^{27}Al(^{16}O,αpγ)   **2011Ch54**

		History		
Type	Author	Citation	Literature Cutoff Date	
Full Evaluation	Jun Chen	NDS 152, 1 (2018)	30-Sep-2017	

2011Ch54: E=34 MeV ^{16}O beam was produced from Inter University Accelerator Centre (IUAC), New Delhi. Target was Al from ^{18}O target frame. γ rays were detected by Indian National Gamma Array (INGA) of eighteen Compton-suppressed Clover detectors. Measured Eγ, $\gamma\gamma(\theta)$, $\gamma\gamma$(lin pol). Deduced levels.

2017Da13: E=34 MeV beam from the 15UD Pelletron of the IUAC-New Delhi facility. Target was ≈200 mg/cm^2 thick Aluminum foil. γ rays were detected with the INGA array. Measured Eγ, Iγ, lifetime using DSAM technique on a thick target.

1991Ja11: E=60 MeV ^{16}O beam provided by the Pelletron at TIFR, Bombay. Measured lifetime by recoil-distance method for 4480, 4585 and 7609 levels.

1976Ra05: E=32.5 MeV ^{16}O beam provided by the HVEC tandem of the University of Cologne. Measured $\gamma(\theta,t)$ for recoil in vacuum. Deduced lifetime for 4585 level.

^{38}Ar Levels

E(level)[†]	J$^\pi$[†]	T$_{1/2}$	Comments
0	0$^+$		
2167	2$^+$	444 fs 25	T$_{1/2}$: from DSAM (2017Da13). Uncertainty from stopping powers, estimated by the authors as ≈5%, is added in quadrature to the original value of 444 fs 10 in 2017Da13.
3810	3$^-$		
4480	4$^-$	0.93 ps 20	T$_{1/2}$: from 1991Ja11.
4586	5$^-$	135 ps 4	T$_{1/2}$: weighted average of 134 ps 4 (1976Ra05) and 136 ps 4 (1991Ja11).
10174		2.6 ps 4	E(level),T$_{1/2}$: the halflife quoted here is for a 7609 level in 1991Ja11 which is taken from 1976Ko10 in ^{27}Al(^{14}N,n2pγ) based on their placement of 1201γ. This level is now obsolete since the 1201γ is re-placed from the 10174 level in later studies. So the halflife (presumably 1201γ) is for the 10174 level.

[†] From Adopted Levels. Energies are rounded values.

$\gamma(^{38}$Ar$)$

E$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	Comments
106	4586	5$^-$	4480	4$^-$		R$_{ang}$=1.02 2 (2011Ch54).
670	4480	4$^-$	3810	3$^-$	M1	POL=−0.032 12, R$_{ang}$=0.90 2 (2011Ch54).
776	4586	5$^-$	3810	3$^-$		A$_2$=−0.241 10 (1976Ra05), inconsistent with ΔJ=2.
1643	3810	3$^-$	2167	2$^+$	E1	POL=+0.012 9, R$_{ang}$=0.83 1 (2011Ch54).
						A$_2$=−0.256 14 (1976Ra05).
2167	2167	2$^+$	0	0$^+$	E2	POL=+0.062 14, R$_{ang}$=1.06 2 (2011Ch54).

[†] Rounded values from Adopted Gammas.

[‡] Deduced by the evaluator from $\gamma\gamma(\theta)$ and $\gamma\gamma$(lin pol) in 2011Ch54. Positive POL value indicates a dominantly electric transition, while a negative value indicates a dominantly magnetic transition; R$_{ang}$~0.83 for ΔJ=1 dipole transitions and ~1.11 for ΔJ=2 quadrupole transitions (2011Ch54).

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Level Scheme

5⁻	776 106 670 M1	4586 135 ps *4*
4⁻	1643 E1	4480 0.93 ps *20*
3⁻		3810
2⁺	2167 E2	2167 444 fs *25*
0⁺		0

${}^{38}_{18}$Ar$_{20}$