Contribution ID: **12** Type: **Talk**

On the Possibility to Count Fast Neutrons with High Spatial and Timing Resolution

Wednesday, 23 October 2019 09:00 (30 minutes)

Various technologies have been developed to this date for the detection of fast neutrons, each having certain advantages and limitations at the same time. There is no one single device, which meets all the requirements of various experiments where fast neutrons have to be detected. Detectors with microchannel plates (MCPs), which were initially developed for the applications with very low input photon fluxes, have been recently extended for thermal and epithermal neutron imaging experiments. The fact that event multiplication within the MCP is localized within a pore, has low transit time spread and can be encoded with virtually no readout noise provide the possibility to detect both time and position for every neutron registered with relatively high detection efficiency. Conventional glass MCP manufacturing technology has been recently modified to contain neutron-absorbing atoms (e.g. B, Gd) for thermal and cold neutron counting. Detection of fast neutrons with MCPs has been also demonstrated by novel MCPs manufactured from plastic material (PMMA), where proton recoil is used for fast neutron detection. In this paper we will review the characteristics of plastic MCPs for fast neutron detection and discuss possible readout options. Although such devices will not outperform or replace widely used scintillator-based detectors, where incoming neutron flux is converted into light subsequently detected by a CCD or CMOS sensor, the detectors with plastic MCPs can still provide some unique capabilities in some applications, where high resolution neutron counting with low readout noise is required.

Primary author: TREMSIN, Anton (University of California)

Presenter: TREMSIN, Anton (University of California)

Session Classification: Detectors

Track Classification: Neutron detection