^{24}Mg(^{16}O,αnγ) 2007De14,2005DeZZ

2007De14,2005DeZZ: a 70-MeV ^{16}O beam was produced by the XTU-Tandem accelerator at the Legnaro National Laboratory, Italy. The arget was a 400 μg/cm^2 self-supporting target of ^{24}Mg. γ ray from fusion evaporation reactions of ^{16}O(^{24}Mg,αnγ)^{35}Ar and ^{16}O(^{24}Mg,αpγ)^{35}Cl were detected using the GASP spectrometer, which consists of an array of 40 Compton-suppressed HPGe detectors and a multiplicity filter of 80 BGO scintillators of 80 BGO scintillators. The GASP spectrometer is operated in conjunction with the 4π charged-particle detector ISIS and a neutron ring of 6 BC501A scintillators. The events were collected when at least two Ge detectors and one BGO scintillator were fired in coincidence. Measured Eγ, Iγ, $\gamma\gamma$, αnγ-coin, αpγ-coin, $\gamma(\theta)$, $\gamma\gamma(\theta)$(ADO). Deduced levels, J, π, and transition multipolarities from γ-ray ADO ratios. Comparisons with Shell-model calculations show the multipole Coulomb interaction and the electromagnetic spin-orbit interactioncontribute to the observed mirror energy differences.

^{35}Ar Levels

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
0.0	3/2$^+$	3196.7[#] *7*	7/2$^-$	5613.2 *11*	(11/2$^-$)	8212.1 *10*	15/2$^-$
1750.8 *5*	5/2$^+$	4358.6 *8*	9/2$^-$	5765.3 *8*	13/2$^-$	9905.5[#] *21*	19/2$^-$
2603.0 *7*	7/2$^+$	5383.7[#] *7*	11/2$^-$	8109.2[#] *14*	15/2$^-$	12276.5[#] *33*	23/2$^-$

[†] From a least-squares fit to γ-ray energies.
[‡] As given in 2007De14 based on known assignments of low-lying levels and mirror levels in ^{35}Cl and the measured $\gamma\gamma(\theta)$(ADO) ratios. When considered in the Adopted Levels, the firm assignments here are placed within parentheses if there are no other strong arguments to support these firm assignments.
[#] Band(A): Band based on f$_{7/2}$ orbital.

γ(^{35}Ar)

R_{ADO}=[Iγ(34°)+Iγ(146°)]/2Iγ(90°). Expected values are $R_{ADO}\approx$1.3 for stretched quadrupole (ΔJ=2) and $_{ADO}\approx$0.8 for stretched dipole (ΔJ=1) transitions.

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	Comments
381.5 *3*	29 *3*	5765.3	13/2$^-$	5383.7	11/2$^-$	M1	R_{ADO}=0.81 *10*.
593.7 *2*	11 *2*	3196.7	7/2$^-$	2603.0	7/2$^+$		
851.8 *9*	8 *2*	2603.0	7/2$^+$	1750.8	5/2$^+$		
1025.2 *4*	6 *2*	5383.7	11/2$^-$	4358.6	9/2$^-$		
1162.0 *8*	15 *3*	4358.6	9/2$^-$	3196.7	7/2$^-$		R_{ADO}=0.95 *25*.
1254.6 *8*	15 *5*	5613.2	(11/2$^-$)	4358.6	9/2$^-$		
1406.9 *7*	5 *1*	5765.3	13/2$^-$	4358.6	9/2$^-$	E2	R_{ADO}=1.3 *7*.
1446.1 *6*	67 *5*	3196.7	7/2$^-$	1750.8	5/2$^+$	E1	R_{ADO}=0.87 *19*.
1693.3 *27*	15 *3*	9905.5	19/2$^-$	8212.1	15/2$^-$	E2	R_{ADO}=1.41 *23*.
1750.8 *5*	100 *9*	1750.8	5/2$^+$	0.0	3/2$^+$	E2	R_{ADO}=1.46 *24*.
1756.3 *14*	17 *9*	4358.6	9/2$^-$	2603.0	7/2$^+$		
1796.3 *25*	10 *3*	9905.5	19/2$^-$	8109.2	15/2$^-$	E2	R_{ADO}=1.8 *3*.
2186.8 *4*	49 *3*	5383.7	11/2$^-$	3196.7	7/2$^-$	E2	R_{ADO}=1.31 *15*.
2342.6 *28*	8 *2*	8109.2	15/2$^-$	5765.3	13/2$^-$		
2370.9 *25*	15 *5*	12276.5	23/2$^-$	9905.5	19/2$^-$	E2	R_{ADO}=1.8 *4*.
2446.6 *16*	6 *2*	8212.1	15/2$^-$	5765.3	13/2$^-$		
2602.6 *15*	60 *6*	2603.0	7/2$^+$	0.0	3/2$^+$	E2	R_{ADO}=1.37 *20*.
2725.7 *14*	4 *1*	8109.2	15/2$^-$	5383.7	11/2$^-$		
2828.3 *7*	28 *5*	8212.1	15/2$^-$	5383.7	11/2$^-$	E2	R_{ADO}=1.7 *6*.
3197 *6*	16 *3*	3196.7	7/2$^-$	0.0	3/2$^+$	M2	R_{ADO}=1.7 *8*.

