Neutrino Physics and LArTPC R&D with ArgoNeuT

JOSHUA SPITZ, Yale University, ARGONEUT COLLABORATION — Set to begin taking data in early 2008 in the on-axis NuMI neutrino beamline, ArgoNeuT is a Liquid Argon Time Projection Chamber (LArTPC) R&D test stand for future CP Violation and $\theta_{13}$ neutrino oscillation searches. The first LArTPC to be placed in a “low” energy accelerator-based neutrino beam, ArgoNeuT will collect $\sim 10^5$ neutrino events per year in the 0.1-10 GeV range (peaking at 3 GeV). The GEANT4 simulation framework and physics capability of the detector will be presented. Including comparison to first events, simulation discussion will focus on using a $dE/dx$ tag for electron and gamma separation, vital for $\nu_\mu/\nu_e$ tagging efficiency. Also, the possibility of $\nu_\mu$ charged current quasi-elastic cross section and $M_A$ parameter measurements will be discussed.

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