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

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Abstract:

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 deliver the highest intensities in the considered energy range. In order to obtain the necessary high neutrino fluxes, the primary proton beam current needs to be even higher than current state-of-the-art machines at PSI have demonstrated. This has led to a substantial R&D effort on the accelerator side of DAEδALUS and IsoDAR. In this contribution, we will report on the latest driver designs and the challenges we are faced in creating, transporting, and accelerating high intensity beams.