Contribution ID : **309** Type : **Poster**

THE PRINCIPLES OF NEUTRINO SOURCE CREATION ON THE BASE OF LITHIUM. THE VARIANTS OF REALIZATIONS (REVIEW)

Monday, 22 October 2018 15:40 (150)

The 8Li is neutron rich short living isotope (T1/2 = 0.84 s) with hard antineutrino spectrum (Emax= 13 MeV and averaged - 6.5 MeV). Powerful 8Li-antineutrino source can be realized on the base of (n,gamma)-activation of 7Li isotope and subsequent beta-decay. The source is a prime perspective owing to the hard antineutrino spectrum as cross section of neutrino depends at the considered energy proportional to squared energy and rate of the neutrino interactions will increase strongly.

Different neutron sources can be utilized for lithium activation [1-3]. It can be the high-flux nuclear reactors (in a stationary mode) enclosed by lithium blanket-converter (i.e., the neutrino factory in a static regime of operation). The advantages of 8Li antineutrino spectrum will be more fully utilized in the scheme with pulse reactors, when antineutrino flux from beta-decay of fission isotopes will be separated in time from neutrino of 8Li decay. Another perspective regime is dynamical one, when an activated 7Li is pumped in the close cycle through the active zone of the reactor and further is delivered close to the neutrino detector. Today significant activity directed to creation of the neutrino factory based on the tandem of lithium blanket plus an accelerator and neutron generating target [4-5].

It was calculated the efficiency (number of 8Li isotopes per neutron of the neutron source) of such an installations. It was considered the geometries of lithium blankets. Different types of blanket matter were considered: the pure lithium in the metallic state and lithium chemical compounds. The most preferable is the D2O-solution of LiOD, which allows to decrease the requirements in mass of high purified 7Li isotope from tens to about three hundreds times [5-7]. It was considered the neutron yield from targets (W, Pb) of the neutrino factory in the “tandem” scheme of proton accelerator (with energy of several hundreds MeV’s) and the expected efficiency of the lithium blanket were obtained. The conception of the proposed lithium source in the “tandem” scheme [8] is included today to the project of the powerful source and proposed for neutrino investigations [4]. It was considered the advantages ensured by 8Li source for neutrino experiments.

Primary author(s) : LYASHUK, Vladimir; Prof. LUTOSTANSKY, Yury (National Research Center ”Kurchatov Institute”, Moscow, 123182, Russia)

Presenter(s) : LYASHUK, Vladimir

Session Classification : Poster session and coffee-buffet

Track Classification : Facilities and advanced detector technologies