^{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. Detectors were the GASP array of Ge detectors, the ISIS charged-particle array of 40 Si ΔE-E telescopes, a Neutron Ring at the most forward angles, and 74 BGO detectors. 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$^{\pi}$[‡]
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.
[‡] From mirror levels in ^{35}Cl and from the measured ratios of yields 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. R($\gamma(\theta)$)≈1.2 for stretched quadrupole and R($\gamma(\theta)$)≈0.7 for stretched dipole (ΔJ=1).

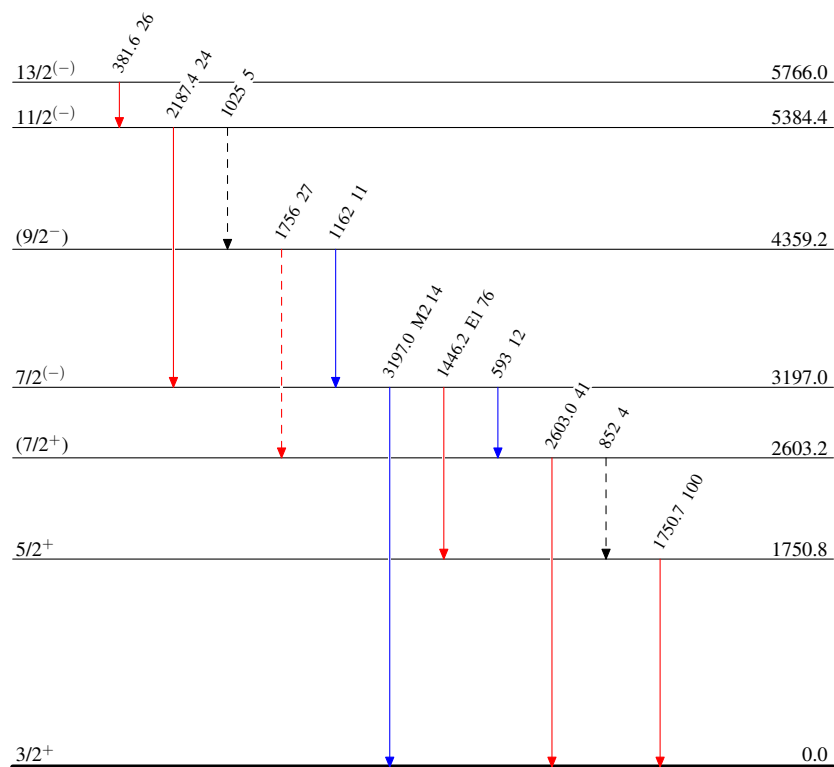| E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^{\pi}$	E$_f$	J$_f^{\pi}$	Mult.	Comments
381.6 *1*	26 *3*	5766.0	13/2$^{(-)}$	5384.4	11/2$^{(-)}$		R($\gamma(\theta)$)=0.69 *18*.
593 *1*	12 *6*	3197.0	7/2$^{(-)}$	2603.2	(7/2$^+$)		
852[†] *1*	4 *2*	2603.2	(7/2$^+$)	1750.8	5/2$^+$		
1025[†] *1*	5 *2*	5384.4	11/2$^{(-)}$	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$^{(-)}$		R($\gamma(\theta)$)=1.6 *4*.
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($\gamma(\theta)$)=1.5 *5*.

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

$^{16}\text{O}(^{24}\text{Mg},\alpha n\gamma)$ **2004Ek01,2005Ek01**

Legend

Level Scheme

Intensities: Relative I_γ

→ $I_\gamma < \ 2\% \times I_\gamma^{max}$
→ $I_\gamma < 10\% \times I_\gamma^{max}$
→ $I_\gamma > 10\% \times I_\gamma^{max}$
⇢ γ Decay (Uncertain)

Level	Energy
$13/2^{(-)}$	5766.0
$11/2^{(-)}$	5384.4
$(9/2^-)$	4359.2
$7/2^{(-)}$	3197.0
$(7/2^+)$	2603.2
$5/2^+$	1750.8
$3/2^+$	0.0

381.6 26
2187.4 24
1025 5
1756 27
1162 11
3197.0 M2 14
1446.2 E1 76
593 12
2603.0 41
852 4
1750.7 100

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