

## **Neutron Generation Using a Beam of Relativistic Electrons. Development of Methods for Measuring Neutron Fields with High Spatial Resolution**

**Dmitry Korovkin, Anton Baldin, Veronika Bleko, Vitold Bleko, Sergey Chetverikov,  
Vladimir Glagolev, Pavel Kharyuzov, Valery Kobets, Andrey Safonov**

PO

[Joint Institute for Nuclear Research, Dubna, Russia](#)

The results of testing a neutron generation setup using beams of relativistic electrons at the LINAC-200 accelerator are presented. The setup is designed for testing neutron detectors with a specified energy in the range from 10 keV up to 18 MeV, using the time-of-flight (TOF) method for momentum determination. LINAC-200 is a linear electron accelerator with an energy range of 5-200 MeV, pulsed current from a few electrons per bunch up to 80 mA, and a maximum average current of 5  $\mu$ A. Neutrons were generated using Pb, W, Be, and Fe targets.

To measure the neutron time-of-flight, scintillation detectors and a TOF system with FEU-87 photomultiplier tubes and "TOPAZ" photomultipliers based on microchannel plates (MCP) were used. A time resolution of 80 ps was achieved over a 15-meter flight path.

As part of the development of a neutron radiography research program within the FLAP collaboration, a new type of detector was developed and tested. The detector includes a  $^{10}\text{B}$  radiator, a detection system based on a chevron MCP stack, and a phosphor screen. The image is recorded by a high-resolution optical camera.