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Dark matter search results from DEAP-3600 at SNOLAB

Tuesday, 4 June 2019 09:15 (20 minutes)

Dark matter search results and a detailed background model for DEAP-3600 will be presented. DEAP-3600 is searching for dark matter interactions with a target of liquid argon, shielded from cosmic rays by more than 2 km of rock at SNOLAB in Sudbury, Canada. The spherical detector consists of 3.3 tonnes of liquid argon in a large ultralow-background acrylic cryostat instrumented with 255 photomultiplier tubes. DEAP-3600 is sensitive to nuclear recoils from dark matter particles, which cause the emission of prompt scintillation light. Backgrounds come from alpha particles on the inner detector surfaces, from external neutrons, from argon-39 beta decays, and from trace radioactivity in detector components. This talk details the model for each of these backgrounds, and the analysis techniques that were used to reject them. The latest results from DEAP-3600 demonstrate excellent performance for pulse-shape discrimination, event reconstruction, background rejection and sensitivity to dark matter.

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