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A 20 ton double phase LAr TPC for LBNO

Double phase liquid argon time projection chambers are an exciting new technology for neutrino detectors. This technology is known to provide excellent tracking and calorimetry performance that can outperform other techniques. In this context GLACIER is a proposed giant double phase liquid argon underground neutrino observa- tory scalable to masses of 100 kton. As proposed by the future European Long Baseline Neutrino Oscillation program (LBNO), a neutrino beam from CERN with GLACIER as far detector would allow to precisely measure the neutrino mixing parameters, determine the neutrino mass hierarchy and test the existence of the CP-violating phase. At the same time, the detector could conduct astroparticle experiments of unprecedented sensitivity. GLACIER relies on novel technologies which are currently being tested on smaller scale prototypes. After the successful operations of a 3 liter and a 250 liter chamber we are now constructing a detector with a 3 × 1 × 1 m^3 active volume (~20 ton total). The chamber would explicitly test many of the detector components envisaged for GLACIER such as the membrane insulation, charge readout, signal and high voltage feedthroughs etc.. This poster will describe the LBNO physics potential and provide an overview of the ongoing R&D towards giant double phase liquid argon detectors. A detailed description of the 3 × 1 × 1 m^3 chamber will be presented.

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