

BUDKER INSTITUTE OF NUCLEAR PHYSICS (BUDKER INP) - SIBERIAN SYNCHROTRON AND TERAHERTZ RADIATION CENTRE (SSTRC)

BUDKER INSTITUTE OF NUCLEAR PHYSICS of the Siberian Branch of the RAS is the largest Russian academic institute, one of the world's leading research centers in the field of particle physics, accelerator physics and technology, synchrotron radiation sources, free-electron lasers, high-temperature plasma physics, and controlled thermonuclear fusion. Some ideas and developments that determine the state-of-the-art accelerator science and technology were proposed and implemented at the Budker INP.

At the present time **the Siberian Synchrotron and Terahertz Radiation Center** is one of two Russian synchrotron radiation (SR) research centers.

The SSTRC provides users with access to the most popular synchrotron radiation applications and research techniques including the unique ones in the world. Most of the SSTRC activities is devoted to developing original approaches for synchrotron radiation usage. The center uses two SR source: VEPP-3 storage ring (beam energy 2 GeV) and electron-positron collider VEPP-4M (beam energy 1.9 – 4.5 GeV).

The center makes available specialized instrumentation for the work with synchrotron and terahertz radiation beams; magnetic elements for accelerators and storage rings; superconducting insertion devices, the new light source for SSTRC.



SSTRC

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Instruments:	Domain and object of research :
„Cosmos“ beamline	Soft X-ray and VUV metrology in 10-2000 eV range
Hard X-ray imaging beamline	Phase contrast microscopy, microtomography, micro-beams radiation cancer therapy, hard X-ray fluorescence analysis (photons energy range 40 – 100 keV)
Fast dynamic processes and extreme state of matter	Explosive and energetic materials, detonation and shock-waves processes, equations of the state on matter, nanosecond time resolution
Plasma beamline	Material for thermonuclear reactors, the degradation of the material in the case of intense pulse loads
LIGA-technology and X-ray lithography beamline	Technological applications of the X-ray lithography and galvanoplastic. Fabrication of the micromechanical devices.
Subnanosecond diagnostics	Explosive and energetic materials, detonation and shock-waves processes.
Anomalous scattering	Precise diffraction researches of the functional materials.
X-ray fluorescence analysis	Scanning high sensitive analysis of the elemental composition of the different samples
High pressure diffraction	Phase state researches of the matter under ultrahigh pressures and temperatures
X-ray microscopy and microtomography	X-ray microimaging of weak contrast objects
Small angle scattering and time resolved diffraction	Small angle X-ray scattering and diffraction researches physical and chemical processes with milliseconds resolution
Time resolved luminescence	Picosecond scale researches of the scintillators and phosphorus
Precise diffraction	Complex <i>in-situ</i> analysis of the catalysts and catalytic reactions and processes
XAFS-spectroscopy	EXAFS and XANES analysis for catalysts chemistry