

Coulomb excitation 2007CI02

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Jun Chen and Ameenah R. Farhan		NDS 194,3 (2024)	8-Jan-2024

2007CI02: beam= ^{76}Kr at 4.4 MeV/nucleon, target= ^{208}Pb . Experiments performed at the SPIRAL facility at GANIL. Measured E_γ , I_γ , $\gamma\gamma$ coin using eleven germanium clover detectors in the EXOGAM array. The detectors were placed at angles of 90° and 135° relative to the beam. The scattered projectiles and the recoiling target nuclei were detected in double-sided silicon detectors (DSSDs). Also **2011CI03**, **2007Go42**, **2005Go15**, **2005Ko11**, **2004Ko63**, **2003Bo45** from the same group as **2007CI02**.

2004Ku11, **2005Be61:** $^{26}\text{Mg}(^{76}\text{Kr}, ^{76}\text{Kr}')$, $E=230$ MeV; measured g factor by transient-field technique in Coul. ex. at LBNL cyclotron facility.

1992Os02: $^{208}\text{Pb}(^{76}\text{Kr}, ^{76}\text{Kr}')$, Coulomb excitation of ^{76}Kr beam produced in $^9\text{Be}(^{70}\text{Ge}, 3n)$ reaction, measured σ .

 ^{76}Kr Levels

All data are from **2007CI02**, unless otherwise stated.

Q^t =transition quadrupole moment, Q_0 =intrinsic quadrupole moment, Q^s =static quadrupole moment.

E(level)	J^π	$T_{1/2}^\dagger$	Comments
0^\pm	0^+		
424.1 ‡ 7	2^+	26.3 ps 15	g=+0.37 11 (2004Ku11,2005Be61) $Q=-0.7$ 2 The g factor measured by transient-field technique in Coul. ex. $T_{1/2}$: from free fit. Other: 28.6 ps 4 from constrained fit. E2 matrix element ($0,0^+$ to $424,2^+$)=+0.849 6. $B(E2)=0.721$ 10, deduced from E2 matrix element. E2 diagonal matrix element=-0.9 3. $Q_0^s=+2.5$ 8. $Q_0^t=2.69$ 2. $\sigma(19^\circ \text{ to } 51^\circ)=2.7$ b 3 (1992Os02).
770.0 $^\circ$ 9	0^+	47.3 ps 17	E2 matrix element (from $424,2^+$ to $770,0^+$)=-0.490 +11-8.
1034.9 ‡ 8	4^+	3.05 ps 14	$Q=-1.7$ 3 $T_{1/2}$: from free fit. Other: 2.70 ps 7 for constrained fit. E2 matrix element ($424,2^+$ to $1035,4^+$)=+1.49 1. E2 diagonal matrix element=-2.3 4. $Q_0^s=+4.7$ 8. $Q_0^t=2.94$ 3.
1221.8 $^\#$ 7	2^+	1.11 ps 7	$Q=-0.7$ 3 E2 matrix element (from $0,0^+$ to $1222,2^+$)=+0.183 +8-6. E2 matrix element (from $1222,2^+$ to $1957,4^+$)=+0.89 +10-13. E2 matrix element (from $424,2^+$ to $1222,2^+$)=-0.09 4. E2 matrix element (from $1035,4^+$ to $1222,2^+$)=-0.62 +4-5. E2 matrix element (from $770,0^+$ to $1222,2^+$)=+1.22 +8-4. E2 diagonal matrix element=-1.0 5. $Q_0^s=2.6$ 13, positive sign for K=2, negative sign for K=0.
1688.2 $^\circ$ 7	2^+	0.326 ps 35	$Q=+1.0$ 4 E2 matrix element (from $0,0^+$ to $1688,2^+$)=+0.121 +4-5. E2 matrix element (from $424,2^+$ to $1688,2^+$)=-0.200 +9-8. E2 matrix element (from $770,0^+$ to $1688,2^+$)=+0.87 +4-2. E2 matrix element (from $1035,4^+$ to $1688,2^+$)=+0.52 5. E2 matrix element (from $1222,2^+$ to $1688,2^+$)=+0.81 +10-24. E2 diagonal matrix element=+1.3 5. $Q_0^s=-3.4$ 13. $Q_0^t=2.77$ +12-7.

