Abstract Submitted
for the DNP19 Meeting of
The American Physical Society

Influence of the neutron pf shell on the structure of ^{28}Mg JONATHAN WILLIAMS, Simon Fraser University — Excited states in ^{28}Mg were studied in an experiment at the ISAC-II facility at TRIUMF to investigate the lowering in energy of pf intruder orbitals predicted near the $N = 20$ 'island of inversion'. A ^{12}C(^{18}O,2p)^{28}Mg fusion-evaporation reaction was used to populate states at high excitation energy where the influence of intruder orbitals is expected. Data corresponding to ^{28}Mg was extracted via time coincident identification of gamma rays using the TIGRESS array at ISAC-II and protons using a new CsI(Tl) scintillator array, part of the TIGRESS Integrated Plunger (TIP) infrastructure. Lifetime measurements of excited states were performed using the Doppler shift attenuation method (DSAM). Three new excited states of ^{28}Mg were identified near its neutron separation energy. Multiple intruder state candidates were also observed, including an unusually long-lived state thought to decay by an M2 transition ($I^\pi = (0, 4)^-$). The observed level energies are consistent with shell model calculations in the $sdpf$ shell, where negative parity levels arise from single neutron excitation to the pf shell. Experimental results and their interpretation with respect to the lowering of intruder orbitals near the 'island of inversion' will be discussed.

Jonathan Williams
Simon Fraser University

Date submitted: 20 Jun 2019 Electronic form version 1.4