Contribution ID: **24** Type: **Contributed Oral/Poster**

Quasi-free proton knockout reactions on oxygen isotopic chain

Tuesday, 12 July 2016 16:25 (15 minutes)

According to the Independent Particle Model (IPM) single-particle states are fully occupied with a spectroscopic factor one. However in electron-induced proton knockout reactions a reduction of single-particle strengths has been observed to about 60-70% for stable nuclei in comparison to the IPM [1]. This finding has been confirmed by nuclear knockout reactions using stable and exotic beams, however, with a strong dependency on the proton-neutron asymmetry [2], which is not yet well understood. To understand this dependency quantitatively a complementary approach, quasi-free reactions, is introduced. Quasi-free knockout reactions in inverse kinematics at relativistic energies provide a direct way to investigate single-particle structure of stable and exotic nuclei [3].

We have performed a systematic study of spectroscopic strength of oxygen isotopes using quasi-free (p,2p) knockout reactions in complete kinematic at the R3B/LAND experimental setup (at GSI in Darmstadt, Germany) with secondary beams containing $^{13-24}$O. The oxygen isotopic chain offers a large variation of separation energies, which allow us to obtain a quantitative understanding of spectroscopic factors with respect to isospin asymmetry.

We will present systematic results on the entire oxygen isotopic chain obtained in a single experiment. The results include total and partial cross sections extracted by means of gamma-coincidence measurements as well as momentum distributions. The latter is sensitive to the angular momentum of the knocked-out nucleon in the projectile. By comparison with the eikonal reaction theory [4] the spectroscopic factors and reduction factors as a function of separation energy have been extracted and will be compared to existing data in literature.

The work is supported by HIC for FAIR, GSI-TU Darmstadt cooperation, and BMBF project 05P15RDFN1.

1. L. Lapikas Nucl. Phys. A553, 297c (1993).
2. J. A. Tostevin, A. Gade Phys. Rev. C 90, 057602 (2014).
3. V. Panin et al. Phys. Letters B 753, 204-210 (2016).
4. T. Aumann, C. Bertulani, J. Ryckebusch Phsy. Rev. C 88, 064610 (2013).

Primary author: Dr ATAR, Leyla (TU Darmstadt, Germany)

Co-authors: Prof. BERTULANI, Carlos (Texas A&M University-Commerce, USA); Dr SCHEIT, Heiko (TU Darmstadt, Germany); Dr PASCHALIS, Stefanos (TU Darmstadt, Germany); Prof. AUMANN, Thomas (TU Darmstadt, Germany)

Presenter: Dr ATAR, Leyla (TU Darmstadt, Germany)

Track Classification: Shell evolution through direct reactions - Spectroscopy of nuclear levels and nuclear shapes through direct reactions