Contribution ID: **14** Type: **not specified**

Low-Energy Nuclear Interaction Chamber for Experiments in Nuclear Astrophysics

Tuesday 19 September 2017 14:10 (30 minutes)

A Low-EneRgy Nuclear Interaction Chamber, LERNIC, has been developed to be used as an active target system for nuclear astrophysics experiments. LERNIC is a position and time sensitive detector system based on the low-pressure MWPC technique. While the astrophysically relevant nuclear reaction processes at stellar burning temperatures are dominated by radiative captures, in this experimental scheme we will measure the time-reversed processes. Due to the transformation of phase space, the photodisintegration cross-sections are up to two orders of magnitude higher. The main advantage of this new target-detector system is a capability to operate at high intensity photon beams, high sensitivity to the low-energy, highly ionizing particles and insensitivity to the γ-rays and minimum ionizing particles, thus allowing us to detect only the products of the nuclear reaction of interest. The main disadvantage of this detector is a density several orders of magnitude lower than conventional gas targets. It can be compensated by using multi-module detector system and highly directed, intense, laser Compton backscattered γ-ray beam. The test results of the prototype detector as well as the possibility of measurement of the cross section of $\gamma + {}^{16}O \longrightarrow {}^{12}C + \alpha$ reaction are discussed.

Type of contribution

Talk

Authors: Dr MARGARYAN, Amur (Alikhanyan National Science Laboratory); Mr KHACHATRYAN, Vachik (Alikhanyan National Science Laboratory)

Co-authors: Mr AJVAZYAN, Robert (Alikhanyan National Science Laboratory); Dr BALABANSKI, Dimiter (ELI-NP, Horia-Hulubay National Institute for Physics and Nuclear Engineering, Bucharest, Magurele, Romania); Dr ANNAND, John (School of Physics & Astronomy, University of Glasgow); Dr GRIGORYAN, Nersik (Alikhanyan National Science Laboratory); Dr KAKOYAN, Vanik (Alikhanyan National Science Laboratory); Mr KHACHATRYAN, Patrick (Alikhanyan National Science Laboratory); Dr MONTGOMERY, Rachel (School of Physics & Astronomy, University of Glasgow); Dr VARDANYAN, Henrik (Alikhanyan National Science Laboratory); Dr ZHAMKOCHYAN, Simon (Alikhanyan National Science Laboratory)

Presenter: Dr MARGARYAN, Amur (Alikhanyan National Science Laboratory)