CREMLIN PLUS
Connecting Russian and European Measures for Large-scale Research Infrastructures

Joint Institute for Nuclear Research - IBR-2 REACTOR

Frank Laboratory of Neutron Physics is one of the laboratories of the Joint Institute for Nuclear Research (Dubna, Russia) that investigates the neutron as an elementary particle using various instruments, and employs the neutron as an instrument to investigate the structure and dynamics of condensed matter, including crystals and nanosystems, functional materials, complex liquids and polymers, rocks, etc. so that relative findings could find application in molecular biology and pharmacology, engineering diagnostics and in other fields of science and technology.

IBR-2 is a pulsed fast reactor of periodic operation. Ist unique technical approach produces one of the most intense neutron fluxes at the moderator surface among the world's reactors: ~10^{16}/cm^2/s, with a power of 1850 MW in pulse. Its main difference from other reactors consists in mechanical reactivity modulation by a movable reflector. The movable reflector is a complex mechanical system providing reliable operation of two parts, which determine the reactivity modulation: the main movable reflector and the auxiliary movable reflector. The rotors of the main and auxiliary movable reflectors rotate in opposite directions with different velocities. When both reflectors coincide near the reactor core, a power pulse is generated.

IBR-2 reactor includes a total of 19 facilities: 17 are for condensed matter investigation (neutron scattering, radiation hardness tests and instrumental neutron activation analysis) and 2 for nuclear neutron physics investigations. A user program is established for 14 facilities.

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Instruments:	Domain and object of research : ENE
DIN-2PI	A study of lattice dynamics of crystalline, amorphous materials and liquids.
YuMO	Determination of structural characteristics (size and shape of particles, agglomerates, pores, fractals) of nanostructured materials and nanosystems, including polymers, lipid membranes, proteins, solvents, etc.
HRFD	Determination of structural parameters of crystalline materials with high precision.
RTD	Determination of structural parameters of crystalline materials and nanosystems (lipid membranes, etc), real-time studies of chemical and physical processes.
DN-6	Determination of parameters of crystal and magnetic structure of materials as function of external pressures.
EPSILON	In situ studies of macro- and microstresses in rocks.
SKAT	Studies of texture of geological samples (rocks, minerals).
NERA	A study of lattice dynamics and structural parameters of molecular crystals, crystals with molecular ions, especially exhibiting polymorphism.
REMUR	Determination of magnetization profile of layered magnetic nanostructures, studies of proximity effects in nanosystems.
REFLEX	Determination of structural characteristics of thin films and layered nanostructures.
GRAINS	Studies of surface and interface phenomena in soft and liquid nanosystems (magnetic fluids, polymers, lipid membranes).
FSD	Determination of residual stresses in bulk industrial components and new advanced materials.
DN-12	Determination of parameters of crystal and magnetic structure of materials as function of external pressures.
REGATA	Neutron activation analysis for environmental, heritage and material science studies