

HIGH-PRESSURE NEUTRON AND X-RAY DIFFRACTION FACILITIES AT FLNP JINR: CAPABILITIES AND APPLICATIONS

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Structural studies of condensed matter under extreme conditions are a key research area at the Frank Laboratory of Neutron Physics, JINR. High pressure serves as a precise tool for tuning interatomic distances and lattice configurations, enabling a direct probe into the fundamental links between crystal/magnetic structures and physical properties.

This work presents the experimental capabilities of the DN-12 and DN-6 diffractometers at the IBR-2 pulsed reactor, which are optimized for high-pressure neutron diffraction using various high-pressure cells, including diamond anvil cells (DAC). To complement these studies, the laboratory utilizes a high-brightness Xeuss 3.0 X-ray source, specifically configured for small-sample diffraction in DAC environments. We describe the design features, technical parameters, and a unified experimental approach for conducting comprehensive neutron and X-ray diffraction studies under extreme pressure, supported by recent experimental results.