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Modeling nuclear and electronic recoils in noble gas detectors with NEST JEREMY MOCK, University at Albany, NEST COLLABORATION — Noble gases such as xenon and argon are used as targets in single and dual phased rare event detectors like those used in the search for dark matter. Such experiments require an understanding of the behavior of the target material in the presence of low-energy ionizing radiation. This understanding allows an exploration of detector effects such as threshold, energy and position reconstruction, and pulse shape discrimination. The Noble Element Simulation Technique (NEST) package is a comprehensive code base that models the scintillation and ionization yields from liquid and gaseous xenon and argon in the energy regimes of interest to many types of experiments, like dark matter and neutrino detectors. NEST is built on multiple physics models, which are constrained by available data for both electronic and nuclear recoils. A substantial body of data exists in the literature, and we are reaching an era in which sub-keV yields can be explored experimentally. Here we present a new global analysis of all available nuclear recoil data, and the latest updates to the electronic recoil model, in light of recent low-energy measurements and an improved understanding of detector systematics.

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