^{9}Be(^{38}Si,^{35}Mgγ) 2011Ga15

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. The secondary target was a 376(4)-mg/cm^2 ^{9}Be target. The reaction leading to ^{35}Mg from ^{38}Si is likely dominated by the two-proton knockout into the continuum of ^{36Mg} and subsequent neutron emission. The reaction residues were 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 Eγ(>80 keV). Deduced levels. 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$^-$)	
49? *11*	(3/2$^-$)	E(level): 30 keV predicted by the SDPF-M shell model.
446 *5*		
495? *12*		
670 *8*		

[†] From measured Eγ.
[‡] Predicted by the SDPF-M shell model.

γ(^{35}Mg)

Other possible placements: 670γ and 621γ both populate the g.s.; 670γ and 621γ both populate the 3/2$^-$ first excited state at the predicted 30 keV.

E$_\gamma$	E$_i$(level)	E$_f$	J$^\pi_f$	Comments
446 *5*	446	0	(5/2$^-$)	a strong γ transition populating the g.s. or 3/2$^-$ first excited state.
446 *5*	495?	49?	(3/2$^-$)	
621 *7*	670	49?	(3/2$^-$)	
670 *8*	670	0	(5/2$^-$)	

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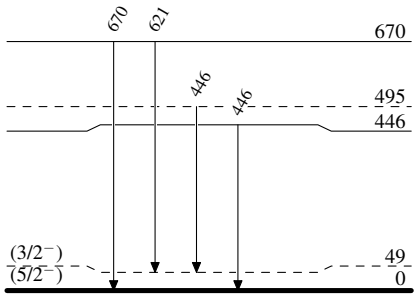
Level Scheme



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