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## Controlling the Stability of Xenon-Doped Argon Mixtures

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The scintillation, ionization, and electroluminescence properties of liquid argon are substantially modified by the addition of small quantities of xenon in a way that benefits many experiments. The resulting target medium retains the low cost and light nuclear mass of argon needed for large neutrino CEENS and dark matter experiments. Maintaining a stable mixture suitable for particle detection requires a cryogenic system designed with specific attention to the large difference in vapor pressures of the components and the xenon solubility limit. We present experiments within a specially designed liter-scale system containing up to 2.35% xenon mole fraction, which is projected to significantly modify the gas-phase electroluminescence spectrum. We describe the exploration of different modes of operation that strongly affect the mixture stability and the implications of this for the design of xenon-doped argon systems.

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