

CPM Session 109

Determining the Masses and Nature of Neutrinos

Organizers: V. Cirigliano (RF), A. de Gouvea (TF), C. Giunti (NF), L. Strigari (TF)

Science Topics

- ★ **Big questions:** what is the nature and size of neutrino masses? How do massive neutrinos impact the cosmic evolution? Do neutrinos play a role in baryogenesis? Are neutrinos a portal to the dark sector?
- ★ **Suite of laboratory and cosmological probes:** single and double beta decay, CMB, structure formation.
- ★ **Huge theoretical activity** on model building, connections to dark sectors, neutrinoless double beta decay as a probe of lepton number violation, and neutrinos in cosmology.

Presentations

- Overview of Neutrino Masses and the Nature of Neutrinos: Alexei Smirnov
- Direct searches for neutrino masses: Joseph Formaggio
- Neutrinoless double beta decay: Lisa Kaufman
- Neutrinos in cosmology: Marilena Loverde

Follow-up Actions and Planning

- A **white paper** on **Direct Searches for Neutrino Masses** (CF, NF, TF), including standard light neutrinos and heavy neutral leptons, with tritium (KATRIN, Project 8) and electron capture experiments (ECHO, HOLMES). Should include also the possibility to detect relic neutrinos (PTOLEMY) and theoretical studies.
- A joint **white paper** on **Neutrinoless Double-Beta Decay** (NF, RF, TF) that includes: (i) experimental status / prospects; (ii) benchmark theoretical scenarios for Lepton Number Violation.
- A **white paper** on **Neutrinos in Cosmology** (CF, NF, TF)?
- A **workshop** on **Determining the Masses and Nature of Neutrinos** (CF, NF, RF, TF) in winter/spring?