

STUDY OF TAGGED NEUTRINO BEAM CHARACTERISTICS AT THE U-70 ACCELERATOR

Friday, 15 July 2022 12:30 (20 minutes)

In accelerator-based neutrino experiments, the momentum of an interacting neutrino is known with poor accuracy. The type of neutrino interacting in the detector is not known definitely also.

These problems could be solved by using tagged neutrino beams. The idea of tagged neutrino beams is that, simultaneously, with the registration of neutrino interaction, a special tagging station measures the momentum of the parent particle, as well as the momenta of other charged particles from its decay. Based on the reconstruction of the $\pi(K)^\pm \rightarrow \mu^\pm \mu(\mu)$ or $Ke3$ decays kinematics of parent particles from measured data it is possible to reconstruct the momentum and the type of a produced neutrino with a high accuracy [1, 2].

One of the problems that arise when constructing of tagged neutrino beams is how to relate the neutrino interaction to the corresponding parent particle decay. For this, both temporal and spatial referencing of events registered in the neutrino detector and in the tagging station detectors are used.

In this paper, we describe a technique for the tagged neutrino production from $\pi^\pm \rightarrow \mu^\pm \mu(\mu)$ decays at the U-70 (Protvino) accelerator channel. The calculated characteristics of the channel for the formation of a beam of parent particles π^\pm are presented. Various options of the tagging station design are considered. The main characteristics of the obtained tagged neutrino beams are presented.

1. A. A. Boikov et al., Preprint IHEP 80-156 (1980).
2. A. A. Boikov et al., Preprint IHEP 80-158 (1980).

The speaker is a student or young scientist

No

Section

1. Neutrino physics and nuclear astrophysics

Primary author: Dr SOKOLOV, A. A.

Presenter: Dr SOKOLOV, A. A.

Session Classification: Experimental and theoretical studies of nuclear reactions