

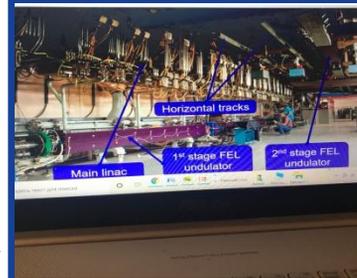
**BUDKER INSTITUTE OF NUCLEAR PHYSICS (BUDKER INP) -
NOVOSIBIRSK FREE ELECTRON LASER, TERAHERTZ
RANGE (NOVOFEL)**



BUDKER INSTITUTE OF NUCLEAR PHYSICS (Budker INP) 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 BINP. The BINP now employs over 3000 people, and hosts several research groups and facilities.

The Novosibirsk high-power terahertz free electron laser (**NOVOFEL**) is a major user facility of the Siberian Center for Synchrotron and Terahertz Radiation. The average power of the FEL radiation is the largest in the world and apparently will remain such in the near future. As concerns the spectral emissive power, the Novosibirsk FEL overmatches all the other sources in the world by several orders of magnitude. This enables conduction of unique, having no analogues in the world, experiments using terahertz radiation.

The NOVOFEL facility has been in operation for users of terahertz radiation since 2004.



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Instruments:

Domain and object of research: PSE

Name of the instrument or the technique used	Brief description of the Instrument or of the technique used
<p>The Novosibirsk high-power terahertz free electron laser (NOVOFEL)</p>	<p>The NOVOFEL facility has three FELs installed on the first, second, and fourth orbits of the multiturn energy recovery linac (ERL).</p> <p>The 1-st FEL covers the 90–340 μm range of wavelengths at an average radiation power of 0.5 kW with a pulse repetition rate of 5.6 or 11.2 MHz and a peak power of 1MW.</p> <p>The 2-nd FEL operates in the 35–80 μm range of wavelengths at an average radiation power of 0.5 kW with a pulse-repetition rate of 7.5 MHz and a peak power of around 1 MW. These two FELs are the world’s most powerful (in terms of average power) sources of coherent narrow-band (less than 1%) radiation in their wavelength ranges.</p> <p>The 3-d FEL was commissioned in 2015 to cover the 5–20 μm range of wavelengths.</p> <p>The Novosibirsk ERL is the world’s first and only multiturn ERL. Its distinctive features include a normally-conductive 180 MHz accelerating system, a direct current (DC) electrostatic electron gun with a control grid and thermionic cathode, three operating modes of the magnetic system, and a compact (6 × 40 m) design.</p> <p>All 3 laser systems of the NOVOFEL facility are now in operation ($\lambda = 8-10, 37-50, 90-340 \mu\text{m}$).</p> <p>11 workstations are in operation and more 2 are under construction. All workstations are well equipped with instrumentation which is available to users. The facility is open to all interested potential users without regard to nationality or institutional affiliation. The facility provides resources sufficient for users to conduct work safely and efficiently.</p> <p>User fees are not charged for work if an agreement on scientific collaboration between Budker INP and user’s institution is signed.</p>