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Neutrino Oscillations in the Three-Flavor Paradigm – Charge

This working group focuses on the scientific questions related to neutrino oscillation in the three flavor framework and the implications for our understanding of the Universe at all scales. After the discovery of large θ13 the remaining open questions are:

- What is the ordering of neutrino mass eigenstates, the so-called mass hierarchy?
- Is there leptonic CP violation and what is the value of the Dirac phase?
- What are the precise values of the oscillation parameters?
- What level of precision is needed to test the consistency of the three-flavor framework?

The working group will explore and identify the scientific opportunities arising from those three questions in both theory and experiment. On the theory side, we aim at the connection of neutrino mixing to more general questions like the origin of the baryon asymmetry of the Universe, grand unification, and new physics at the LHC or elsewhere with the goal to formulate a concise physics case. On the experimental side, we will assess the likely development of the existing and proposed experimental program until the middle of the next decade and develop an an understanding of the experimental techniques and strategies required to answer above questions. This working group will focus on the scientific merit with respect to above questions and evaluate the scientific opportunities for the domestic program in the international context. Possible synergies between oscillation physics and other topics, within and without of neutrino physics, will be carefully examined. R&D requirements to establish technical feasibility will be collected. We also will discuss the necessary growth of neutrino theory in support of the experimental efforts. The goal is to chart a path over the next two decades for evolution from the existing experimental efforts towards a world class diverse program in precision neutrino physics that would address the open questions in the field as well as enable discoveries of new physics beyond the 3-flavor paradigm

In phase 1 we will solicit one-page white papers addressing above topics (deadline January 31st 2013) and we would urge submitters to provide references to more detailed documents. A summary of these white papers will be discussed at the March meeting at SLAC. In phase 2, the community input will have to be transformed into a coherent message which can be presented at CSS 2013.

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