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Astroparticle Physics with a Generation-3 Liquid Xenon Detector

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This talk will present the science case for a future generation-3 liquid xenon time projection chamber for astroparticle physics. Such an experiment is envisioned to follow the current generation of experiments such as LZ and XENONnT, delivering diverse science at moderate cost. With a sensitivity sufficient to probe WIMP dark matter down to the signal from atmospheric neutrinos, numerous science channels are available. This includes various dark matter models including spin-dependent, spin-independent, and other WIMP couplings; sub-GeV WIMPs; leptophilic dark matter models; and axion-like particles and solar axions. In addition, such a detector will be a true multi-purpose astroparticle observatory. A precision measurement of solar pp-neutrinos is possible as is a measurement of solar boron-8 neutrinos through coherent elastic neutrino nucleus scattering. Atmospheric neutrinos provide another scientifically interesting target. The detector can also provide complementary neutrino flavor-independent information in case of a Galactic supernova event. Depending on the eventual realization, even searches for neutrinoless double-beta decay or a first measurement of solar CNO neutrinos will be possible.

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