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Progress towards Low Energy Neutrino Spectroscopy (LENS)¹

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The Low-Energy Neutrino Spectroscopy (LENS) experiment will precisely measure the energy spectrum of low-energy solar neutrinos via charged-current neutrino reactions on indium. LENS will test solar physics through the fundamental equality of the neutrino fluxes and the precisely known solar luminosity in photons, will probe the metallicity of the solar core through the CNO neutrino fluxes, and will test for the existence of mass-varying neutrinos. The LENS detector concept applies indium-loaded scintillator in an optically-segmented lattice geometry to achieve precise time and spatial resolution and unprecedented sensitivity for low-energy neutrino events. The LENS collaboration is currently developing a prototype, miniLENS, in the Kimballton Underground Research Facility (KURF). The miniLENS program aims to demonstrate the performance and selectivity of the technology and to benchmark Monte Carlo simulations that will guide scaling to the full LENS instrument. We will present the motivation and concept for LENS and will provide an overview of the R&D efforts currently centered around miniLENS at KURF.

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