

Measurement of the ionization produced by sub-keV silicon nuclear recoils in a skipper CCD

We report a measurement of the ionization efficiency of silicon nuclei recoiling with sub-keV kinetic energy in the bulk silicon of a skipper charge-coupled device (CCD). This energy range is relevant for the detection of low-mass dark matter particles. Nuclear recoils are produced by low-energy neutrons (<24 keV) from a ^{124}Sb - ^9Be photoneutron source, and their ionization signal is measured down to ~ 11 eV electron equivalent. Differences with respect to recent measurements in silicon with similar thresholds are discussed. This measurement demonstrates the sensitivity to nuclear recoils of skipper CCDs employed by DAMIC-M, a dark matter direct detection experiment located in the Laboratoire Souterrain de Modane.

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