Seminarium Studium Doktoranckiego NCBJ

Thursday, 29 October, 9:00

Speaker:
Maitrayee Mandal (Studium Doktoranckie NCBJ)

Title:
Improving the Tau Appearance Study in Atmospheric Neutrinos with Neutron Capture Information at the Super-Kamiokande Experiment

Abstract:

The Super-Kamiokande (SK) experiment is dedicated to the detection and understanding of neutrino physics. Currently, few experiments constrain the tau neutrino sector and therefore, improving the detection of the appearance of tau neutrinos in atmospheric neutrino flux at SK is an interesting problem. To identify the tau signal from the background, a neural network is utilised at SK. The predominant background consists of neutral current interactions of neutrinos of all flavors. Lesser neutron captures per event are expected in case of the tau signal than in the predominant background, however the present neural network does not include an input of neutron capture information. The recent SK-Gd upgrade will result in 90% of the neutrons produced in the detector being detected and recognised. In the presented study, we show that adding a new input corresponding to the number of neutron captures per event allows for better classification of the tau-signal. We also observe a positive correlation of initial kinetic energy of the event with the separation of signal and background due to neutron captures.