

Report of the Reviewer on the project "Development of an inelastic neutron scattering spectrometer in inverse geometry at the IBR-2 reactor" in the framework of the theme "Investigations of Functional Materials and Nanosystems by Neutron Scattering Methods"

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Neutron scattering is a unique method for studying the properties of condensed matter. They have a number of properties that make them an irreplaceable tool in these studies. Neutrons can excite atomic vibrations or activate stochastic motions via energy and momentum exchange during inelastic scattering.

FLNP JINR has a huge tradition and experience in conducting studies of Inelastic Neutron Scattering. Currently, there are many researchers in FLNP who carry out this kind of measurements. Unfortunately, the equipment base is outdated and does not meet the requirements and expectations of the scientific community, which limits the highest level of research.

The reviewed project concerns the construction of a new neutron inelastic neutron scattering spectrometer in inverse geometry. Earlier experiments with this type of spectrometers such as KD-SOG and NERA have shown that these research devices are perfect for working with pulsed neutron source.

According to the authors of the project, the use of modern neutron optics and the location of the spectrometer at a distance of about 105 meters from the neutron source will ensure high resolution, excellent signal-to-noise ratio, which will allow testing of samples of small size. The estimated parameters of the new spectrometer are one or two orders of magnitude (depending on the parameter) better compared to the parameters currently present in NERA spectrometer.

I believe that a spectrometer with such parameters will be competitive with similar devices already existing in leading European neutron laboratories (Institut Laue-Langevin, ISIS Neutron and Muon Source). The emergence of such a spectrometer will contribute to raising the level of neutron scattering research conducted at FLNP, will definitely expand their scope and increase the number of scientists conducting this type of research both from JINR member countries and from around the world.

Based on above, I definitely recommend to endorse the opening of the new project "Development of an inelastic neutron scattering spectrometer in inverse geometry at the IBR-2 reactor" in the framework of the theme "Investigations of Functional Materials and Nanosystems by Neutron Scattering Methods" for a period of 3 years starting from 2021.

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