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Study of spectroscopic factors at N=29 using isobaric analog resonances in inverse kinematics

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A measurement was recently performed at the National Superconducting Cyclotron Laboratory on resonant proton scattering of 46Ar in inverse kinematics in the region of isobaric analog states of 47Ar. The experiment was performed using a re-accelerated 46Ar radioactive beam at 4.6 MeV/u from the ReA3 linac after production via the projectile fragmentation of a 48Ca primary beam from the Coupled Cyclotron Facility. This beam was injected into the Active Target Time Projection Chamber where the reaction took place on an isobutane target and the scattered protons were detected. Four candidate resonances were observed, two of which corresponding to the isobaric analogs of 47Ar ground and first excited states. Spectroscopic factors were deduced from the strength of these resonances and compared to values in the literature. This novel experimental method to extract spectroscopic information from proton elastic scattering on radioactive nuclei will be presented, as well as the analysis methods used to extract results from the data.

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