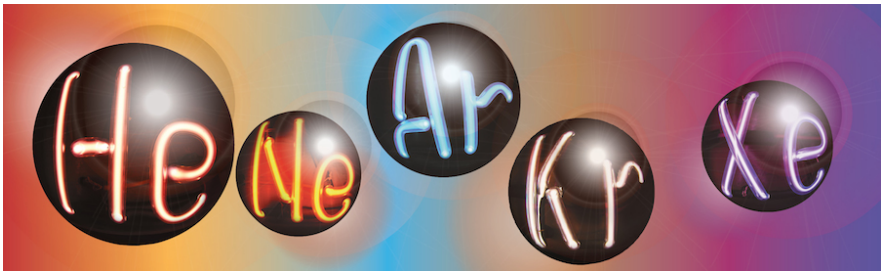

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The liquid argon scintillation detection system for LEGEND-200

Wednesday, 15 September 2021 10:00 (15 minutes)

The LEGEND-200 experiment at LNGS will search quasi-background free for the neutrinoless double-beta decay in ^{76}Ge. Bare high-purity Ge detectors enriched in the isotope ^{76}Ge are operated in liquid argon, which serves as a coolant and active shielding. Background events are identified by their interaction typologies. The key to search background-free for $0\nu\beta\beta$ decays is the identification of events which deposit simultaneously energy in the germanium detectors and in the liquid argon. The latter interactions are identified by scintillation light at 128 nm wavelength. The LAr instrumentation consists of two concentric, wavelength-shifting green fiber barrels coated with TPB that shift the photons from the primary LAr light at 128 nm to the green. The photons are read out with arrays of SiPMs at the ends of the fibers. Due to the close proximity of the LAr instrumentation to the Ge detectors, strong restrictions apply with respect to the radioactivity of the components. Many commercially available components (e.g., packaging of SiPMs) exceed this limitation. This talk will present the design, construction, and first performance of a wavelength-shifting, ultrahigh-purity LAr scintillation detection system which will be operated in the LEGEND-200 experiment.

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