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Excited State Properties in Neutron-rich Nuclei near N = 40[1]

B.P. CRIDER, C.J. PROKOP, S.N. LIDDICK, NSCL/MSU, C.J. CHIARA, Army Research Lab, ORAU, A.D. AYANGEAKAA, ANL, J.J. CARROLL, Army Research Lab, J. CHEN, NSCL/MSU, H.M. DAVID, ANL, S. GO, R. GRZYWACZ, UTK, J. HARKER, UMD, R.V.F. JANSSENS, T. LAURITSEN, D. SEWERYNIAK, ANL, W.B. WALTERS, UMD — The neutron-rich nuclei near N = 40 have recently been the focus of many experimental and theoretical efforts. In this region, the competing energy cost for promoting pairs of nucleons across either Z = 28 or N = 40 and the energy gain from residual nucleon-nucleon interactions gives rise to several low-energy 0^+ states and is a hallmark of shape coexistence. Low-energy 0^+ states have been observed in ^{68}Ni, and predicted for other nuclei in the region. Recent theoretical calculations are able to reproduce the energies of known states in ^{68}Ni and stress the importance of the tensor component of the monopole interaction. Yet, while energies of the levels are a useful comparison, a more stringent test is the reproduction of level lifetimes, where the predicted half-lives can vary by several orders of magnitude depending on the interaction. To further benchmark theoretical calculations in this region, a setup designed to measure level lifetimes has been constructed. A description of the array and preliminary results will be presented.

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Benjamin Crider
Michigan State Univ

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