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Precision ionization calibrations of silicon skipper CCDs for dark matter detection

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Direct dark matter detection experiments can reach the thresholds as low as $\mathcal{O}$(10eV). In that regime, we report precision ionization measurements induced by Compton scattering of gamma rays and nuclear recoils from neutrons. A skipper charge-coupled device (CCD) with single electron resolution developed for DAMIC-M experiment was used to collect data. Compton scattering on silicon atomic shell electrons down to 23 eV was measured using a ^{241}Am source and compared with Monte Carlo simulations and *ab initio* calculations. Nuclear recoil ionization efficiency of silicon nuclei was measured using a SbBe source and Monte Carlo simulations were used to model the nuclear recoil spectrum. Agreements with simulations for Compton scattering and the deviation of nuclear recoil ionization efficiency from the extrapolated Lindhard model will be dicussed.

Primary author: YAJUR, Rachana Suthikshn (University of Chicago)

Presenter: YAJUR, Rachana Suthikshn (University of Chicago)

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