

Coulomb excitation 2000To12,1980Le24

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Ameenah R. Farhan		NDS 107, 1923 (2006)	30-Apr-2006

2000To12: Pb($^{74}\text{Ge}, ^{74}\text{Ge}'\gamma$) E=300 MeV. Measured γ rays with an array of 12 HPGe detectors with BGO anti-Compton suppressors. Deduced E2 and diagonal matrix elements using the least-squares search code GOSIA.

1980Le24: ($^{16}\text{O}, ^{16}\text{O}'\gamma$) E=36-42 MeV.

Others: 1987La20, 1984Pa20, 1980Le16, 1977Fa07, 1974Hu01, 1972Gr37, 1971Wa30, 1969He11, 1965Ro09, 1962Mc03, 1962St02, 1962Ga13, 1962Ga10, 1962Er05, 1960Wi18, 1956Te26.

Q measurement: 2000To12, 1980Le16, 1972Gr37.

μ measurement: 1984Pa20, 1969He11. Data of 1969He11 reanalyzed by 1977Fa07 and 1974Hu01.

Reactions:

($^{74}\text{Ge}, ^{74}\text{Ge}'$) E=300 MeV: 2000To12.

($^{34}\text{S}, ^{34}\text{S}'$) E=75 MeV: 1987La20.

($^{32}\text{S}, ^{32}\text{S}'$) E=85 MeV, ($^{28}\text{Si}, ^{28}\text{Si}'$) E=70 MeV: 1984Pa20.

($^{16}\text{O}, ^{16}\text{O}'$): 1980Le24, 1980Le16, 1972Gr37, 1971Wa30, 1969He11.

($^{14}\text{N}, ^{14}\text{N}'$): 1962Ga13, 1962Ga10, 1962Er05.

(α, α'): 1980Le16, 1965Ro09, 1962Mc03, 1962St02, 1962Ga13, 1962Ga10, 1956Te26.

(d,d'), (p,p'): 1960Wi18; (p,p' γ): 1979ShZE.

In the least-squares analysis, 2000To12 included previously known spectroscopic data for branching ratios, lifetimes, and mixing ratios.

 ^{74}Ge Levels

E(level)	J $^{\pi}$ [†]	T _{1/2}	Comments
0.0	0 ⁺		
595.88 10	2 ⁺	12.41 ps 9	<p>$\langle Q^2 \rangle = 0.31$ 2; $\langle \cos 3\delta \rangle = +0.21$ 2 (2000To12). $Q = -0.19$ 2 (2000To12) $B(E2)\uparrow = 0.3040$ 22 $\langle Q^2 \rangle = 0.28$ 4; $\langle \cos 3\delta \rangle = +0.32$ 12 (2000To12). g-factor = +0.350 22 (1987La20), +0.433 20 (1984Pa20), 0.44 22 (1969He11), 0.45 10 (1974Hu01), 0.37 6 (1977Fa07). μ: 1977Fa07 and 1974Hu01 reanalyzed data of 1969He11. Evaluators have adjusted values of 1969He11, 1974Hu01 and 1977Fa07 using $T_{1/2} = 12.41$ ps. Q: others: -0.25 6 (1980Le16), -0.25 10 (1972Gr37). The values are for constructive interference. For destructive interference values are -0.05 6 (1980Le16) and -0.17 10 (1972Gr37). Models predict constructive interference (see 1980Le16). $B(E2)\uparrow$: weighted average of 0.3045 30 (1980Le24, 1980Le16) and 0.3036 22 (2000To12). Others: 0.32 3 (1962St02), 0.30 5 (1962Er05), 0.32 3 (1960Wi18), 0.25 4 (1956Te26), 0.29 2 (1972Sa27). $T_{1/2}$: From $B(E2) = 0.3040$ 22. $g = +0.41$ 12 (1984Pa20) $Q = +0.26$ 6 (2000To12) $\langle Q^2 \rangle = 0.08$ +10-6; $\langle \cos 3\delta \rangle = -0.15$ 15 (2000To12). $B(E2)$(from g.s.) = 0.0062 10 (weighted average of 0.0035 15 (2000To12), 0.0065 25 (1980Le24), 0.0066 10 (1962Mc03) and 0.0082 16 (1962Ga13)). $B(E2)$ (from 596,2⁺) = 0.058 17 (weighted average of 0.051 8 (2000To12) and 0.10 2 (1980Le24)). $T_{1/2}$: weighted average of 5.7 ps 9 (from $B(E2) = 0.0062$ 10) and 7.4 ps 22 (from $B(E2)$(from 596,2⁺) = 0.058 17), using Branching and δ from 'adopted gammas'.</p>
1204.3 4	2 ⁺	5.9 ps 9	
1463.7 5	4 ⁺	1.53 ps 10	<p>$B(E2)\uparrow = 0.135$ 9 $B(E2)\uparrow$: from 596,2⁺; weighted average of 0.144 9 (2000To12) and 0.121 11 (1980Le24). $T_{1/2}$: From $B(E2) = 0.135$ 9.</p>
1482.8 5	0 ⁺	6 ps +15-3	<p>$T_{1/2}$: from $B(E2)$ of 2000To12. $\langle Q^2 \rangle = 0.02$ +6-2; $\langle \cos 3\delta \rangle = +0.44$ 24 (2000To12). $B(E2)$(from 596,2⁺) = 0.0036 26 (2000To12), <0.008 (1980Le24).</p>

[†] From 'Adopted Levels'.

Coulomb excitation 2000To12,1980Le24 (continued) $\gamma(^{74}\text{Ge})$

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Comments
595.88	2 ⁺	595.88 10	100	0.0	0 ⁺	B(E2)=0.0604 4 (2000To12), 0.0609 6 (1980Le24). E2 matrix element=+0.551 20 (2000To12). β_{20} =0.285 (1980Le24).
1204.3	2 ⁺	608.4 5	100	595.88	2 ⁺	B(E2)=0.051 8 (2000To12), 0.10 2 (1980Le24). E2 matrix element=+0.50 4 (2000To12). M1 matrix element=0.0014 7 (2000To12). β_{22} =0.260 (1980Le24).
		1204.3 5	35 3	0.0	0 ⁺	B(E2)=0.0007 3 (2000To12), 0.0013 5 (1980Le24). E2 matrix element=+0.058 10 (2000To12). β_{20} =0.042 (1980Le24).
1463.7	4 ⁺	259.4 [#]		1204.3	2 ⁺	E2 matrix element=+0.05 25 (2000To12). B(E2)<0.010 (2000To12).
		867.8 5	100	595.88	2 ⁺	E2 matrix element=+0.850 25 (2000To12). B(E2)=0.080 5 (2000To12), 0.067 6 (1980Le24). β_{42} =0.211 (1980Le24).
1482.8	0 ⁺	278.5 [#]		1204.3	2 ⁺	E2 matrix element=0.00 11 (2000To12). B(E2)<0.012 (2000To12).
		886.9 5	100	595.88	2 ⁺	E2 matrix element=+0.14 4 (2000To12). B(E2)=0.018 13 (2000To12), <0.040 (1980Le24). β_{02} <0.16 (1980Le24).

[†] From 1980Le24.

[‡] Photon branching ratios (1980Le24).

[#] Placement of transition in the level scheme is uncertain.

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Legend

Level Scheme

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)