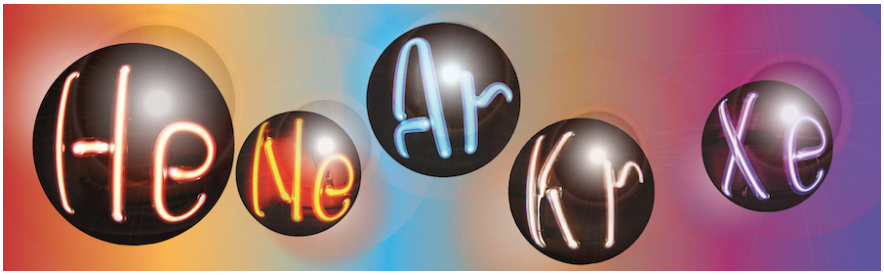

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Scintillation and optical properties of xenon-doped liquid argon

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Liquid argon (LAr) is widely employed as a scintillator in rare-event searches. Its optical and scintillation properties, as well as the impact of impurities, are being studied extensively by many groups world-wide. LAr scintillation light exhibits a main emission wavelength of 128 nm, which makes propagation and detection challenging because of short attenuation lengths and low quantum efficiencies of photo sensors in the VUV spectral range.

Previously, we have determined the attenuation length of purified liquid argon for its own scintillation light to be larger than 110 cm at a wavelength of 128 nm [1, 2]. Already in 1982 Kubota et al. [3] investigated the impact of xenon doping of LAr. Recently, we have studied the emission spectrum and time distribution dependent on the xenon concentration [4].

Here, we present our latest study of xenon-doped LAr with focus on the primary photon yield, the effective triplet lifetime and attenuation length, with xenon concentrations ranging from 3 ppm to 300 ppm. The scintillation and optical properties were measured simultaneously with the *LLAMA* [5] instrument operated inside *SCARF*, a 1 ton LAr test stand, and the xenon concentrations using *IDEFIX*, a dedicated mass spectrometer setup.

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