Contribution ID: **5** Type: **Oral Presentation**

Toward Nuclear Astrophysics studies with Electronic TPC (eTPC) and gamma beams from ELI-NP

Monday, 18 May 2015 17:40 (25 minutes)

The Extreme Light Infrastructure-Nuclear Physics (ELI-NP) – currently being built near Bucharest, Romania – will deliver monochromatic, brilliant and polarized gamma-ray beams (tunable energy from 1 to 20 MeV). We propose to use a gaseous active target detector to study (&alpha,&gamma) and (p,&gamma) nuclear reactions of current astrophysical interest by means of studying time-inverse processes induced by high energy photons. The advantage of such an approach stems from the fact that photons are not subject to the nuclear Coulomb barrier. The ultimate goal of such an active target detector is to measure cross sections and angular correlations for ¹⁶O(&gamma,&alpha)¹²C reaction at lower center-of-mass energies that were studied so far, and to provide input for astrophysical models of He-burning in massive stars. The charged products of photodisintegration reactions will be measured by means of a special Time Projection Chamber (eTPC) with innovative 3-coordinate (u-v-w) planar electronic readout acting as virtual pixels. The detector will be equipped with triple-GEM structure for gas amplification and will work at lower-than-atmospheric pressure. The eTPC detector is part of a broader effort of the Charged Particle Detection Working Group established at ELI-NP, and will be complemented by: an SSD detector (solid target) and a bubble chamber (liquid target). The concept of eTPC detector and preliminary results from a demonstrator detector will be presented in this talk.

Primary author: Dr CWIOK, Mikolaj (University of Warsaw)

Co-authors: Dr MAZZOCCHI, Chiara (University of Warsaw); Mr BIHALOWICZ, Jan (University of Warsaw); Prof. PFUTZNER, Marek (University of Warsaw); Prof. GAI, Moshe (UConn and Yale); Dr TESILEANU, Ovidiu (ELI-NP/IFIN-HH); Prof. MATULEWICZ, Tomasz (University of Warsaw); Prof. DOMINIK, Wojciech (University of Warsaw); Prof. JANAS, Zenon (University of Warsaw)

Presenter: Dr CWIOK, Mikolaj (University of Warsaw)

Session Classification: Session 4

Track Classification: Active target detectors and associated electronics