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Uncertainties in Direct Dark Matter Detection Rates due to Nuclear Form Factors GEORGE REIFENBERGER, GINTARAS DUDA, Creighton University — Theoretical calculations of neutralino cross sections with various nuclei are of great interest to direct dark matter searches such as CDMS, EDELWEISS, ZEPLIN, and other experiments. These cross sections and direct detection rates are generally computed with standard, one or two parameter model-dependent nuclear form factors, which may not exactly mirror the actual form factor for the particular nucleus in question. As is well known, elastic electron scattering can allow for very precise determinations of nuclear form factors and hence nuclear charge densities for spherical or near-spherical nuclei. We use charge densities derived from elastic electron scattering data to calculate model independent form factors for various target nuclei important in dark matter searches, such as Si, Ge, S, Ca and others. We have found that for nuclear recoils in the range of 1-100 keV significant differences in cross sections and rates exist when the model independent form factors are used. We will present quantitative uncertainties in detection rates due to nuclear form factors for current and proposed experiments in their relevant data-taking energy ranges.

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