^{9}Be(^{38}Si,^{35}Mgγ) 2011Ga15

^{38}Si->2p+1n+^{35}Mg.

2011Ga15: A ^{38}Si secondary beam was produced via the projectile fragmentation of a 140-MeV/nucleon ^{48}Ca primary beam impinging on a ^{9}Be target and selected by the A1900 separator at NSCL, MSU. E(^{38}Si)=83 MeV/nucleon in the middle of the 376(4)-mg/cm^2 ^{9}Be secondary target. The reaction leading to ^{35}Mg from ^{38}Si is likely dominated by the two-proton knockout into the continuum of ^{36}Mg and subsequent neutron emission. The reaction residues were selected and identified by the S800 spectrograph using the ΔE-ToF method. The γ rays in coincidence with reaction residues were detected using a 32-fold segmented high-purity germanium detector array (SeGA) at 90° and 37°. Measured Doppler-corrected Eγ(>80 keV) and deduced levels. Results were compared with Monte Carlo shell-model calculations using the SDPF-M effective interaction that allows for unrestricted mixing of neutron particle-hole configurations across the N = 20 gap, and with conventional shell-model calculations with the SDPF-U effective interaction that does not include neutron intruder configurations in the model space.

^{35}Mg Levels

E(level)†	J$^\pi$	Comments
0	(5/2$^-$)	J$^\pi$: From shell-model calculations with the SDPF-M interaction.
0+x		
446+x *5*		
621+x *7*		
670+x *8*		

† From measured Eγ. x≤80 keV (detection threshold). Shell-model calculations with the SDPF-M interaction predicts a 3/2$^-$ level at 30 keV.

γ(^{35}Mg)

2011Ga15 stated that the γ-ray transitions they observed were not in coincidence and depopulate excited states at ≈500 and ≈700 keV to the ground state or the alleged near-degenerate excited state below 100-keV excitation energy. 2017Mo26 stated that the difference of the γ-ray emission between 1n-knockout and 1p1n-removal reaction channels suggests that were emitted from two different excited states. Another possible placement of the 621 and 670-keV γ rays: 2011Ga15 stated that it might be possible that the two transitions originate from the same level and that their energy difference of 49(11) keV corresponds to the energy spacing of the alleged (5/2$^-$,3/2$^-$) doublet near the ground state.

E$_\gamma$	E$_i$(level)	E$_f$	Comments
446 *5*	446+x	0+x	E$_\gamma$: strong γ transition observed in 2011Ga15; could correspond to a transition to the g.s. or the shell-model predicted low-lying excited state from any of the shell-model predicted levels at 350 keV with J^π=7/2$^-$; 360 keV with J^π=3/2$^+$, 400 keV with J^π=1/2$^-$, or 560 keV with J^π=7/2$^-$.
621 *7*	621+x	0+x	
670 *8*	670+x	0+x	

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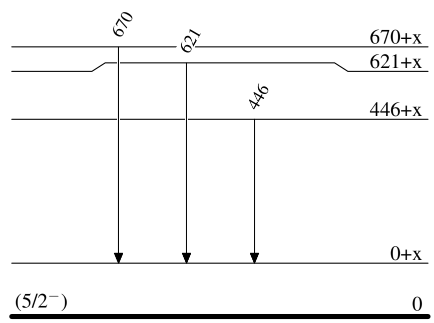
Level Scheme



$^{35}_{12}Mg_{23}$