Abstract Submitted
for the APR15 Meeting of
The American Physical Society

**Identification of deformed intruder states in semi-magic $^{70}$Ni**[1] C.J. CHIARA[2], U. of Maryland/Argonne National Laboratory, W.B. WALTERS, U. of Maryland, R.V.F. JANSSENS, Argonne National Laboratory, D. WEISSHAAR, National Superconducting Cyclotron Laboratory — and the U. of Maryland – ANL – MSU – U. of Tokyo – U. of Padua – LBNL – U. of Edinburgh – U. of Aizu – Orsay – JAEA – Central Michigan U. collaboration — The structure of semi-magic $^{70}_{28}\mathrm{Ni}_{42}$ was investigated following complementary multinucleon-transfer and secondary fragmentation reactions. Changes to the higher-spin, presumed negative-parity states based on observed $\gamma$-ray coincidence relationships improve the agreement with shell-model calculations using effective interactions in the neutron $f_{5/2}pg_{9/2}$ model space. The second $2^+$ and $(4^+)$ states, however, can only be successfully described when proton excitations across the $Z = 28$ shell gap are included. Monte-Carlo shell-model calculations suggest that the latter two states are part of a prolate-deformed intruder sequence, establishing an instance of shape coexistence at excitation energies lower than those observed recently in neighboring $^{68}$Ni.

[1]Based on work supported in part by the US DoE (DE-FG02-94ER40834, DE-AC02-06CH11357, DE- AC02-05CH11231), NSF (PHY-1102511), and NNSA (DE-NA0000979).
[2]Current affiliation: Oak Ridge Associated Universities/U.S. Army Research Laboratory

Christopher Chiara
U. of Maryland

Date submitted: 09 Jan 2015 Electronic form version 1.4