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Perspectives on novel neutrino beams

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Neutrino beams today are delivered using technology first developed at CERN in the early 1960s. The next generation of long-baseline neutrino oscillation experiments, DUNE in the US, and Hyper-K in Japan, will exploit enormous detectors of exquisite sensitivity and resolution to deliver enormous data sets with which sensitive searches for the violation of the matter-antimatter symmetry can be made. The statistical weight of these experiments is such that beam-related systematic uncertainties are expected to play a significant role. To drive the field beyond the sensitivity that will be delivered by DUNE and Hyper-K will require the development and exploitation of novel accelerator techniques. A number of techniques have been proposed to provide the well characterised neutrino beams required to take the field beyond the sensitivity of DUNE and Hyper-K. Such techniques include the creation of neutrino beams from the decay of stored muons and beams in which the neutrino flavour is tagged, and its energy is constrained, by instrumentation in the decay channel. The potential of such approaches will be reviewed and the status of the development of nuSTORM (Neutrinos from Stored Muons) ENUBET (Enhanced Neutrino beam from Kaon Tagging) experiments, as well as other initiatives such as NuTAG and ESSnuSB, will be summarised. Synergies between the two programmes and with the R&D required to develop the muon-collider will be presented.

First author

Kenneth Long

Email

k.long@imperial.ac.uk

Collaboration / Activity

None

Primary author: LONG, Kenneth**Presenter:** LONG, Kenneth**Session Classification:** T13 - Accelerator for HEP**Track Classification:** Accelerators for HEP