^{16}O(^{24}Mg,αnγ)   **2004Ek01,2005Ek01**

2004Ek01,2005Ek01: a 60-MeV ^{24}Mg beam was produced at the Legnaro National Laboratory, Italy. The target was 0.5-mg/cm^2 enriched ^{40}Ca with a 7-mg/cm^2 tantalum backing. Oxygen was present in the target, giving rise to the fusion evaporation reactions of ^{16}O(^{24}Mg,αnγ)^{35}Ar and ^{16}O(^{24}Mg,αpγ)^{35}Cl. γ rays were detected using the GASP array of Ge detectors and 80 BGO detectors. Charged particles were detected using the ISIS array of 40 Si ΔE-E telescopes. Neutrons were detected using a Neutron Ring replacing the six BGO elements at the most forward angles. The event trigger required one Ge detector, one BGO detector, and one neutron detector, or two Ge detectors and one BGO detector firing. Measured Eγ, Iγ, $\gamma\gamma$, αnγ-coin, and αpγ-coin. Deduced levels, J, π from the measured ratios of yields R($\gamma(\theta)$) and comparisons with the mirror nucleus ^{35}Cl.

^{35}Ar Levels

E(level)†	J$^{\pi\ddagger}$
0.0	3/2$^+$
1750.8 *3*	5/2$^+$
2603.2 *4*	(7/2$^+$)
3197.0 *4*	7/2$^{(-)}$
4359.2 *7*	(9/2$^-$)
5384.4 *5*	11/2$^{(-)}$
5766.0 *5*	13/2$^{(-)}$

† From a least-squares fit to γ-ray energies.
‡ As given in 2004Ek01 based on known assignments of low-lying levels and mirror levels in ^{35}Cl and the measured ratios of yields R($\gamma(\theta)$). When considered in Adopted Levels, the firm assignments here are placed within parentheses if there are no other strong arguments to support these firm assignments. R($\gamma(\theta)$) in 2004Ek01.

γ(^{35}Ar)

The ratios of yields R($\gamma(\theta)$) were measured at 35° and 81° with respect to the beam axis. Expected values are R($\gamma(\theta)$)≈1.2 for stretched quadrupole (ΔJ=2) and R($\gamma(\theta)$)≈0.7 for stretched dipole (ΔJ=1) transitions.

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	Comments
381.6 *1*	26 *3*	5766.0	13/2$^{(-)}$	5384.4	11/2$^{(-)}$	M1	R($\gamma(\theta)$)=0.69 *18*.
593 *1*	12 *6*	3197.0	7/2$^{(-)}$	2603.2	(7/2$^+$)		
852† *1*	4 *2*	2603.2	(7/2$^+$)	1750.8	5/2$^+$		
1025† *1*	5 *2*	5384.4	11/2$^{(-)}$	4359.2	(9/2$^-$)		
1162 *1*	11 *3*	4359.2	(9/2$^-$)	3197.0	7/2$^{(-)}$		
1446.2 *2*	76 *7*	3197.0	7/2$^{(-)}$	1750.8	5/2$^+$	E1	R($\gamma(\theta)$)=0.71 *9*.
1750.7 *4*	100 *7*	1750.8	5/2$^+$	0.0	3/2$^+$		R($\gamma(\theta)$)=1.41 *14*.
1756† *1*	27 *4*	4359.2	(9/2$^-$)	2603.2	(7/2$^+$)		
2187.4 *4*	24 *3*	5384.4	11/2$^{(-)}$	3197.0	7/2$^{(-)}$	E2	R($\gamma(\theta)$)=1.60 *36*.
2603.0 *5*	41 *9*	2603.2	(7/2$^+$)	0.0	3/2$^+$		R($\gamma(\theta)$)=1.01 *17*.
3197.0 *7*	14 *4*	3197.0	7/2$^{(-)}$	0.0	3/2$^+$	M2	R($\gamma(\theta)$)=1.45 *51*.

† Placement of transition in the level scheme is uncertain.

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Legend

Level Scheme

Intensities: Relative I$_\gamma$

I$_\gamma$ < 2% × I$_\gamma^{max}$
I$_\gamma$ < 10% × I$_\gamma^{max}$
I$_\gamma$ > 10% × I$_\gamma^{max}$
γ Decay (Uncertain)

$^{35}_{18}$Ar$_{17}$