

Abstract

The monography summarizes the current knowledge about standard and non-standard neutrino oscillations involving tau neutrinos, with special emphasis placed on the results from the MINOS (Main Injector Neutrino Oscillation Search) and MINOS+ experiments. Since the experimental discovery of neutrino oscillations, awarded the Nobel Prize in Physics in the year 2015, this phenomenon has been studied by many experiments. However, appearance of tau neutrinos originating from oscillations is one of the least known areas of neutrino field. Their detection is experimentally challenging due to the short lifetime of τ lepton produced in the interactions of ν_τ . The experimental methods developed for searching for interactions of tau neutrinos and experimental results concerning appearance of tau neutrinos are comprehensively reviewed. In addition to the processes known from the standard oscillation model, the searches of mixing of ν_τ with sterile states that can lead to the anomalous production of tau neutrinos are also presented. Particularly important part is devoted to the description of developed analysis methods and results obtained in the MINOS+ experiment. The monography ends with the discussion of future perspectives for the study of standard and anomalous appearance of tau neutrinos.