Contribution ID: **219** Type: **Poster**

Accelerator design and modeling for the decay-at-rest neutrino experiments DAEδALUS and IsoDAR

The proposed Decay-At-rest Experiment for δ_CP violation At the Laboratory for Underground Science (DAEδALUS) and the Isotope Decay-At-Rest experiment (IsoDAR) search for CP violation in the neutrino sector and sterile (non-interacting) neutrinos. Both are short baseline experiments that use proton driver beams. In the IsoDAR case, a 60 MeV proton beam will impinge on a high purity lithium/beryllium target to produce isotope decay-at-rest and in DAEδALUS, 800 MeV protons will hit a carbon target to produce pion/muon decay-at-rest. The drivers are cyclotrons, because they are comparatively cheap, compact, and well-established. In order to obtain the necessary high neutrino fluxes, the primary proton beam current needs to be higher than current state-of-the-art machines have demonstrated. This has led to a substantial R&D effort on the accelerator side of these projects. In this contribution, we will report on the latest design and the challenges we are faced in creating, transporting, and accelerating high intensity beams.

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Track Classification: Short Baseline Oscillations / Sterile Neutrinos / Non-standard Oscillations