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## Capacitive Monitoring of Xenon Concentration in a Xenon-Doped Argon Detector

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Xenon and argon are widely used target media for low cross-section experiments including neutrino physics and dark matter searches. Xenon-doping of dual phase argon time projection chambers (TPCs) at the O(1%) level may enable these technologies to reach unprecedented sensitivity limits. However, the large temperature discrepancy between the argon and xenon boiling points can produce instabilities in a xenon-doped argon detector such as unwanted xenon distillation. Due to the challenging nature of maintaining mixture stability in xenon-doped liquid argon, it is desirable to develop sensors which can precisely measure changes in xenon concentration. We have built a custom capacitor that utilizes the difference in xenon and argon atomic polarizability to measure the xenon concentration in liquid argon with a precision of 0.1%. This talk will discuss the application of this capacitor to monitor the xenon concentration in a dual phase argon detector doped with xenon at 2.35% by molar fraction.

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