

C(${}^{42}\text{Si}$, ${}^{40}\text{Mg}$) 2014Cr02

Type	History		Literature Cutoff Date
	Author	Citation	
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This dataset is adapted from a dataset in the XUNDL database, compiled by M.S. Basunia (LBNL), Dec 3, 2014.
Two-proton knockout reaction from ${}^{42}\text{Si}$ beam.

2014Cr02: secondary ${}^{42}\text{Si}$ beam was produced at RIBF-RIKEN facility in ${}^9\text{Be}({}^{48}\text{Ca},X),E=345$ MeV/nucleon primary fragmentation reaction, with an average intensity of approximately 70 pA for ${}^{48}\text{Ca}$ beam. Projectile-like fragments were selected using $B\rho$ - ΔE - $B\rho$ method through the BigRIPS fragment separator. The ${}^{42}\text{Si}$ beam was incident on 4.02 g/cm² thick carbon target placed at the focal point of the ZeroDegree spectrometer (ZDS). Outgoing particles were identified in A/Q and Z through event-by-event analysis by $B\rho$ - ΔE -TOF method using the ZDS spectrometer. Deduced inclusive cross section for 2p knockout from ${}^{42}\text{Si}$. Comparison with shell model calculations using the SDPFU-Si and SDPF- μ interactions. A total of five events of ${}^{40}\text{Mg}$ were observed for 9.65×10^5 incident ${}^{42}\text{Si}$ particles.

 ${}^{40}\text{Mg}$ Levels

<u>E(level)</u>	<u>J^{π}</u>	<u>Comments</u>
0	0 ⁺	A prolate deformation for the ${}^{40}\text{Mg}$ g.s. was suggested by 2014Cr02 . Measured inclusive cross section= $40 \mu\text{b} +27-17$ for 2p knockout from ${}^{42}\text{Si}$, which is in agreement with the theoretical total $\sigma=67 \mu\text{b}$ for 0 ⁺ g.s. and first 2 ⁺ state ($51 \mu\text{b}$ for the g.s. and $16 \mu\text{b}$ for the first 2 ⁺ state), indicating that only the g.s. 0 ⁺ is bound in ${}^{40}\text{Mg}$, considering $S(n)({}^{40}\text{Mg})=2000$ keV 720 and $S(2n)({}^{40}\text{Mg})=1870$ 710 (syst, 2017Wa10), and predicted excited 0 ⁺ state at 1683 keV from shell-model calculations (2014Cr02).