T 32: Neutrinophysik mit Beschleunigern

Zeit: Mittwoch 16:45–17:50 Raum: WIL-C107

Gruppenbericht T 32.1 Mi 16:45 WIL-C107

The OPERA Experiment - Neutrino Oscillation Search — •Annika Hollnagel for the OPERA-Hamburg-Collaboration — Universität Hamburg, Institut für Experimentalphysik

The primary goal of the OPERA long-baseline neutrino oscillation experiment is the first direct detection of $\nu_\mu \rightarrow \nu_\tau$ oscillations.

The hybrid OPERA detector consists of a large-mass target made from lead and photo emulsions - providing micrometric resolution - and electronic detector parts for online readout. It is located in the LNGS underground laboratory, at a distance of 730km from the SPS at CERN, where the CNGS ν_μ beam is produced. The measurement of ν_τ appearance relies on the detection of the decay of τ leptons which are created in ν_τ charged current reactions. Data acquisition lasted from 2008 to 2012, and numerous beam-induced events have been recorded.

In this talk, the current status of the neutrino oscillation analysis will be presented.

T 32.2 Mi 17:05 WIL-C107

Long-baseline neutrino beam for the LENA detector — •Marta Meloni and Achim Stahl — RWTH Aachen University, Germany

LENA stands for Low Energy Neutrino Astronomy; despite its name this future liquid scintillator detector is also a useful tool for neutrino physics at GeV energies and is suitable as a far detector for a long baseline neutrino beam experiment. Possible perspectives of such an experiment are the determination of the neutrino mass hierarchy and the measurement of the CP-violating phase δ_{CP}, depending on the baseline. Several locations are currently discussed for the choice of the detector site, one of the most favorable being a mine in Pyhäsalmi, Finland. This talk will focus on the geometrical properties and discovery potential of a possible neutrino beam from the Swedish facility ESS in Lund to the LENA detector, assumed to be situated in the Pyhäsalmi mine at a distance of 1134.7 km.

T 32.3 Mi 17:20 WIL-C107

Analyse von ND280-Daten im Bezug auf im FSI-Matching — •Lukas Flötotto, Karim Laihem, Stefan Roth, Achim Stahl, Jochen Steinmann und Dennis Terhorst — III. Physikalisches Institut B, RWTH Aachen

Um die Zusammensetzung des Neutrinostrahls im T2K-Experiment zu bestimmen, wird dieser in 280 m Abstand vom Target mit dem Nahdetektor ND280 untersucht. In der Monte-Carlo-Simulation wird zunächst die Wechselwirkung von Neutrinos mit Nukleonen simuliert. Zusätzlich werden Prozesse behandelt, die dazu führen, dass der Endzustand zwischen der Kollision mit einem Nukleon und dem Verlassen des Kerns sich verändert. So können neue Endprodukte entstehen bzw. eigentlich entstandene Endprodukte den Kern gar nicht verlassen. Dieser Vorgang wird Final State Interaction (FSI) genannt.

Um die Genauigkeit des FSI-Matchings zu testen, wird ein Vergleich der Daten des ND280-Detektors mit der Monte-Carlo-Simulation durchgeführt. Hierbei werden Variablen der Endzustände gesucht, die einen Hinweis liefern, ob der Endzustand bezüglich der FSI korrekt simuliert wird.

Der Vortrag soll einen Statusbericht dieser Analyse liefern.

T 32.4 Mi 17:35 WIL-C107

Background simulation study for deep underground cavities — •Matteo Palermo for the GeDet-Collaboration — Max-Planck-Institut fuer Physik, Muenchen

Underground cavities are the location of choice for low background experiments. Nevertheless, the hadronic showers created by muons or neutrinos which penetrate deep into the Earth create radiation, even inside the deepest cavity. The showers do not have to originate inside the cavity. The minimum distance, up to which muons have to be considered as "dangerous", is investigated. Moreover, the overall shower behavior and its single components, especially the neutral component, are studied. This is done by simulating the hadronic showers according with an energy spectrum expected from muons deep underground.