Contribution ID: **92** Type: **Oral talk (15 min + 5 min questions)**

LUE-200 ACCELERATOR – THE DRIVER OF THE PULSE RESONANCE NEUTRON SOURCE IREN

Friday, 15 July 2022 12:10 (20 minutes)

The linear electron accelerator LUE-200 was designed and built at the Joint Institute for Nuclear Research (Dubna) as a driver for a booster-type neutron source with a multiplying target - an active zone with an integral neutron yield of ⊠ 1014 s-1, which determines the energy and power of the accelerated particle beam. The accelerator was designed and put into operation in stages. In 2009 - 2010 the physical start-up of the IREN installation was carried out as part of the first stage of the accelerator with a non-multiplying target (electron gun, one accelerating section, one klystron, one modulator). The first stage of the accelerator worked for the experiment for several thousand hours at a cycle frequency of 10 - 25 Hz with a beam current of 1.5 - 2.0 A, a duration of ⊠ 100 ns and an energy of 30 - 35 MeV (spectrum maximum). In 2016, the second accelerating section was installed and launched (+ the 2nd klystron with a modulator). As a result of the launch of the second stage of the accelerator (2016–2019), an increase in the energy of accelerated electrons up to 70 MeV was achieved, with an average electron beam power of up to 0.6 kW at a cycle frequency of 25–50 Hz.
The problems of achieving the design parameters of the accelerator and the possibility of the accelerator developing as a neutron source driver without a breeding core are considered. The plans for the development of the accelerator provide for an increase in the cyclicity of the accelerator to 100 - 120 Hz and an increase in the beam power to 1.5 kW, which will make it possible to obtain an integral neutron yield from a non-multiplying W target up to 3·1012 s-1.

The speaker is a student or young scientist

No

Section

1. Design and development of charged particle accelerators and ionizing radiation sources

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Session Classification: Design and development of charged particle accelerators and ionizing radiation sources