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Calibrating DUNE –The Largest LArTPC Ever To Be Built

The Deep Underground Neutrino Experiment, DUNE, is a next-generation, long-baseline, neutrino experiment, and flagship project for the U.S. It is poised to perform some of the most precise measurements of the properties of neutrinos in order to elucidate their role in the outstanding matter-antimatter asymmetry. DUNE will make use of the world's most intense neutrino beams produced by the Fermi National Accelerator Lab in Batavia, Illinois and propagate them towards a far detector located 1300 km away and 1.5 km underground at the Sanford Underground Research facility (SURF) in Lead, South Dakota.

At a nominal 70 kilotons of liquid Argon, the DUNE far detector will be the largest Liquid Argon Time Projection Chamber (LArTPC)-based neutrino observatory in the world. The level of precision required to answer the questions sought after by DUNE, result in unprecedented requirements in our understanding of the detector response. We must therefore, carefully address various systematic uncertainties, particularly those in position and energy reconstruction of neutrino interactions and their byproducts. I will talk about the challenges involved in calibrating the largest LArTPC ever to be built and elaborate on the sophisticated calibration systems, tailored for DUNE, to provide the precision required to achieve future breakthrough discoveries.

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