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A Review of NEST Models, and Their Application to Particle Identification

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Noble element detectors (two-phase emission detectors, liquid phase-only detectors, etc.) have many applications in modern research.

For example, they are broadly used in dark matter registration, non-standard neutrino interactions searches and even Standard Model processes observation (for example, coherent elastic neutrino-nucleus scattering (CEvNS) studies). Modeling signal generation from these complicated interactions requires precise simulations. The main problem of modeling such phenomena is that various theoretical predictions are inconsistent with each other and compared to experimental data.

In this talk, the current status of NEST: Noble Element Simulation Technique, which is a simulation package based on reasonable empirical models informed by the world's best data on the subject, will be discussed.

Talk will present on the methods used for modeling electronic recoils, nuclear recoils, and quantification of the misidentification of the former as the latter, the primary means of determining the ability to discriminate against residual backgrounds. NEST models results to data will be compared. Also existing work on argon will be discussed.

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