New Accelerators for Neutrino Physics

DAEδALUS is a proposed neutrino experiment, whose ultimate aim is to search for evidence of CP violation in the neutrino sector. The experiment will consist of several accelerator-based modules that produce decay-at-rest neutrino beams located at three different distances from a single, large underground neutrino detector. Each of these modules will make use of a pair of low-cost, high power cyclotrons to accelerate an H2+ beam initially up to 60 MeV with a compact injector cyclotron and then ultimately up to 800 MeV with a separated sector super-conducting cyclotron. These new low-cost, high power cyclotrons are motivated by industry needs and also open up new possibilities for searches for physics beyond the standard model with neutrinos.

In this talk, Dr. Toups will present an overview of the DAEδALUS neutrino physics program. In particular he will describe how the DAEδALUS injector cyclotron enables a sensitive search for non-standard interactions and for sterile neutrinos motivated by the reactor neutrino anomaly. Finally, he will present some of the technical challenges to building such a cyclotron and report on recent progress solving some of these issues at an experiment hosted by Best Cyclotrons, Inc. in Vancouver, Canada.