Contribution ID: **235**   Type: **not specified**

SHiP: a new facility with a dedicated detector for studying tau neutrino properties and nucleon structure functions

Wednesday 13 April 2016 16:53 (20 minutes)

SHIP is a new general purpose fixed target facility, whose Technical Proposal has been recently reviewed by the CERN SPS Committee, who recommended that the experiment proceeds further to a Comprehensive Design phase. In its initial phase, the 400GeV proton beam extracted from the SPS will be dumped on a heavy target with the aim of integrating 2×10^{20} pot in 5 years. A dedicated detector downstream the target will allow to probe a variety of models with light long-lived exotic particles and masses below a few GeV/c^2. Another dedicated detector will allow the study of neutrino cross-sections and angular distributions, and it will be the focus of the talk. ν_τ deep inelastic scattering cross sections will be measured with a statistics 1000 times larger than currently available, with the extraction of the F_4 and F_5 structure functions, never measured so far and allow for new tests of lepton non-universality with sensitivity to BSM physics. Moreover, ν_τ's will be distinguished from $\bar{\nu}_\tau$'s, thus providing the first observation of the $\bar{\nu}_\tau$. With ν_μ scattering it will be possible to reduce by about 50\% the current uncertainty on the strange content of the nucleon in the range of the x variable between 0.05 and 0.3, complementary to LHC measurements. Eventually, it will be possible to improve existing limits on dark photons decaying into dark matter particles, with the elastic scattering of these ones on electrons. The detector will be based on several techniques developed for the OPERA experiment at LNGS.

Primary author: Dr BONIVENTO, walter (infn)

Presenter: BUONAURA, Ahnnarita (University of Naples)

Session Classification: WG7 Future Experiments

Track Classification: Future Experiments