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Sensitivity of XENON detectors to Galactic/Solar Axions and Bosonic Super-WIMPs based on the Axio-electric Effect ALEXEY LYASHENKO, UCLA, XENON COLLABORATION — We investigate the sensitivity of the XENON detectors to hypothetical Galactic/Solar axions and Bosonic Super-WIMPs using axio-electric effect (analogue of the photoelectric effect) on xenon atoms. Since liquid xenon detectors also provide an extremely low radioactivity environment for electron recoils, very weakly-interacting low-mass particles ($<$100 keV/c^2), such as the hypothetical axion (and Bosonic Super-WIMP), could be detected using the axio-electric effect. The limits for the axion-electron coupling constant g_{Ae} were calculated from the analysis of 224.6 live days X 40 kg of exposure of XENON100 Dark Matter Detector. For the future ton-scale liquid Xe detectors (e.g. XENON1T) assuming one ton-year of exposure, galactic axions (as non-relativistic dark matter) could be detected if the axio-electric coupling g_{Ae} is greater than 10^{-14} at 1 keV/c^2 (or 10^{-13} at 100 keV/c^2). Below a few keV/c^2, and independent of the mass, a solar axion search would be sensitive to a coupling g_{Ae} $\sim 10^{-12}$.

Alexey Lyashenko
UCLA

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