NNN25

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Scintillation and Cherenkov Light Separation in a Liquid Argon Detector

Friday, October 3, 2025 10:00 AM (25 minutes)

This talk will present the first event-by-event observation of Cherenkov radiation from sub-MeV electrons in a high-yield scintillator (liquid argon) detector, representing a milestone in low-energy particle detector development and one of the major goals of 2021 Snowmass Process. This work utilizes the Coherent CAPTAIN-Mills (CCM) experiment, a 10-ton liquid argon light collection detector located at the Los Alamos National Lab pion decays at rest source. The detector is instrumented with 200 8-inch PMTs, 80% of which are coated in a wavelength shifter and 20% are uncoated. Using gamma-rays from a sodium-22 radioactive source, we have isolated prompt Chernekov light with >5 sigma confidence, possible through the unique combination of coated and uncoated PMTs. Cherenkov light identification allows for a highly pure selection of electromagnetic events, enabling exciting beyond Standard Model physics searches that I will review.

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