(HI,xnγ) 1976Wa03,1977Ke13

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 149, 1 (2018)	1-Jan-2018

1976Wa03 (also 1975Ol01): ^{24}Mg(^{18}O,n2pγ), ^{26}Mg(^{18}O,αnγ) and ^{27}Al(^{18}O,np$\alpha\gamma$) E=40 MeV ^{18}O beam was produced from the Brookhaven National Laboratory MP tandem Van de Graaff. Targets were isotopically enriched ^{24}Mg, ^{26}Mg, or ^{27}Al with thickness of 250 μg/cm^2 evaporated onto thick W backings. γ rays were detected with the Johns Hopkins University Compton polarimeter consisting of two true coaxial Ge(Li) detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma(\theta$,linear pol), Doppler-shift attenuation. Deduced levels, J, π, γ-ray multipolarities, $T_{1/2}$. Comparisons with theoretical predictions.

1977Ke13: ^{25}Mg(^{16}O,2pγ) E=36.5 MeV; ^{26}Mg(^{18}O,αnγ) E=45, 50, 55 MeV. ^{16}O and ^{18}O beams were produced from the HVEC tandem accelerator at the University of Koln. Targets were 300 μg/cm^2 enriched ^{25}Mg (99.2%) and ^{26}Mg (99.4%) on Ta or Au backings. γ rays were detected with two Ge(Li) detectors. Measured Eγ, Iγ, recoil-distance. Deduced levels, J, π, $T_{1/2}$, γ-ray multipolarities, transition strengths. Comparisons with available data.

^{39}Ar Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0	7/2$^-$		
2651.12 *25*	11/2$^-$	0.7 ps *2*	J$^\pi$: (11/2$^-$) in 1976Wa03. $T_{1/2}$: from τ=1.0 ps *3*, weighted average of 1.1 ps *3* and 0.9 ps *3*. Other: <2.8 ps (1976Wa03).
3992.0 *4*	(13/2)$^+$	0.8 ps *2*	J$^\pi$: (13/2$^+$) in 1976Wa03. $T_{1/2}$: from τ=1.1 ps *3*, weighted average of 0.8 ps *3*, 1.1 ps *3*, and 1.7 ps *5*. Other: <2.8 ps (1976Wa03).
4543.1 *4*	(15/2)$^+$	1.1 ps *2*	J$^\pi$: (15/2$^+$) in 1976Wa03. $T_{1/2}$: Others: <3.6 ps (1977Ke13), 0.7-2.1 ps (1976Wa03).
5535.5 *5*	(17/2)$^+$	<0.7 ps	J$^\pi$: (17/2) in 1976Wa03. $T_{1/2}$: from both 1977Ke13 and 1976Wa03.

[†] From a least-squares fit to γ-ray energies.
[‡] From Adopted Levels. Assignments by 1976Wa03 based on $\gamma(\theta$,linear pol) are given under comments.
[#] From 1977Ke13 using recoil-distance method (RDM). Quoted values are weighted average of values from two reactions if available. Note that unweighted average from two reactions is adopted by 1977Ke13.

$\gamma(^{39}$Ar)

Values of A_2, A_4 and POL given under comments are from 1976Wa03. Three sets of values are from ^{24}Mg(^{18}O,n2pγ), ^{26}Mg(^{18}O,αnγ) and ^{27}Al(^{18}O,np$\alpha\gamma$) reactions, respectively, unless otherwise noted.

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[†]	Comments
551.08 *10*	46	4543.1	(15/2)$^+$	3992.0	(13/2)$^+$	M1	I$_\gamma$: others: 27, 36 (1976Wa03), 54 (1977Ke13). A_2=−0.35 *2*, A_4=−0.02 *3*, POL=−0.35 *8*. A_2=−0.23 *5*, A_4=−0.04 *6*, POL=−0.22 *7*. A_2=−0.28 *5*, A_4=0, POL=−0.44 *11*.
992.4 *3*	40	5535.5	(17/2)$^+$	4543.1	(15/2)$^+$	D	I$_\gamma$: others: 13, 13 (1976Wa03), 8 (1977Ke13). A_2=−0.21 *17*, A_4=0 from ^{27}Al(^{18}O,np$\alpha\gamma$) reaction in 1976Wa03.
1340.90 *20*	89	3992.0	(13/2)$^+$	2651.12	11/2$^-$	E1	I$_\gamma$: others: 76, 70 (1976Wa03), 90 (1977Ke13). A_2=−0.22 *4*, A_4=+0.03 *3*, POL=+0.33 *16*. A_2=−0.27 *3*, A_4=0, POL=+0.15 *11*. A_2=−0.23 *2*, A_4=0, POL=+0.40 *25*.
2651.02 *25*	100	2651.12	11/2$^-$	0	7/2$^-$	E2	A_2=+0.34 *3*, A_4=−0.04 *3*, POL=+0.7 *4*.

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(HI,xnγ) 1976Wa03,1977Ke13 (continued)

γ(^{39}Ar) (continued)

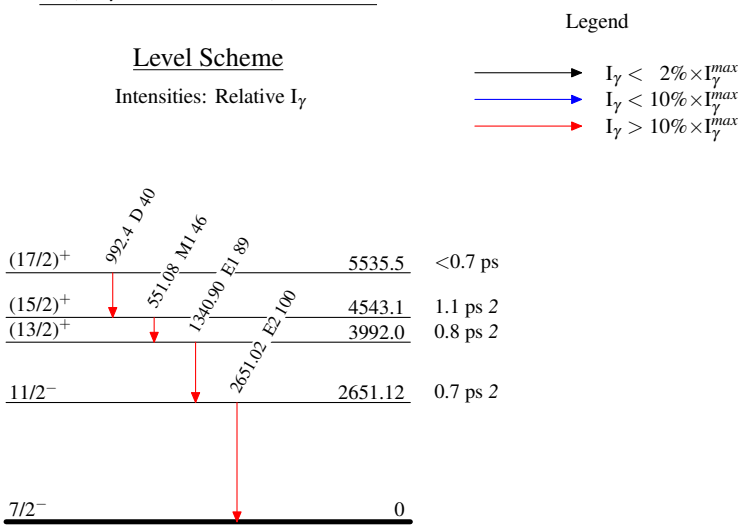
E_γ †	E_i(level)	Comments
		A_2=+0.19 *3*, A_4=−0.11 *3*, POL=+0.10 *26*.
		A_2=+0.23 *3*, A_4=−0.07 *3*, POL=+0.5 *4*.

† From 1976Wa03, unless otherwise noted. Multipolarities are based on γ(θ,linear pol). Quoted values of relative intensities are from 1976Wa03 in ^{24}Mg(^{18}O,n2pγ); values from other reactions in 1976Wa03 and ^{26}Mg(^{18}O,αnγ) in 1977Ke13 are given under comments.

(HI,xnγ) 1976Wa03,1977Ke13

Level Scheme

Intensities: Relative I_γ



$^{39}_{18}Ar_{21}$