Continued on next page (footnotes at end of table)

Coulomb excitation 2007CI02 (continued)

^{76}Kr Levels (continued)

E(level)	J^π	$T_{1/2}^\dagger$	Comments
1858.9 [‡] 13	6 ⁺	0.568 ps 35	Q=-2.0 3 T _{1/2} : from free fit. Other: 0.53 ps 4 for constrained fit. E2 matrix element (1035,4 ⁺ to 1859,6 ⁺)=+1.90 +11-3. E2 diagonal matrix element=-2.9 4. Q ₀ ^s =+5.1 7. Q ₀ ^t =2.98 +17-6.
1957.5 [#] 10	4 ⁺	0.90 ps 14	E2 matrix element (from 424,2 ⁺ to 1957,4 ⁺)=0.09 +1-19. E2 matrix element (from 1035,4 ⁺ to 1957,4 ⁺)=+0.43 3. Q ₀ ^t =1.77 +20-26.
2763 [#]	6 ⁺		This level is included here for completeness, but does not appear to be populated in Coulomb excitation.
2878.9 [‡] 17	8 ⁺	0.173 ps 21	E2 matrix element (from 1859,6 ⁺ to 2879,8)=+2.25 +16-10. Q ₀ ^t =3.02 +22-14.
4067.9 [‡] 19	10 ⁺	0.104 ps 21	E2 matrix element (2879,8 ⁺ to 4068,10 ⁺)=+2.19 +22-14. Q ₀ ^t =2.60 +26-15.

† From GOSIA analysis of Coulomb excitation data by constraining the fit using half-lives from 2005Go43 as starting input parameters for the following levels: 424,2⁺: 28.8 ps 6; 1035,4⁺: 2.54 ps 6; 1859,6⁺: 0.67 ps 20. Values for 424, 1035 and 1859 levels are taken from free fit, while the ones with constrained fit are listed under comments.

‡ Band(A): g.s. band.

Band(B): Excited 2⁺ state band.

@ Band(C): Excited 0⁺ band.

$\gamma(^{76}\text{Kr})$

$E_i(\text{level})$	J_i^π	E_γ	I_γ^\dagger	E_f	J_f^π	Mult. [†]	δ^\dagger	Comments
424.1	2 ⁺	424		0	0 ⁺			B(E2)↓=0.144 2
770.0	0 ⁺	346		424.1	2 ⁺			B(E2)↓=0.241 +11-9
1034.9	4 ⁺	611		424.1	2 ⁺			B(E2)↓=0.247 6
1221.8	2 ⁺	(187)		1034.9	4 ⁺			B(E2)↓=0.079 14
		(452)		770.0	0 ⁺			B(E2)↓=0.30 +4-2
		798	100 3	424.1	2 ⁺	M1+E2	+0.2 1	B(E2)↓=0.002 2; B(M1)↓=0.035 2 M1 matrix element=-0.42 1.
		1222	69 4	0	0 ⁺			B(E2)↓=0.0067 +5-4
1688.2	2 ⁺	(467)	4.6 16	1221.8	2 ⁺			B(E2)↓=0.13 +3-7
		(653)	9.2 3	1034.9	4 ⁺			B(E2)↓=0.055 +12-10
		918	100 6	770.0	0 ⁺			B(E2)↓=0.15 1
		(1264)	21.2 7	424.1	2 ⁺			B(E2)↓=0.0080 7
		(1688)	28.8 10	0	0 ⁺			B(E2)↓=0.0029 2
1858.9	6 ⁺	824		1034.9	4 ⁺			B(E2)↓=0.28 +3-1
1957.5	4 ⁺	735 [‡]	57 6	1221.8	2 ⁺			B(E2)↓=0.09 +2-3
		923	100 10	1034.9	4 ⁺	E2+M1	-0.84 5	B(E2)↓=0.021 3; B(M1)↓=0.017 3 M1 matrix element=-0.39 3.
		(1533)	29 3	424.1	2 ⁺			B(E2)↓=0.0010 +3-1
2878.9	8 ⁺	1020		1858.9	6 ⁺			B(E2)↓=0.30 +5-3
4067.9	10 ⁺	(1189)		2878.9	8 ⁺			B(E2)↓=0.23 +5-3

