Contribution ID: **626** Type: **Poster**

The Discovery Power of Future Neutrinoless Double Beta Decay Experiments

Friday, 8 July 2022 20:10 (20 minutes)

The search for lepton creation and Majorana neutrinos with double-beta decays is about to enter a new era. Several ton-scale experiments are in preparation to explore the full parameter space allowed by theories predicting inverted-ordered neutrino masses. In this paper, we evaluate the discovery probability of a combined analysis of such a multi-experiment endeavor assuming the complementary scenario, in which neutrino masses are normally ordered. The discovery probability strongly depends on the mass value of the lightest neutrino, ranging from 0 probability in case of vanishing lightest neutrino masses, up to 87% for mass values just beyond the current constraints. We study discovery probability for a selection of priors on the lightest neutrino mass, including exciting possible future scenarios in which cosmological surveys measure the sum of neutrino masses. Uncertainties of nuclear calculations which influence all experiments are also evaluated and found to partially compensate each other when data from different isotopes are available. Although discovery is far from being granted, the theoretical motivations for these searches and the presence of scenarios with high discovery probability strongly motivate the proposed international, multi-isotope experimental enterprise.

In-person participation

Yes

Primary authors: CALDWELL, Allen (Max Planck Institute for Physics); Mr ETTENGRUBER, Manuel (Max--Planck-Institut für Physik (Werner-Heisenberg-Institut)); Dr SCHULZ, Oliver (Max-Planck-Institut für Physik); Dr ELLER, Philipp (Technische Universität München); Dr AGOSTINI, Matteo (University College London)

Presenter: Mr ETTENGRUBER, Manuel (Max-Planck-Institut für Physik (Werner-Heisenberg-Institut))

Session Classification: Poster Session

Track Classification: Neutrino Physics