Coulomb excitation **1972An17,1974Iv03,2010Di14**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 188,1 (2023)	17-Jan-2023

1972An17: (α,$\alpha'\gamma$) E=6-8 MeV and (^{14}N,^{14}N$'\gamma$) E=23 MeV from a cyclotron at USSR. Measured γ-ray yields with a coaxial Ge(Li) detector. Deduced levels, transition strengths.

1974Iv03: (α,$\alpha'\gamma$) E=13 MeV α beam from the IAP cyclotron. Measured $T_{1/2}$ with DSAM.

2010Di14: ^{104}Pd,^{120}Sn(^{71}Ga,^{71}Ga$'$),E=2.95 MeV/nucleon provided by REX-ISOLDE-CERN facility. Radioactive ^{71}Ga ion beam produced in U(p,X),E(p)=1.4 GeV using UC_x target and laser ionization RILIS. Coulomb excitation targets were 1.7 mg/cm^2 thick ^{120}Sn and 2 mg/cm^2 ^{104}Pd. Measured Eγ, Iγ, (particle)$\gamma\gamma$-coin using MINIBALL Ge array, and charged particles with a double-sided silicon strip detector. Deduced B(E2)(W.u.) values for the 512 and 965 levels from experimental Coulomb excitation cross sections obtained from observed gamma-ray yields normalized to the known cross section for excitation of the first 2^+ states in ^{104}Pd and ^{120}Sn targets. GOSIA analysis used for matrix elements.

1973AnZX: (HI,HI$'\gamma$). Measured $T_{1/2}$ with DSAM.

^{71}Ga Levels

Measured B(E2)↑ values given under comments are from 1972An17.

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0.0	3/2$^-$		
390.0 *3*	1/2$^-$		B(E2)↑<0.00017 B(E2)<0.17 listed in table 4 of 1972An17 seems a misprint.
487.2 *3*	5/2$^-$		B(E2)↑<0.00034
511.5 *3*	3/2$^-$	1.5 ps *7*	B(E2)↑=0.0080 *13* B(E2)↑: from 1972An17. Other: 0.0087 *35* from measured B(E2)(W.u.)=5 *2* (2010Di14). $T_{1/2}$: other: 22 ps *+12−9* from B(E2)↑=0.0080 *13*, adopted branching of 91.98% *23* for 511γ, and adopted δ(511.6γ)=−0.37 *6*.
910.2 *3*	3/2$^-$	0.24 ps *16*	B(E2)↑=0.0020 *3* $T_{1/2}$: other: 0.37 ps from DSAM (1973AnZX).
964.7 *3*	5/2$^-$	1.5 ps *4*	B(E2)↑=0.032 *5* $T_{1/2}$: from B(E2)↑=0.032 *5*, adopted branching=76.5% *15* and adopted δ=1.3 *3*. Other: >0.76 ps (DSAM,1974Iv03).
1107.5 *3*	7/2$^-$	0.48 ps *+14−10*	B(E2)↑=0.0029 *5* $T_{1/2}$: from B(E2)↑=0.0029 *5* and adopted branching=2.05% *9* for 1107γ. Other: >0.21 ps (DSAM,1974Iv03).
1109.0 *10*	1/2$^-$		B(E2)↑=0.0063 *9*
1395.2 *5*	7/2$^-$	0.76 ps *5*	B(E2)↑=0.0096 *14* $T_{1/2}$: others: 1.00 ps *+21−15* from B(E2)↑=0.0096 *14* and adopted branching=44.8% *7*; 0.32 ps from DSAM (1973AnZX).
1475.9 *3*	5/2$^-$		B(E2)↑<0.0051

[†] From a least-squares fit to Eγ data, assuming ΔEγ=0.5 keV for Eγ quoted to nearest tenth keV and 1 keV for Eγ quoted to keV.

[‡] From the Adopted Levels.

[#] From DSAM (1974Iv03), unless otherwise stated.

Coulomb excitation 1972An17,1974Iv03,2010Di14 (continued)

$\gamma(^{71}Ga)$

B(E2)(W.u.) deduced from B(E2)↑ values in 1972An17.

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.	δ	Comments
390.0	1/2−	389.9		0.0	3/2−			B(E2)(W.u.)<0.2 (1972An17)
487.2	5/2−	487		0.0	3/2−			B(E2)(W.u.)<0.1 (1972An17)
511.5	3/2−	121.5	8.5	390.0	1/2−			
		511.6	91.5	0.0	3/2−	M1+E2	0.09 *3*	B(E2)(W.u.)=4.6 (1972An17) Other: B(E2)(W.u.)=5 *2* (or B(E2)↑=0.0087 *35*) (2010Di14) who also quote average B(E2)(W.u.)=4.6 *6* from their data and those of 1972An17. δ: deduced by the evaluators from $T_{1/2}$=1.5 ps *7*, B(E2)↑=0.0080 *13*, and adopted branching=91.98% *23* for 511γ. This value differs from −0.37 *6* from $\gamma\gamma(\theta)$ in β^- decay, which is adopted in Adopted Gammas.
910.2	3/2−	398.6	7.1	511.5	3/2−			
		423.2	0.4	487.2	5/2−			
		520.5	0.9	390.0	1/2−			
		910.3	91.5	0.0	3/2−	M1+E2	0.08 *3*	B(E2)(W.u.)=1.1 (1972An17) δ: deduced by the evaluators from $T_{1/2}$ and B(E2)↑=0.0020 *3* with adopted branching(910γ)=0.914 *18*.
964.7	5/2−	453.1	17.5	511.5	3/2−			
		477.4	4.1	487.2	5/2−			
		574.9	2.2	390.0	1/2−			
		964.7	76.2	0.0	3/2−			B(E2)(W.u.)=12.3 (1972An17) Measured B(E2)(W.u.)=9 *5* (or B(E2)↑=0.024 *13*) (2010Di14) who also quote average B(E2)(W.u.) from their data and those from 1972An17.
1107.5	7/2−	(142.6)	6.0	964.7	5/2−			
		596.1	30.3	511.5	3/2−			
		620.1	61.5	487.2	5/2−			
		1107.4	2.2	0.0	3/2−			B(E2)(W.u.)=0.84 (1972An17)
1109.0	1/2−	1109		0.0	3/2−			B(E2)(W.u.)=7.2 (1972An17)
1395.2	7/2−	1395.2		0.0	3/2−			B(E2)(W.u.)=2.8 (1972An17)
1475.9	5/2−	566.2		910.2	3/2−			
		964.6		511.5	3/2−			
		988.6		487.2	5/2−			
		1085.3		390.0	1/2−			
		1476		0.0	3/2−			B(E2)(W.u.)<1.9 (1972An17)

