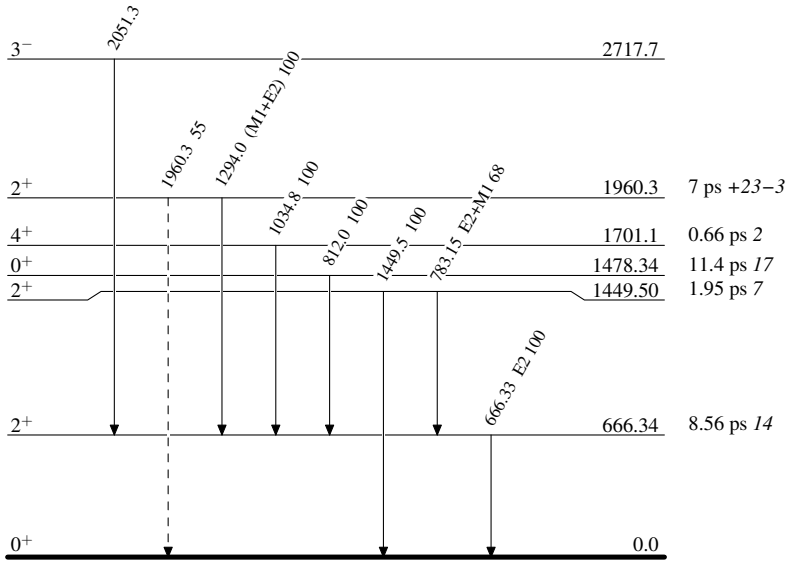
Coulomb excitation 1995Ka29,1974Ba80

Legend

Level Scheme

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{80}_{34}Se_{46}$