Contribution ID: **28**   Type: **Talk**

HIGH-INTENSITY PULSED NEUTRON SOURCE "NEPTUNE"(IBR-3)

Monday, 2 September 2019 11:40 (30 minutes)

In the course of one third of centure (since 1984) the IBR-2 reactor has been and still is one of the most intense high-flux source of thermal neutrons in the world for the investigations on extracted beams, providing for the peak density of the neutron flux on the surface of moderators 6x10ˆ15 n/cmˆ2/s and for the time average neutron flux up to 10ˆ13 n/cmˆ2/s. However, service life of the IBR-2 is expected to end in 2034 ÷ 2037. Modern science requires neutron fluxes of one order of magnitude higher. Progress in the technics of spallation neutron sources gave opportunity where the peak fluxes of neutrons approximate to 10ˆ16 n/cmˆ2/s, and the average time ones –to 10ˆ14 n/cmˆ2/s.
In the research studies of FLNP JINR specialists it has been shown that pulsed sources of slow neutrons based on the fission reaction may be competitive with spallation neutron sources and even significantly (by an order of magnitude) exceed them in peak slow-neutron fluxes. Such facility considered to be in principally pulsed fast reactor as its predecessors IBR, IBR-30 and IBR-2 but higher power (10 MW) and with a reactor core based on fissionable isotope neptunium-237.
When being realized, NEPTUNE (IBR-3) will preserve leading position among world neutron facilities for research on extracted neutron beams such as high current linear proton accelerators. Peak neutron flux density expected to be near 10ˆ17 n/cmˆ2/s and time averaged thermal neutron flux 10ˆ14 n/cmˆ2/s. Duration of thermal neutron pulse 250 - 300 μs is consistent to high degree with experimental needs of neutron spectroscopy physics that use more and more cold moderators and long wave neutrons.

Poster back-up

No

Primary authors: Dr KULIKOV, Sergey (Joint Institute for Nuclear Research); AKSENOV, Viktor (Joint Institute for Nuclear Research); Dr SHABALIN, Eugeny (Joint Institute for Nuclear Research); Dr SHVECOV, Valery (Joint Institute for Nuclear Research)

Presenter: Dr KULIKOV, Sergey (Joint Institute for Nuclear Research)

Session Classification: Talks

Track Classification: Neutron Production