

First light from DEAP-3600, a single phase liquid argon detector for dark matter search

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DEAP-3600 is a liquid Argon detector with competitive sensitivity to dark matter interaction especially at high mass (above 100 GeV/c²). The detector is currently 25% full of liquid Argon and filling is expected to be completed in July 2016. When full, DEAP-3600 will hold 3600kg of liquid Argon within an acrylic sphere surrounded by 255 photo-multiplier tubes. Only the scintillation light is recorded in order to maximize the pulse shape discrimination capability that is critical for rejecting electron recoils produced by gamma interactions and by ³⁹Ar decays occurring at an expected rate of 1Hz/kg. The detector concept also relies on having minimum intrinsic radioactivity in the core of the detector (liquid Argon, TPB wavelength shifter and acrylic vessel), in particular to minimize the background from mis-reconstructed α decays. In this talk we will show the key elements of the DEAP-3600 detector concept focusing on the various background mitigation strategies. And we will show data of the detector in operation starting with operation in Nitrogen gas in 2015 to operation with liquid Argon in 2016.

Summary

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