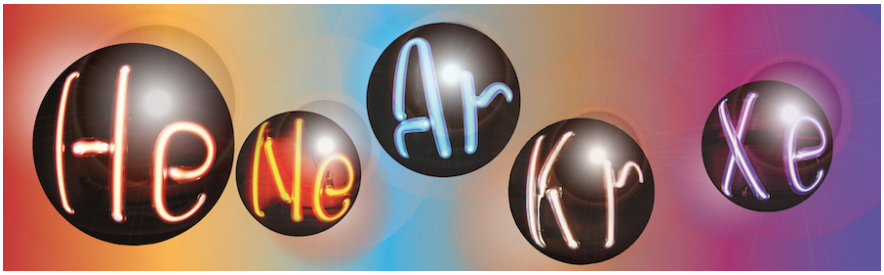

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Novel VUV Light Detection in a Pixelated Liquid Argon Time Projection Chambers

Thursday, 22 September 2022 12:40 (15 minutes)

Projective readout technologies currently used in Liquid Argon Time Projection Chambers come with a set of challenges from the construction of the wire planes themselves to the continuous readout of the system required to accomplish the physics goals of proton decay searches and supernova neutrino sensitivity. Additionally, the reconstruction techniques required for these projective readouts become complex and difficult for complex neutrino interaction topologies. As such, research into reading out LArTPC's using true 3D pixel based schemes has recently garnered a lot of interest. This new charge readout poses a problem for detection of the scintillation light. In the wire based readout, the wires are transparent to the photons and thus photon detectors (PMT's and SiPM's) coated in wavelength shifting materials (TPB and PEN) can be deployed. However, pixel planes are opaque to the light and thus other methods of detection may be required. A number of novel ideas could be pursued to allow the pixel design to be an integrated tracking/photo-detector. One such notion is the exploration of coating the dielectric surface with a type of photo-conductor which would respond to the VUV light incident on the surface. When struck by a VUV photon, the photoconductor would have electrons elevated into the conduction band and move in the electric field toward a pixel button. We will present some early results and initial R&D being done into the realization of such an integrated tracking/photo-detector for pixel based LArTPCs and future plans for testing currently underway.

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