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Optimizing Dual-phase LArTPCs for Sub-keV siignals

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Dual-phase liquid argon time projection chambers (LArTPCs) have a proven track record measuring keV-scale signals from light dark matter through the electron-counting ("S2-only") channel. Enhancing their design can open the door for new, optimized searches for light dark matter, coherent elastic neutrino-nucleus scattering measurements at nuclear reactors, searches for new forces in beam dump experiments, and other topics. This talk will discuss ongoing R&D studying the possibility of using hydrogenous, photo-sensitive dopants to lower the threshold of dual-phase LArTPCs, as well as other ongoing efforts to optimize their design for S2-only analyses and to understand the origins of spurious electron backgrounds that limit sensitivity to their lowest accessible energies.

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