

⁴⁰Ca(⁴⁰Ca,α2pγ) 2005Va30

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

- 2005Va30:** E(⁴⁰Ca)=185 MeV. Measured Eγ, Iγ, γγ using EUROBALL III array of 26 ‘Clover’ and 15 ‘Cluster’ composite Compton-suppressed HPGe detectors. Particles detected with 4π ISIS array consisting of 40 silicon ΔE-E telescopes, neutrons detected with 50 liquid scintillator detectors covering forward 1π section of EUROBALL array.
- 2005Va30:** E(⁴⁰Ca)=165 MeV. Measured Eγ, Iγ, γγ, lifetimes by Centroid-shift Doppler-attenuation method using Gammasphere array of 99 Compton-suppressed HPGe detectors. Particles detected with CsI(Tl) MICROBALL array consisting of 95 detectors.
- 2005Go43:** E=147 MeV. Measured Eγ, Iγ, γγ, lifetimes by recoil-distance Doppler-shift (RDDS) method using GASP array of 32 Compton-suppressed HPGe detectors and inner ball of BGO scintillators. **2005Go43** present data for GS band up to 10⁺.
- 2000A102:** E=160 MeV. Measured level lifetimes by DSA METHOD. Data presented for g.s. band up to 22⁺ and for 5⁻ band up to 21⁻.
- 1991He02:** E=125, 140 MeV. Measured γ, γγ, T_{1/2} by (DSA) method.

⁷⁴Kr Levels

The transition quadrupole moments deduced from lifetime measurements reveal only a modest decrease with at highest spins. This indicates non-termination of rotational bands at maximum spins.

E(level) [†]	J ^π @	T _{1/2} [‡]	Comments
0.0 ^{&}	0 ⁺		
455.7 ^{& 5}	2 ⁺	23.4 [#] ps 4	
1013.7 ^{& 7}	4 ⁺	3.60 [#] ps 14	T _{1/2} : other: <13 ps (1991He02). E(level): from 1991He02 only.
1121.3 ^{? 7}			
1781.9 ^{& 9}	6 ⁺	0.76 [#] ps 16	T _{1/2} : others: 0.75 ps 10 (2000A102), 0.63 ps 7 (1991He02).
2656.3 ^{a 10}	4 ⁻		
2749.1 ^{& 10}	8 ⁺	0.243 ps 35	T _{1/2} : other: 0.166 ps 28 (1991He02).
2813.0 ^{b 11}	5 ⁻		
3140.2 ^{a 10}	6 ⁻		
3368.3 ^{b 9}	7 ⁻		
3841.5 ^{a 11}	8 ⁻		
3893.8 ^{& 11}	10 ⁺	0.111 ps 21	T _{1/2} : Other: 0.069 ps 21 (1991He02).
4134.8 ^{b 10}	9 ⁻	0.82 ps 8	
4723.0 ^{a 12}	10 ⁻		
5088.3 ^{b 12}	11 ⁻	0.270 ps 28	
5181.0 ^{& 12}	12 ⁺	0.069 ps 21	T _{1/2} : other: ≤0.08 ps (1991He02).
5766.0 ^{a 16}	12 ⁻		
6212.5 ^{b 13}	13 ⁻	0.112 ps 21	
6517.2 ^{& 13}	14 ⁺	0.090 ps 21	
6969.1 ^{a 19}	14 ⁻		
7489.5 ^{b 14}	15 ⁻	0.062 ps 14	
7859.8 ^{& 17}	16 ⁺	0.083 ps 14	
8320.1 ^{a 21}	16 ⁻		
8899.9 ^{b 15}	17 ⁻	0.035 ps 14	
9307.3 ^{& 17}	18 ⁺	0.055 ps 21	
9805.1 ^{a 23}	18 ⁻		
10432.0 ^{b 18}	19 ⁻		
10882.4 ^{& 20}	20 ⁺		

Continued on next page (footnotes at end of table)

⁴⁰Ca(⁴⁰Ca,α2pγ) **2005Va30 (continued)**

⁷⁴Kr Levels (continued)

