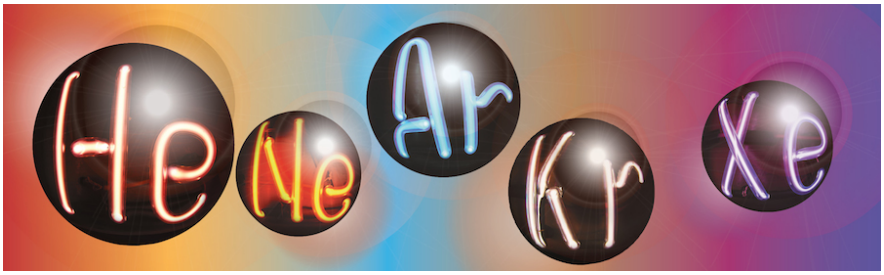

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A New Concept of LXeTPC for PET imaging

Wednesday, 22 October 2025 16:50 (20 minutes)

We propose a new concept of a liquid xenon time projection chamber (LXeTPC) that combines fast primary scintillation (S1) with ionization-induced electroluminescence (EL) generated in liquid xenon for Positron Emission Tomography (PET) imaging. The design aims to exploit S1 for prompt timing and to use EL as a low-noise optical readout of charge to achieve precise 3D localization and improved energy resolution in a monolithic geometry. This dual optical signals approach is expected to enhance depth-of-interaction determination and multiple scatter rejection relative to PET with scintillation-only readout, while preserving scalability and uniformity inherent to LXe detectors. We will present the detector concept along with preliminary simulation results that explore energy and spatial resolutions, detection efficiency and imaging performance, and near-term R&D milestones required to validate EL production and stability in LXe.

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