

Limits on Low-Mass WIMP Dark Matter with an Ultra-Low-Energy Germanium Detector at 220 eV Threshold

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An energy threshold of (220 ± 10) eV was achieved at an efficiency of 50% with a four-channel ultra-low-energy germanium detector [1] with a total active mass of 20 g. This provides a unique probe to WIMP dark matter with mass below 10 GeV. With low background data taken at the Kuo-Sheng Laboratory, limits on WIMPs in the galactic halo were derived for both spin-independent and spin-independent couplings down to WIMP mass of 3 GeV [2]. This detector technique makes the unexplored sub-keV energy window accessible for new neutrino and dark matter experiments [1]. Status on data taking and analysis on a 500-g point-contact germanium detector will be reported.

References:

- 1.H.T. Wong, Mod. Phys. Lett. A 23, 1431 (2008).
- 2.S.T. Lin et al., Phys. Rev. D 76, 061101(R) (2009) .

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