

Jorge Torres – HEP Seminar – November 8, 2022
Yale

Title: Searching for neutrinoless double beta decay with CUORE

Abstract: We do not know whether neutrinos are their own antiparticle. Neutrinoless double beta ($0\nu\beta\beta$) decay is a theorized radioactive decay process that would prove that neutrinos are their own antiparticle, and it would also be the first signal of lepton number violation. The discovery of this “matter-creating” process can provide information on the neutrino mass hierarchy as well as information on the absolute mass of neutrinos. The Cryogenic Underground Observatory for Rare Events (CUORE) at the Laboratori Nazionali del Gran Sasso (LNGS) in Italy is the first one-tonne scale cryogenic experiment searching for $0\nu\beta\beta$ decay in Tellurium-130. In this talk, I will present CUORE’s latest results on the search for $0\nu\beta\beta$ decay in Tellurium-130 [*Nature* **604**, 53–58 (2022)] as well as provide a look at the future of $0\nu\beta\beta$ decay searches with the successor of CUORE: the CUPID experiment.