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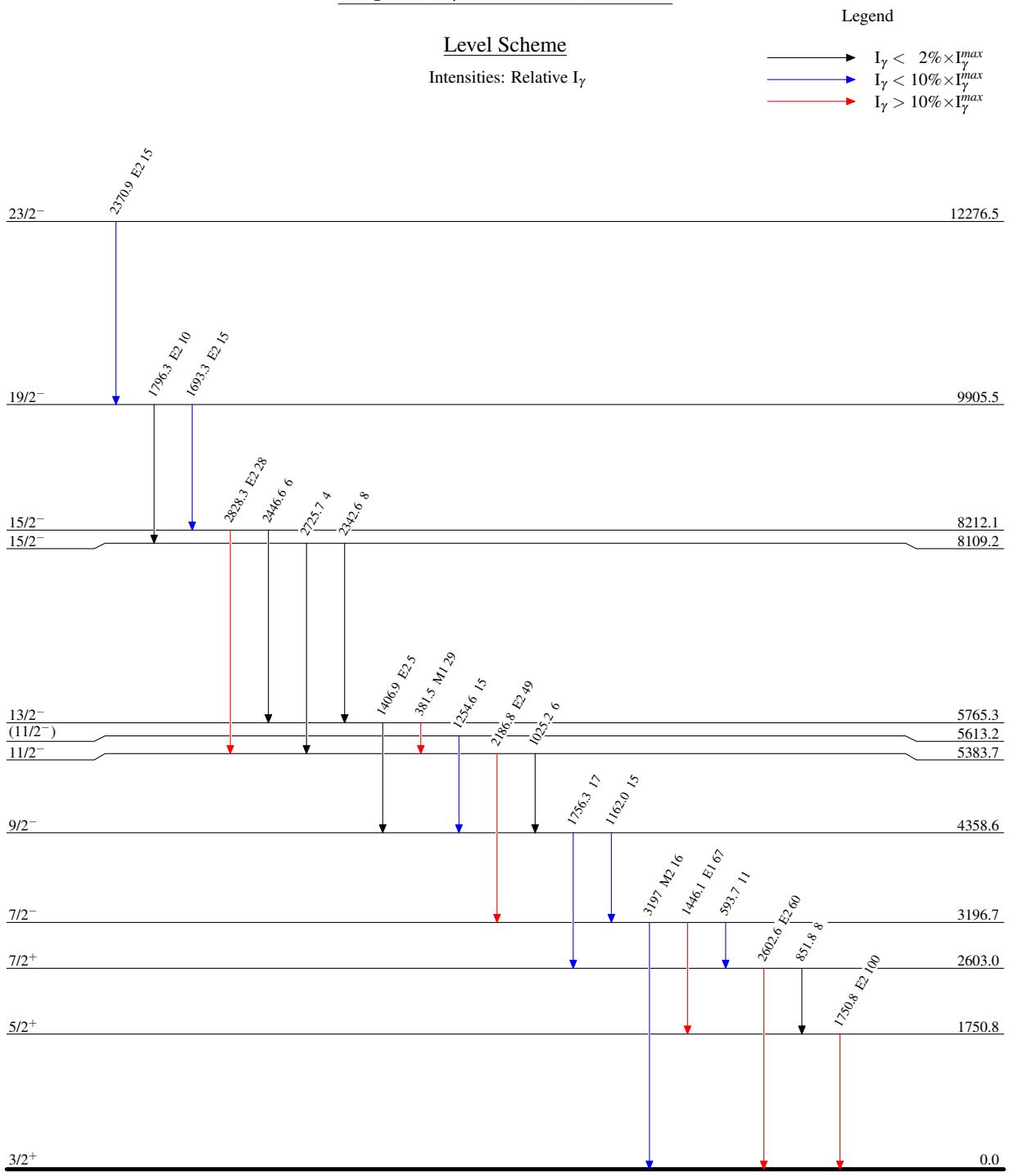
Level Scheme

Intensities: Relative I_γ



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

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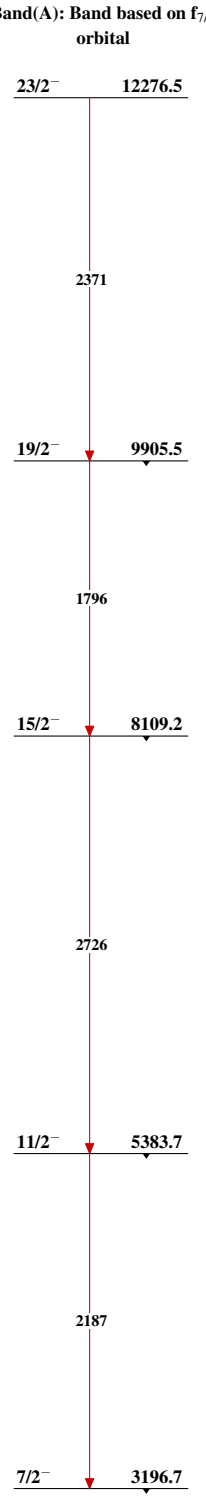

$^{35}_{18}Ar_{17}$