^{24}Mg(^{18}O,2npγ) 1974Ko04,1975Ol01

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

1974Ko04, 1975Ol01: E=20-61.5 MeV ^{18}O beam was produced from the Brookhaven National Laboratory MP tandem Van de Graaff. Targets were isotopically enriched ^{24}Mg 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), recoil-distance. Deduced levels, J, π, $T_{1/2}$, γ-ray multipolarities, mixing ratios. Comparisons with theoretical predictions. Reported data are for E(^{18}O)=40 MeV. 1975Ol01 re-analyzed data from 1974Ko04 and also report data for the reaction of ^{27}Al(^{18}O,α2nγ)^{39}K. See also 1974Wa07 for the compilation of their (HI,xnγ) measurements.

Others:

1981No05: E=42 MeV; measured Eγ, $\gamma\gamma$-coin; study of high-spin states above 6 MeV. 1981No05 report data mostly on ^{36}Ar(α,pγ) and also data on ^{28}Si(^{16}O,p$\alpha\gamma$) at E=42 MeV.

1981Le19: E=36 MeV; measured $\gamma(\theta$,H), deduced g factors by recoil into gas.

^{39}K Levels

E(level)†	J$^\pi$‡	$T_{1/2}$#	Comments
0	3/2$^+$		
2814.22 *17*	7/2$^-$	48 ps *6*	g=1.15 *12* (1981Le19)
3597.62 *17*	9/2$^-$	34 ps *4*	g=0.54 *5* (1981Le19)
3944.30 *18*	11/2$^-$	9.0 ps *10*	$T_{1/2}$: from 1975Ol01 based on re-analysis of data in 1974Ko04 which give $T_{1/2}$=11.2 ps *11*. 1975Ol01 state that the revised value is obtained after accounting for the feeding from the longer lived 4831 level with $T_{1/2}$=20 ps *5*. But the existence of the 4831 level is proposed by 1975Ol01 based on the 3197γ-887γ cascade from 8028 level, the ordering of which is however reversed in Adopted Gammas, resulting in no existence of such level but instead the short-lived 7142 level feeding the 3944 level. So the evaluator has considered that further revision is needed for the quoted $T_{1/2}$ here.
5353.7 *11*	11/2$^-$		
5718.41 *22*	13/2$^-$		$T_{1/2}$: 1.9 ps *10* in 1974Ko04 is retracted by 1977Wa14 from the same laboratory due to revised lifetime for 6475 level and its strong effect on the lifetime of 5718 level from the measurement of ^{27}Al(^{14}N,npγ).
6434.7 *5*	13/2$^+$		
6475.61 *25*	15/2$^+$		$T_{1/2}$: 0.7 ps$\leq T_{1/2}\leq$2.1 ps in 1974Ko04 is replaced with $T_{1/2}$=11.8 ps *21* from authors' later work in 1977Wa14 using ^{27}Al(^{14}N,npγ), with the earlier result found to be in error due to the presence of contaminant γ rays.
7141.7 *4*	15/2$^-$		
8028.2 *11*	19/2$^-$	13.9 ps *35*	g=0.35 *3* (1992Pa01) $T_{1/2}$: or 38 ps *17* from 1974Ko04 using RDM. g: relative to g factor of 15/2$^+$ state in ^{41}Ca measured in the same experiment (1992Pa01).

† From a least-squares fit to γ-ray energies.
‡ From Adopted Levels.
\# From recoil-distance method (RDM) in 1974Ko04, unless otherwise noted.

γ(^{39}K)

A_2 and A_4 values under comments are from 1974Ko04 and re-analysis in 1975Ol01; POL values are from 1975Ol01 only.

Continued on next page (footnotes at end of table)

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γ(^{39}K) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	δ[&]	Comments
346.69 *10*	13.2	3944.30	11/2$^-$	3597.62	9/2$^-$	M1+E2	−0.16 *2*	I_γ: Iγ(347)/Iγ(1130)=36 *5*/64 *5* (1974Ko04). A_2=−0.33 *3*, A_4=+0.04 *3*, POL=−0.21 *5*.
757.19 *12*	7.4	6475.61	15/2$^+$	5718.41	13/2$^-$	E1(+M2)	+0.08 *19*	δ: from −0.10<δ<+0.27 in 1974Ko04. A_2=−0.35 *3*, A_4=0, POL=+0.18 *6*.
783.50 *15*	10.0	3597.62	9/2$^-$	2814.22	7/2$^-$	M1+E2	+1.5 *8*	I_γ: Iγ(783)/Iγ(3597)=41 *8*/59 *8* (1974Ko04). δ: from +0.65<δ<+2.3 in 1974Ko04. A_2=+0.44 *2*, A_4=0, POL=−0.67 *14*.
886.5[#]		8028.2	19/2$^-$	7141.7	15/2$^-$			E_γ: placement from Adopted Gammas, unassigned in 1974Ko04.
1130.03 *12*	23.6	3944.30	11/2$^-$	2814.22	7/2$^-$	E2		A_2=+0.24 *3*, A_4=−0.08 *2*, POL=+0.38 *7*.
1774.07 *12*	9.5	5718.41	13/2$^-$	3944.30	11/2$^-$			δ: +1.5 to +3.7 given for J(5718)=13/2 and −2.5 to −5.7 for J(5718)=9/2 (1974Ko04) are retracted by 1977Wa14 since the 1774γ may be contaminated by 1776γ in ^{36}Cl. A_2=+0.11 *4*, A_4=+0.17 *4*, POL=−0.15 *15*.
1788.0		7141.7	15/2$^-$	5353.7	11/2$^-$			E_γ: placement from Adopted Gammas, unassigned in 1974Ko04.
2490.3 *4*		6434.7	13/2$^+$	3944.30	11/2$^-$			E_γ: this placement is from Adopted Gammas which is confirmed in other studies. It is unplaced in 1974Ko04 and 1975Ol01. POL=−0.4 *5*.
2814.24 *20*	42.4	2814.22	7/2$^-$	0	3/2$^+$	M2+E3	+0.24 *5*	A_2=+0.35 *2*, A_4=+0.03 *2*, POL=−0.36 *15*.
3197.3[#] *3*	4.5	7141.7	15/2$^-$	3944.30	11/2$^-$	E2		A_2=+0.42 *7*, A_4=−0.10 *8*, POL=+0.8 *12*.
3597.25 *25*	10.6	3597.62	9/2$^-$	0	3/2$^+$	E3		A_2=+0.46 *4*, A_4=+0.10 *4*, POL=−0.1 *9*.

† From 1974Ko04 (also quoted in 1975Ol01), unless otherwise noted.
‡ From 1975Ol01 (not reported in 1974Ko04), unless otherwise noted. Quoted values of intensities here are the original values in 1975Ol01 divided by 1000.
# The ordering of the 887-3198 cascade is from Adopted Gammas. It was reversed in 1974Ko04 and 1975Ol01.
@ From $\gamma(\theta)$ in 1974Ko04 and γ(linear pol) in 1975Ol01.
& From $\gamma(\theta)$ data of 1974Ko04.

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Level Scheme

Intensities: Relative I_γ