E(level) [†]	J ^π @	E(level) [†]	J ^π @	E(level) [†]	J ^π @	E(level) [†]	J ^π @
11432 ^a 3	20 ⁻	15128 ^a 3	24 ⁻	19861 ^{&} 3	28 ⁺	26832 ^{&} 4	(32 ⁺)
12090.0 ^b 20	21 ⁻	15909.0 ^b 25	25 ⁻	20736 ^b 3	29 ⁻	27031 ^b 4	(33 ⁻)
12651.4 ^{&} 23	22 ⁺	17068 ^{&} 3	26 ⁺	22577 ^a 4	30 ⁻	30937 ^b 4	(35 ⁻)
13195 ^a 3	22 ⁻	17301 ^a 3	26 ⁻	23129 ^{&} 3	(30 ⁺)		
13898.0 ^b 23	23 ⁻	18174 ^b 3	27 ⁻	23658 ^b 3	31 ⁻		
14688.4 ^{&} 25	24 ⁺	19752 ^a 4	28 ⁻	25856 ^a 4	(32 ⁻)		

[†] From least-squares fit to E_γ's, assuming Δ(E_γ)=0.5 keV uncertainty when E_γ quoted to nearest keV, 1 keV otherwise; χ²=1.1.

[‡] From DSA method (2000A102), unless otherwise stated.

From RDDS method (2005Go43).

@ As proposed by 2005Va30. The assignments are consistent with those in 'Adopted Levels', except that many are given in parentheses there due to lack of strong supporting arguments.

& Band(A): g.s. band. Q(transition)(top of the band)=2.1 (2005Va30).

^a Band(B): 4⁻ band, α=0. Q(transition)(top of the band)=2.4 (2005Va30).

^b Band(b): 5⁻ band, α=1. Q(transition)(top of the band)=2.3 (2005Va30).

γ(⁷⁴Kr)

E _γ [†]	E _i (level)	J _i ^π	E _f	J _f ^π	E _γ [†]	E _i (level)	J _i ^π	E _f	J _f ^π
455.7	455.7	2 ⁺	0.0	0 ⁺	1532	10432.0	19 ⁻	8899.9	17 ⁻
473	3841.5	8 ⁻	3368.3	7 ⁻	1575 [‡]	10882.4	20 ⁺	9307.3	18 ⁺
484.0	3140.2	6 ⁻	2656.3	4 ⁻	1586.8	3368.3	7 ⁻	1781.9	6 ⁺
555	3368.3	7 ⁻	2813.0	5 ⁻	1627	11432	20 ⁻	9805.1	18 ⁻
558.0	1013.7	4 ⁺	455.7	2 ⁺	1643	2656.3	4 ⁻	1013.7	4 ⁺
665.6 [#]	1121.3?		455.7	2 ⁺	1658	12090.0	21 ⁻	10432.0	19 ⁻
701.4	3841.5	8 ⁻	3140.2	6 ⁻	1763	13195	22 ⁻	11432	20 ⁻
766.9	4134.8	9 ⁻	3368.3	7 ⁻	1769	12651.4	22 ⁺	10882.4	20 ⁺
768.2	1781.9	6 ⁺	1013.7	4 ⁺	1799	2813.0	5 ⁻	1013.7	4 ⁺
881.5	4723.0	10 ⁻	3841.5	8 ⁻	1808	13898.0	23 ⁻	12090.0	21 ⁻
953.5	5088.3	11 ⁻	4134.8	9 ⁻	1933	15128	24 ⁻	13195	22 ⁻
966.7	2749.1	8 ⁺	1781.9	6 ⁺	2011	15909.0	25 ⁻	13898.0	23 ⁻
1043	5766.0	12 ⁻	4723.0	10 ⁻	2037	14688.4	24 ⁺	12651.4	22 ⁺
1124.2	6212.5	13 ⁻	5088.3	11 ⁻	2173	17301	26 ⁻	15128	24 ⁻
1144.7	3893.8	10 ⁺	2749.1	8 ⁺	2265	18174	27 ⁻	15909.0	25 ⁻
1203	6969.1	14 ⁻	5766.0	12 ⁻	2380	17068	26 ⁺	14688.4	24 ⁺
1277.0	7489.5	15 ⁻	6212.5	13 ⁻	2451	19752	28 ⁻	17301	26 ⁻
1287.2	5181.0	12 ⁺	3893.8	10 ⁺	2562	20736	29 ⁻	18174	27 ⁻
1336.2	6517.2	14 ⁺	5181.0	12 ⁺	2792	19861	28 ⁺	17068	26 ⁺
1342.6	7859.8	16 ⁺	6517.2	14 ⁺	2825	22577	30 ⁻	19752	28 ⁻
1351	8320.1	16 ⁻	6969.1	14 ⁻	2922	23658	31 ⁻	20736	29 ⁻
1358	3140.2	6 ⁻	1781.9	6 ⁺	3268	23129	(30 ⁺)	19861	28 ⁺
1384	4134.8	9 ⁻	2749.1	8 ⁺	3279	25856	(32 ⁻)	22577	30 ⁻
1410.4	8899.9	17 ⁻	7489.5	15 ⁻	3373	27031	(33 ⁻)	23658	31 ⁻
1447.5	9307.3	18 ⁺	7859.8	16 ⁺	3703	26832	(32 ⁺)	23129	(30 ⁺)
1485	9805.1	18 ⁻	8320.1	16 ⁻	3906	30937	(35 ⁻)	27031	(33 ⁻)

[†] Most values are from 2005Va30. When corresponding values are also available from 2005Go43, 2000A102 and 1991He02, unweighted averages are taken.

