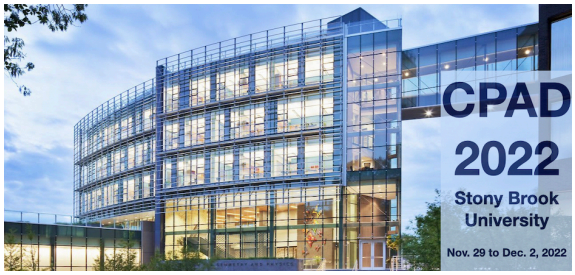

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The TRANSLATE (simulation models the TRANSport in Liquid Argon of near-Thermal Electrons) simulation package and the LArCADe Project

Wednesday, 30 November 2022 09:10 (20 minutes)

Liquid argon (LAr) is widely used as a detector medium to image particle interactions from the keV to GeV scale in searches for rare processes and measurements of neutrino interactions. Furthermore, a vibrant R&D community is active in developing scalable LAr detectors with lower thresholds and fine granularity. One such effort, LArCADe, intends to explore the feasibility of charge amplification in liquid argon to enable measurements of low-threshold processes such as CE□NS. As experiments grow in scale and complexity and R&D efforts advance, the development of tools to investigate important microphysics effects impacting LAr detectors becomes necessary. We present a new time-domain Monte Carlo simulation of electron transport in liquid argon. The simulation models the TRANSport in Liquid Argon of near-Thermal Electrons (TRANSLATE) with the aim of providing a multi-purpose software package for the study and optimization of detector environments, with a particular focus on ongoing and next generation liquid argon neutrino experiments utilizing the time projection chamber technology. TRANSLATE builds on previous simulation tools, with an emphasis on the simulation of charge amplification and ionization electron transport in non-uniform electric fields. The simulation is validated by benchmarking its performance with swarm parameters from data collected in experimental setups operating in gas and liquid. This presentation will cover the TRANSLATE simulation and the status of the LArCADe R&D project.

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