Studying $^{10}\text{Be}$ and $^{11}\text{Be}$ Halo States through the $(p,d)$ Single-Neutron Transfer Reaction

KERI KUHN, FRED SARAZIN, Colorado School of Mines, TIGRESS COLLABORATION, ($PCB$)$^2$ COLLABORATION — One-neutron transfer reactions are being used to study single-particle neutron states in nuclei. For one-neutron halo nuclei, such as $^{11}\text{Be}$, the $(p,d)$ reaction enables the removal of the halo neutron or of one of the core neutrons. This way, it is possible to simultaneously study the halo wavefunction of the $^{11}\text{Be}$ ground-state but also a possible excited halo state in $^{10}\text{Be}$. The $^{11}\text{Be}(p, d)^{10}\text{Be}$ transfer reaction at 10 MeV/nucleon is being investigated at the TRIUMF-ISAC II facility with the Printed Circuit Board Based Charged Particle ($PCB$)$^2$ array inside the TRIUMF ISAC Gamma-Ray Escape-Suppressed Spectrometer (TIGRESS). The ground state and first excited state of $^{10}\text{Be}$ can be directly identified using deuteron identification and kinematics from the charged particle array, while the four excited states in $^{10}\text{Be}$ around 6 MeV, including the suspected halo state (2$^-$ state), are identified using coincident gamma rays from TIGRESS with the identified deuterons. Angular distributions for the $^{10}\text{Be}$ populated states will be shown along with their FRESCO fits.

1This work is partially supported by the US Department of Energy through Grant/Contract No. DE-FG03-93ER40789 (Colorado School of Mines)

Keri Kuhn
Colorado School of Mines

Date submitted: 30 Jun 2017
Electronic form version 1.4