Neutrinos and Cosmic Messengers Discussion

Neutrinos and Cosmic Messengers Preparatory Group

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1 Full exploitation of next generation neutrino oscillation experiments requires combination of experiments, thanks to their high degree of complementarity, and global fits. Collaborations need to get together and setup a proper framework to address the important correlations between experiments (atmospheric and accelerator fluxes, neutrino interaction models, …). What is needed to get ready ? How to coordinate the process?

2 Long baseline experiments will eventually be limited by systematic errors induced by incomplete knowledge of neutrino cross sections

- Do we have a road to ensure proper neutrino interaction modeling to enable sufficient accuracy (including theory, MC codes, dedicated neutrino beams, …)?
- Shall we start planning for neutrino oscillation experiments post DUNE/HK/JUNO? What are the most important elements to consider: eg. size of CP violation?

3 There is a strong interplay between particle physics and astrophysics , including multi-messengers, both in SM and BSM. Furthermore, there are important technological common needs.
Do we have enough cross-collaboration and cross-coordination to extract the most of their interplay?

4 The absolute values of neutrino masses are a fundamental parameter for the standard model and in the latest years they become also a crucial test to check the robustness of cosmological measurements and models. What are the experimental challenges to arrive to a direct experimental measurement of neutrino masses?

5 Neutrinoless double beta decay is a unique gateway for physics BSM. What are the main technological and infrastructural common needs to exploit next generation projects? (Isotope enrichment facilities, collaboration with nuclear theorists for NME modeling, …)