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Probing Nuclear Recoils in Liquid Argon with the ARIS Experiment

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One of the unique challenges facing direct dark matter searches is the signal characterization of the dark matter particle with the detector medium. The goal of the Argon Recoil Ionization and Scintillation (ARIS) experiment is to characterize the response of nuclear recoils in liquid argon (as expected from WIMPs) by measuring the energy scale of nuclear recoils with respect to electron recoils, the ion recombination probability as a function of electric field, and the scintillation time response of nuclear recoils at various energies. A scintillation chamber with an active mass of ~ 0.5 kg was constructed with a tunable cathode to provide a varying electric field within the active volume. This detector was exposed to a highly collimated inverse kinematic neutron beam at the Institut de physique nucléaire d'Orsay in France. Events coincident with one of an array of 8 neutron detectors allowed a scan of nuclear recoil energies. The present status of the experimental analysis will be presented.

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