

NuFact'11 XIIIth Workshop on Neutrino Factories, Superbeams and Beta-beams



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WG1: Optimisation of the Low-Energy Neutrino Factory

The Low-Energy Neutrino Factory (LENF) is a single-baseline neutrino factory operating with typical stored-muon energies less than 10 GeV. The idea behind this design is to exploit the richness of the oscillation spectrum at lower energies to achieve a strong sensitivity to the fundamental parameters whilst also mitigating the effect of degeneracies. Preliminary studies of the LENF have shown that it can meet these expectations well and can provide a competitive performance to the conventional neutrino factory of the IDS design, especially in scenarios when θ_{13} takes relatively large values. In this talk, I will present work towards the optimisation of such a facility. In particular, we have investigated how the performance of the LENF depends upon the choice of baseline distance and stored-muon energy. The parameter ranges that we have studied connect the choices traditionally associated with the LENF to those of the higher-energy neutrino factory. Understanding this region of parameter space helps us to view the two designs as extreme ends of a spectrum of possible configurations whilst also allowing us to report revised sensitivities of such an experiment. These results are of particular importance given the recent hints of large θ_{13} reported by T2K for which we will show that the LENF has an excellent discovery potential for CP-violation and the mass hierarchy.

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