${}^{40}\text{Ca}({}^{40}\text{Ca},\alpha 2p\gamma)$ **2005Va30** (continued)

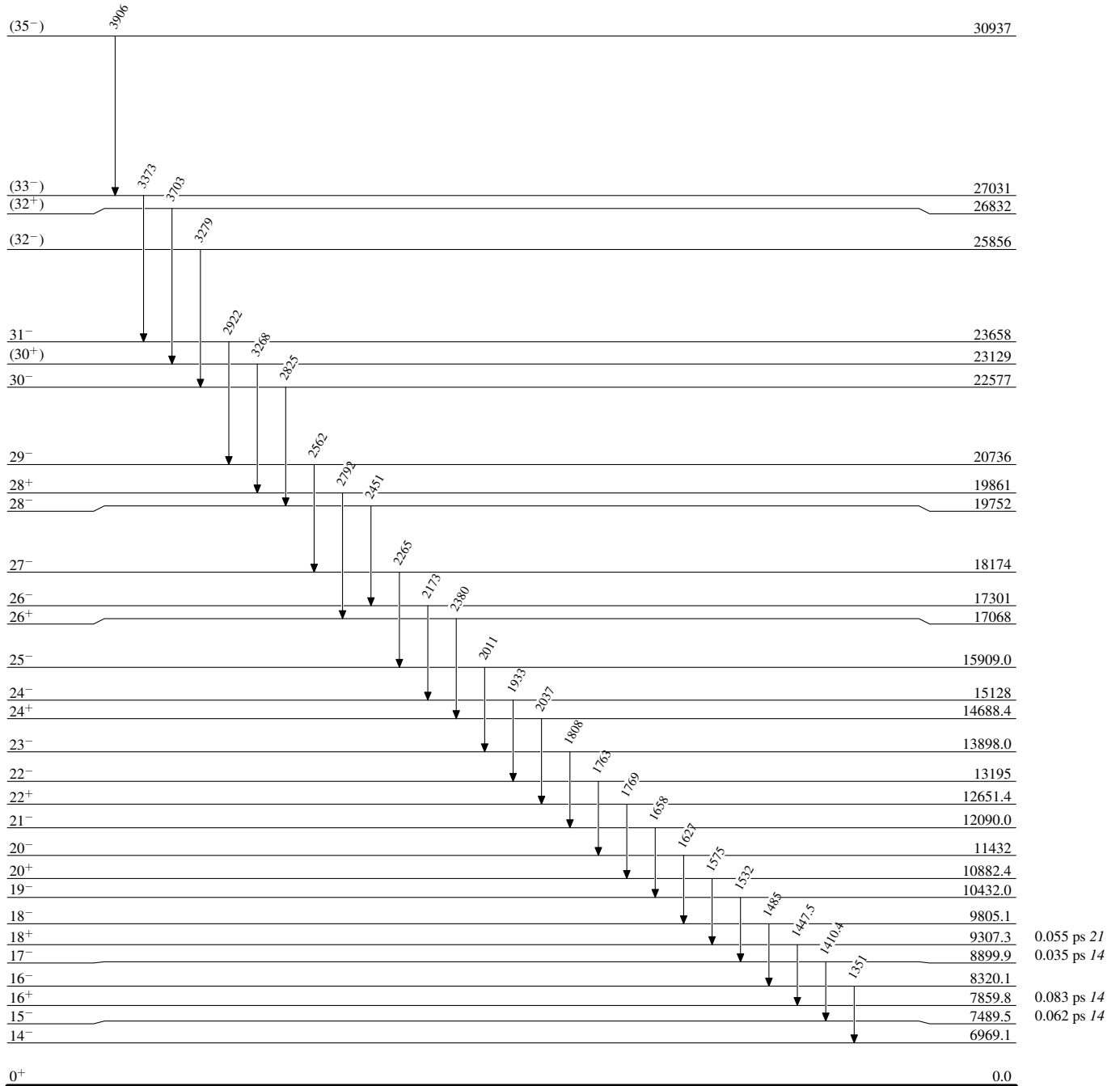
$\gamma({}^{74}\text{Kr})$ (continued)

‡ 1560 In [1991He02](#).

