

MIND at Neutrino Factories

Friday 29 August 2014 16:20 (20 minutes)

Magnetized iron calorimeters have been previously used in neutrino detection applications, with MINOS being a good example. This technology provides the benefits of excellent charge and particle identification while being trivial to scale up in mass. These properties make a magnetized iron neutrino detector (MIND) the ideal far detector for neutrino factory applications. A full simulation of MIND has been produced in conjunction with the Neutrino Factory International Design Study (IDS-NF) to evaluate its detector response. The digitized simulation is subject to a full reconstruction of muon tracks. A multivariate analysis was developed to select muon tracks with a high purity to reduce backgrounds from charge and flavour mis-identification. The detector response and background suppression is optimized for the requirements for the specific experiment and will be discussed. The sensitivity of oscillation physics experiments using a MIND at a neutrino factory will be discussed using the response derived from this analysis will be discussed with a focus on leptonic CP violation.

WG3: Accelerator Physics (Yes/No)

No

WG2: Neutrino Scattering Physics (Yes/No)

No

WG4: Muon Physics (Yes/No)

No

WG1: Neutrino Oscillation Physics (Yes/No)

Yes

Type of presentation

Oral presentation

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Session Classification: WG1: Neutrino Physics