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Study of xenon doping to liquid argon in CENNS-10 detector

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CENNS-10 is a single phase liquid argon (LAr) scintillation detector deployed by the COHERENT collaboration at the Spallation Neutron Source located at the Oak Ridge National Laboratory in 2017. The detector was designed to study the Coherent Elastic Neutrino-Nucleus Scattering (CEvNS) using the high-quality pion-decay-at-rest neutrino source. The collaboration reported the observation of CEvNS in LAr with CENNS-10 in 2020. After the science run, a series of studies of LAr scintillation properties were performed. LAr as a scintillator produces 128 nm VUV light that lies well outside the reasonable sensitivity region of the most PMTs. Therefore, wavelength shifters (WLS) are commonly used as a solution. CENNS-10 applies tetraphenyl-butadiene (TPB) coating on internal surfaces. It is known that xenon doping to LAr can act as a volume-distributed WLS. To study the scintillation properties of various xenon-argon mixtures a dedicated engineering run was conducted with different xenon concentrations. Current status of the analysis and preliminary results are discussed.

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