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Measurement of the longitudinal beam size at the Novosibirsk FEL

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The Novosibirsk Free Electron Laser (NovoFEL) facility consists of three free electron lasers (FELs) installed on different tracks of the Energy Recovery Linac (ERL). These FELs share a common acceleration system, which allows for the generation of high average electron currents, typically around 10 mA. This high current facilitates the production of significant average FEL powers, often exceeding 100 watts in the spectral range between THz and mid-infrared wavelengths. Precise measurement of electron beam parameters is crucial for monitoring the performance of the accelerator and fine-tuning its operating modes. The length of the electron bunch is particularly important, as it directly influences the efficiency of laser radiation generation. This study focuses on the dependence of the electron bunch length on the parameters of the radio frequency (RF) and bunching systems for the first and second FELs at NovoFEL. Measurements were conducted using a Cherenkov aerogel radiator in conjunction with a streak camera to accurately determine the electron beam properties. The measurement results, along with a plan for future experiments, are discussed in detail in this publication.

Footnotes

Funding Agency

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Yes

Primary author: BORIN, Vladislav (Budker Institute of Nuclear Physics)

Co-authors: VINOKUROV, Nikolay (Russian Academy of Sciences); MESHKOV, Oleg (Budker Institute of Nuclear Physics); SHEVCHENKO, Oleg (Russian Academy of Sciences); REVA, Stanislav (Budker Institute of Nuclear Physics SB RAS & Novosibirsk State University); KUBAREV, Vitaly (Novosibirsk State University)

Presenter: BORIN, Vladislav (Budker Institute of Nuclear Physics)

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