^{9}Be(^{46}Ar,^{33}Mgγ) 2017Ri06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 199,1 (2025)	30-Sep-2024

2017Ri06: E=102 MeV/nucleon ^{46}Ar beam was produced at NSCL-MSU facility in fragmentation reaction ^{9}Be(^{48}Ca,X) at E=140 MeV/nucleon. Fragments were separated by the A1900 fragment separator. The secondary target was ^{9}Be of 267 mg/cm^2 thickness. Reaction residues were analyzed by the S800 spectrograph and γ rays were detected with the Gamma Ray Energy Tracking In-Beam Nuclear Array (GRETINA) array. Measured Eγ, Iγ, $\gamma\gamma$-coin, ^{33}Mg-γ-coin. Deduced levels, J, π, rotational band. Comparison with theoretical calculations.

^{33}Mg Levels

E(level)[†]	J$^\pi$	Comments
0[@]	3/2$^-$[#]	
483[@] *4*	(5/2$^-$)[‡]	
703 *4*	(3/2,5/2$^+$)[#]	
780[@] *6*	(7/2$^-$)[‡]	A new level proposed in 2017Ri06.

[†] From a least-squares fit to γ-ray energies.
[‡] From assumed strongly-coupled structure built on K^π=3/2$^-$ bandhead, with configuration=ν3/2[321] (2017Ri06).
[#] From the Adopted Levels.
[@] Band(A): Rotational band built on ν3/2[321]. Band assignment by 2017Ri06 is from excitation energies, measured magnetic moment in 2007Yo06, intrinsic quadrupole moment Q_0=0.70 *16* from measured B(E2) by 2002Pr09, and comparison with yrast band structures in ^{32}Mg and ^{34}Mg nuclei in the 'island of inversion'. Note that in 2002Pr09, g.s. was assumed 5/2$^+$ and Coulomb excitation to 485, 7/2$^+$ level and an unobserved 9/2$^+$, whereas here g.s. is 3/2$^-$ and Coulomb excitation (in 2002Pr09) should populate 483, (5/2$^-$) and 780, (7/2$^-$) levels, the 297γ from the latter was not observed in 2002Pr09 as this transition was likely obscured by low-energy background. The 9/2$^-$ member of this band is predicted at ≈1400 keV (2017Ri06).

γ(^{33}Mg)

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$
220 *4*	8 *2*	703	(3/2,5/2$^+$)	483	(5/2$^-$)
297 *4*	48 *13*	780	(7/2$^-$)	483	(5/2$^-$)
483 *4*	100	483	(5/2$^-$)	0	3/2$^-$
703 *4*	13 *4*	703	(3/2,5/2$^+$)	0	3/2$^-$
779 *4*	12 *4*	780	(7/2$^-$)	0	3/2$^-$
[x]1175 *4*	18 *6*				

[†] From 2017Ri06.
[x] γ ray not placed in level scheme.

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Level Scheme

Intensities: Relative I_γ

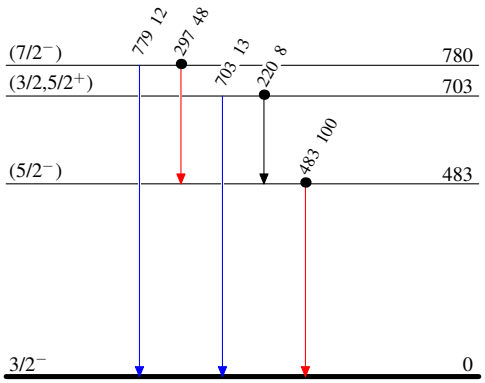
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

Coincidence



$^{33}_{12}Mg_{21}$

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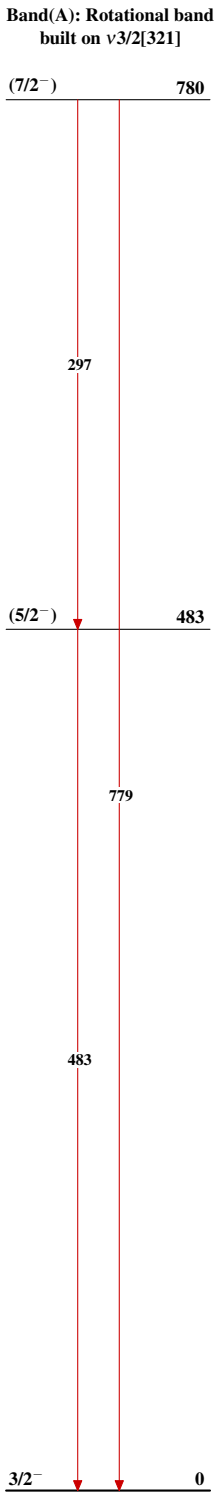

$^{33}_{12}Mg_{21}$