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Energy Scale for Nuclear Recoils in CDMS II Silicon Detectors[1]

MICHAEL BOWLES, Syracuse University — Weakly Interacting Massive Particles (WIMPs) are a favored candidate for the dark matter in the Universe. The Cryogenic Dark Matter Search (CDMS) collaboration employs Z-sensitive Si and Ge crystals instrumented with Ionization and athermal Phonon sensors (ZIPs) attempting to directly detect WIMPs when they produce nuclear recoils. It is necessary to calibrate the detector response with low-energy nuclear recoils to translate results into an allowed WIMP region in mass and cross-section. We present measurements of the energy scale for nuclear recoils for the Si ZIP detectors, determined by comparing the observed energy spectra in Si detectors for 252-Cf neutron calibrations to those expected from Monte Carlo simulations. We quantify uncertainties in both the nuclear recoil spectra Monte Carlo input and results to estimate the nuclear recoil energy scale uncertainty. Implications on regions allowed by previous CDMS Si results are shown.

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