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Neutron Knockout to Probe 3N Forces in the Ca Isotopes

HEATHER CRAWFORD, Lawrence Berkeley National Laboratory, NSCL EXPERIMENT E12029 COLLABORATION¹ — Recent calculations by Holt et al. [1] have suggested that the inclusion of 3N forces to describe the structure of neutron-rich Ca isotopes provides a more realistic description of the nuclear structure. Mass measurements have confirmed the importance of including 3N forces compared to NN-only interactions, but cannot discriminate between the predictions of phenomenological interactions and the NN+3N microscopic calculations. Neutron knockout along the $Z=20$ isotopes provides an opportunity to test the results of NN+3N calculations against phenomenological interactions. The calculations of Holt et al. predict a fragmentation of the $1f_{7/2}$ neutron strength from the first $7/2^-$ state in ^{49}Ca into higher lying states, in contrast to the predictions of both GXPF1 and KB3G which concentrate the strength in the lowest lying $7/2^-$ state. Differences are also observed in the summed $f_{7/2}$ strength to bound nuclear states in both ^{50}Ca and ^{49}Ca neutron knockout. We will report on a systematic study of one-neutron knockout along the Ca isotopes using GRETINA + S800. Comparison of experimental spectroscopic factors to calculations will provide insight into the role of 3N forces in describing the $Z=20$ isotopes.

[1] J. Holt et al., J. Phys. G 39, 085111 (2012).

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