† As quoted by 1972An17, most values seem to be from earlier measurements of 1970Zo01 in β^- decay and 1969Ve03 in (n,n′γ) Relative photon branching from each level.

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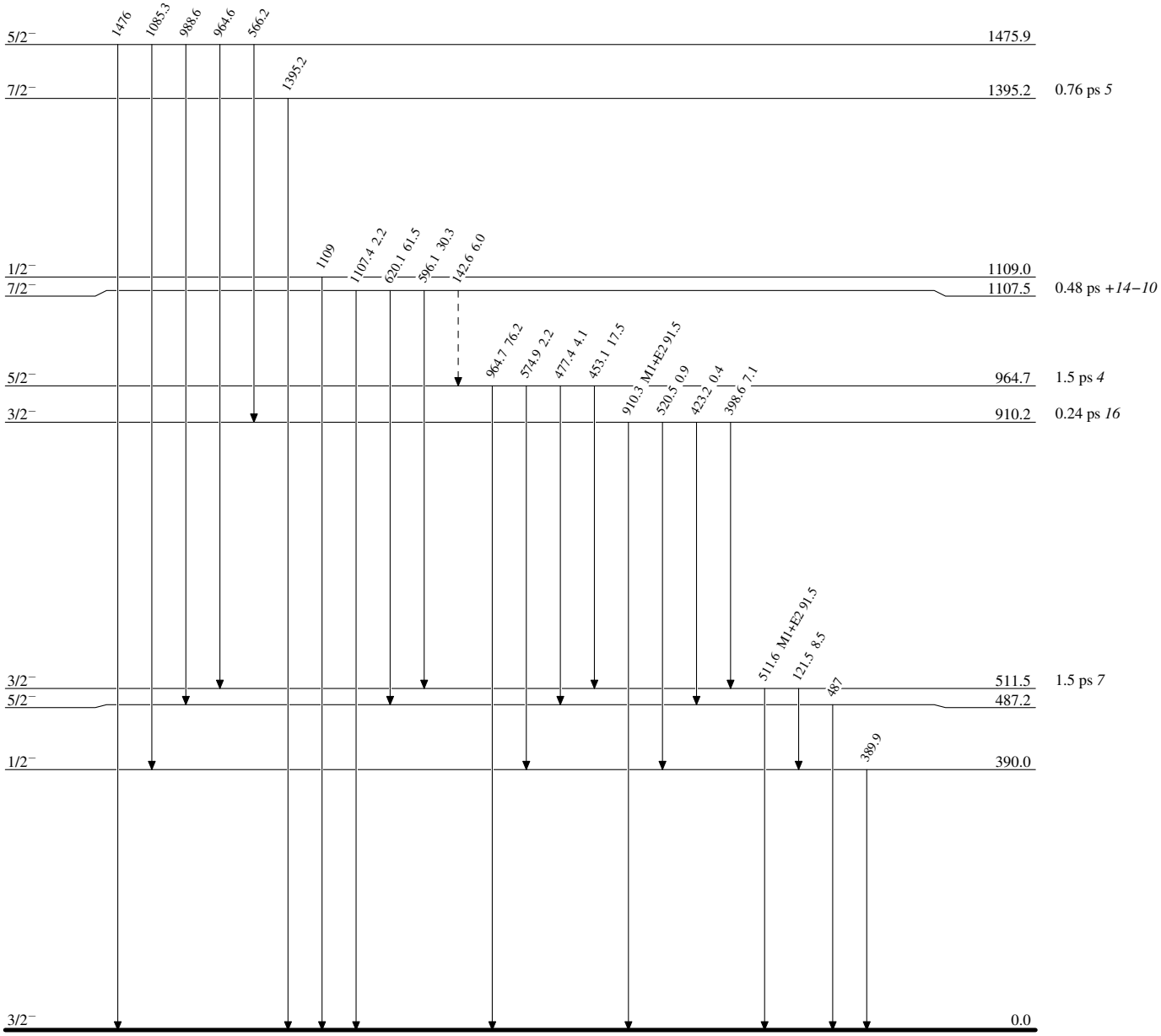
Legend

Level Scheme

Intensities: % photon branching from each level

– – – – – – ► γ Decay (Uncertain)



$^{71}_{31}Ga_{40}$