From [1991He02](#) only.

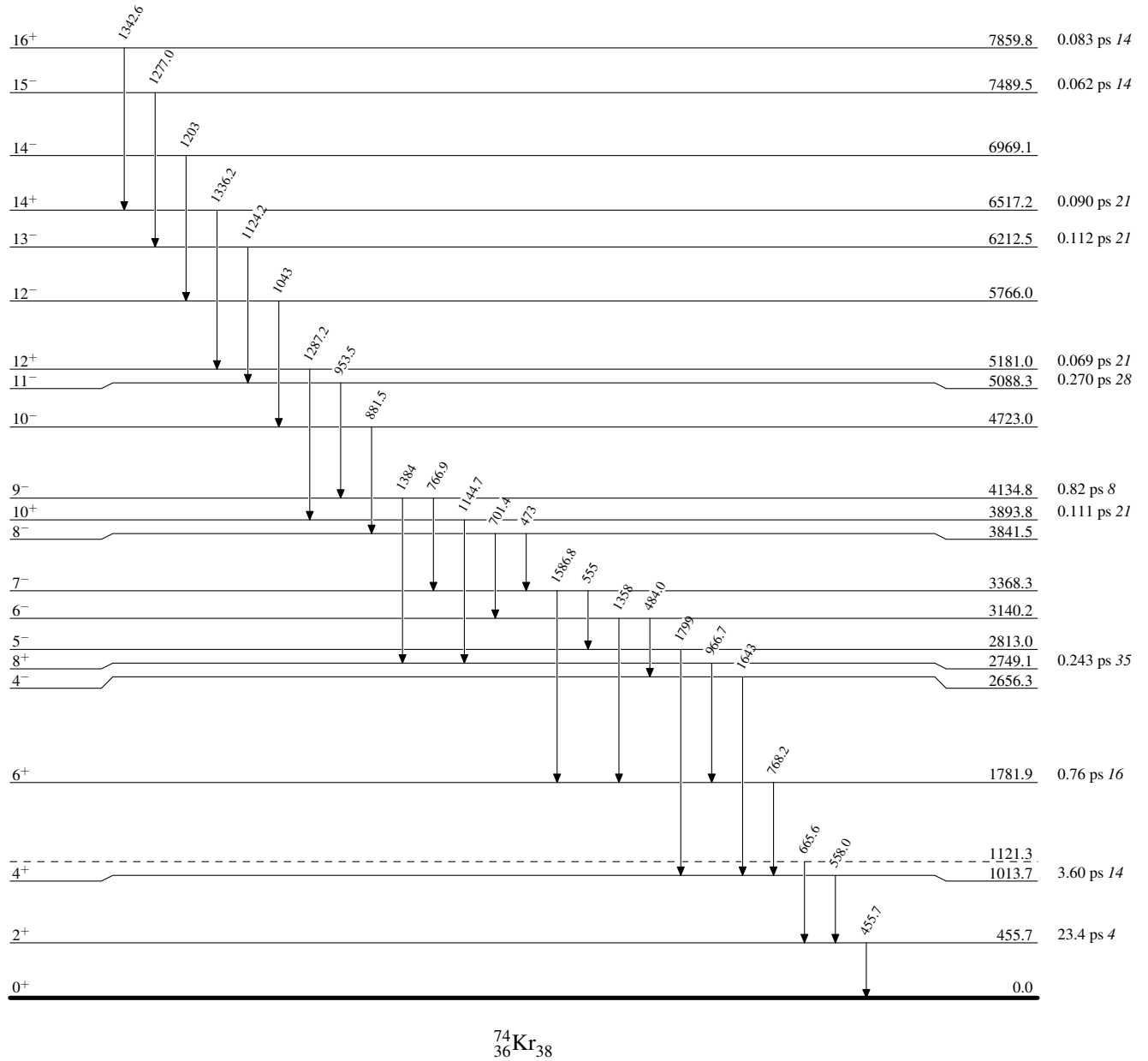
$^{40}\text{Ca}(\alpha^{40}\text{Ca}, \alpha 2p\gamma)$ 2005Va30

Level Scheme



${}^{40}\text{Ca}({}^{40}\text{Ca}, \alpha 2p\gamma)$ 2005Va30

Level Scheme (continued)



${}^{40}\text{Ca}({}^{40}\text{Ca}, \alpha 2p\gamma)$ 2005Va30