† From Adopted Gammas.

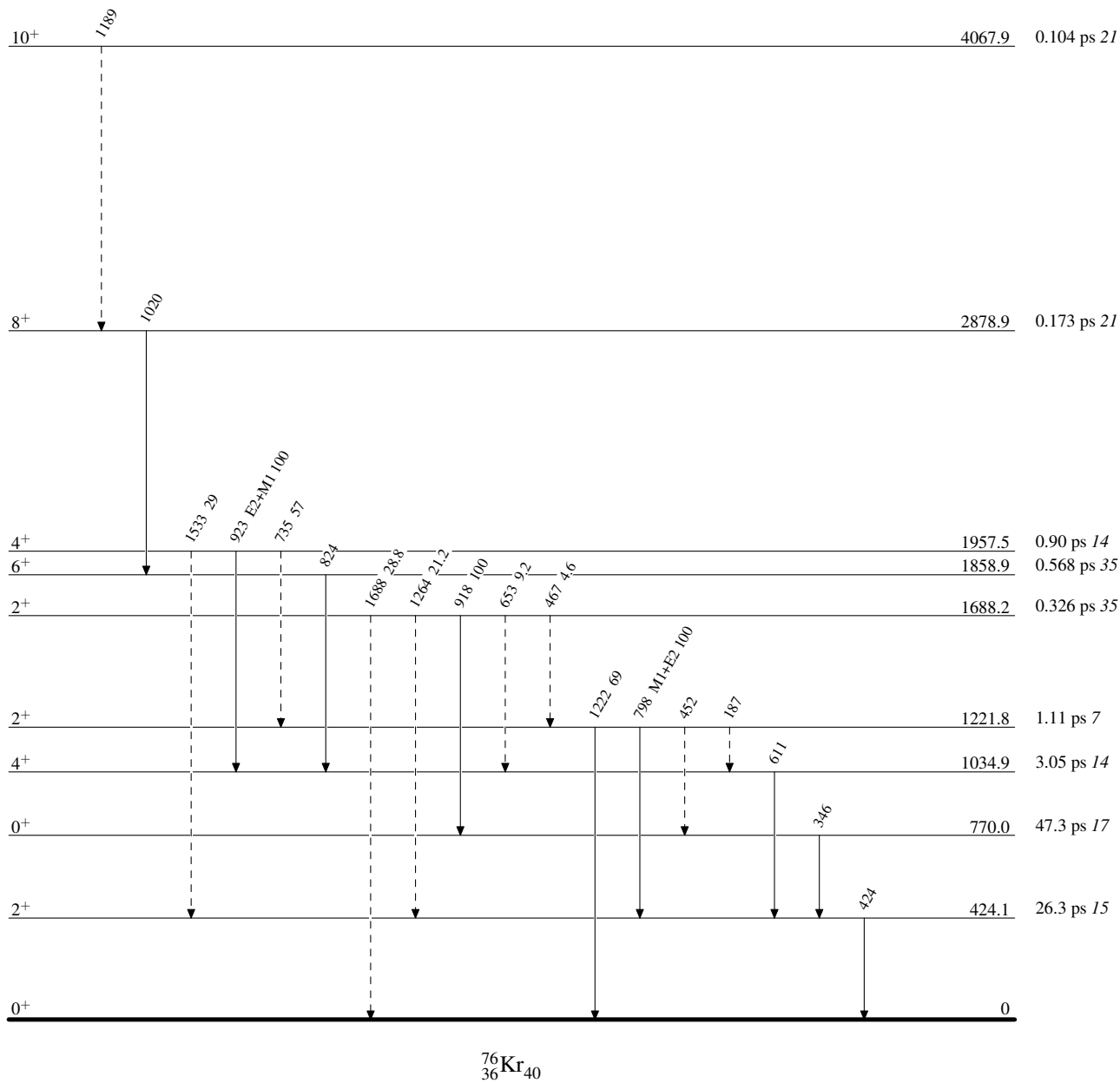
‡ Placement of transition in the level scheme is uncertain.

