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Dark matter search with DEAP-3600 experiment

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DEAP-3600 is a low-background liquid argon detector for a direct WIMP (Weakly Interacting Massive Particles) dark matter search. The detector consists of 3279 kg of LAr contained in a spherical acrylic vessel. Liquid argon is an excellent scintillator, transparent to its own scintillation light. Scintillation is detected by photomultiplier tubes, and pulse shape discrimination is used to differentiate between nuclear recoils, which may result from WIMP-nucleus scattering or some rarer backgrounds, and electronic recoils, the most abundant backgrounds which predominantly come from the beta-decay of Ar39. Ar39 is an inevitable component of background created by interaction of Ar40 with cosmic rays. Here we report the results of an analysis of a 231 live-days data set taken during the first year of operation. We also describe a detailed background model, WIMP selection criteria and future plans including blinding scheme for analysis and machine learning techniques for discrimination against alpha-decays in the neck of the detector.

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