

Contribution ID: 542

Type: Parallel

A short-baseline neutrino experiment at CERN for high-precision cross-section measurements

The limited knowledge on neutrino cross-sections at the GeV scale will represent the main source of systematic uncertainty for the next-generation generation neutrino oscillation experiments. Building on the ideas and R\&D efforts of ENUBET and NuTag, SBN@CERN is a proposal for a high-precision neutrino cross-section experiment.

The experiment is driven by slow extracted proton beam enabling the operation of instrumentation along the beamline and in the decay tunnel. This setup allows for percent-level monitoring of both electron and muon neutrino fluxes, individual tagging of muon neutrinos, and precise measurement of the neutrino energy independently of final-state particle reconstruction in the neutrino detector.

As a result, the SBN@CERN eliminates the two primary sources of systematic uncertainty in cross-section measurements: flux normalization and energy bias caused by nuclear effects. We will discuss the design of the beamline, the proposed technology for its instrumentation together with results of prototyping activities, and possible scenarios for its implementation at CERN. We will also highlight the physics potential of this facility, with a focus on cross-sections relevant to DUNE and Hyper-Kamiokande.

Secondary track

Author: PUPILLI, Fabio Session Classification: T03

Track Classification: T03 - Neutrino Physics