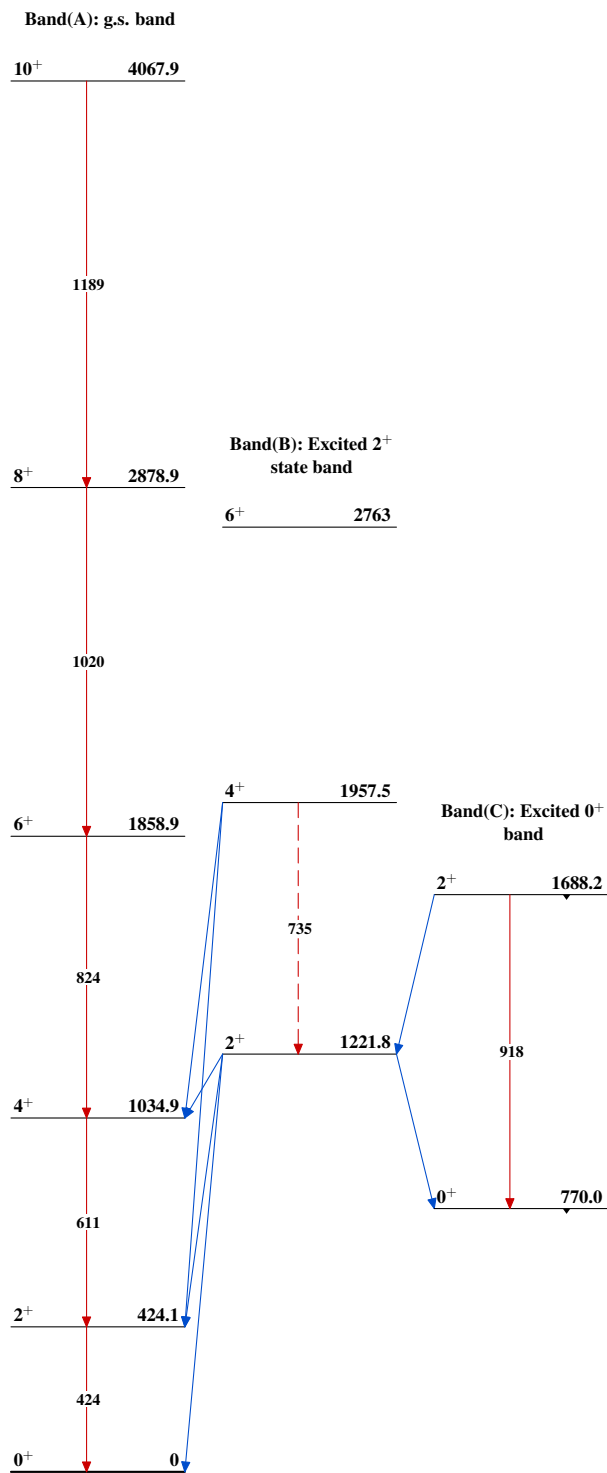
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Legend

Level Scheme

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)

Coulomb excitation 2007CI02 $^{76}_{36}\text{Kr}_{40}$