Contribution ID: **70** Type: **Poster**

Unbound states in 19O(d,p)20O to understand the oxygen dripline

The neutron dripline in oxygen isotopes presents a clear challenge and unique opportunity for studies of shell evolution and nuclear structure. The heaviest observed bound isotope of fluorine ($Z = 9$) has 22 neutrons, whereas oxygen – with only one fewer proton, $Z = 8$ – can only bind 16 neutrons. This striking anomaly is a result of an increase in the spacing between the ν($d_{3/2}$) orbital and the ν($s_{1/2}d_{5/2}$) orbitals, which could only be explained by the inclusion of three-body forces. As such, measurements relating to the ν($d_{3/2}$) orbital in oxygen isotopes are of significant interest, in order to test our current models. Unfortunately, comprehensive spectroscopy close to the dripline is limited by the intensity and quality of radioactive isotope beams. In this work, we instead search for ν($d_{3/2}$) orbital occupation in the the high-energy states of a less-exotic isotope.

The single-neutron transfer reaction ^{19}O(d,p)^{20}O has been performed at GANIL using a high-quality radioactive beam of ^{19}O impinged on a solid CD_2 target (both with and without gold foil backing). States up to and above the neutron separation energy were populated. The resulting ^{20}O heavy recoil, ejected proton, and prompt γ-ray emissions were detected using the state-of-the-art MUGAST+AGATA+VAMOS triple-coincidence experimental set-up. Bound states populated by s-wave and d-wave transfer have been identified, and angular distributions of at least three unbound states between 7.6 MeV and 9.0 MeV have been observed, accessed for the first time through the ^{19}O(d,p) channel.

Authors: PAXMAN, Charlie James (GANIL); Dr ZANON, Irene (Stockholm University)

Presenter: PAXMAN, Charlie James (GANIL)

Session Classification: Poster session

Track Classification: Nuclear Structure, Spectroscopy and Dynamics