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## Autocorrelator for measuring the duration of the NovoFEL laser pulse

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The Novosibirsk Free Electron Laser (NovoFEL) is a powerful source of narrow-band terahertz and infrared radiation, operating at the Institute of Nuclear Physics of the Siberian Branch of the Russian Academy of Sciences (INP SB RAS). It is based on an accelerator-recuperator system and is one of the main user facilities of the Siberian Synchrotron and Terahertz Radiation Center. In recent years, there has been active work to develop new diagnostics for measuring the parameters of the electron beam in the third stage of the NovoFEL. The laser generates pulses of radiation with picosecond durations in the mid-infrared range of 8-12 micrometers that is the challenge for the diagnostics. This paper describes the development of diagnostic systems for the spectral and temporal characteristics of laser radiation from the third stage of the NovoFEL facility. To record the radiation spectra, a diffraction monochromator was used in conjunction with a bolometric array as a detector. A nonlinear autocorrelator based on ZnGeP<sub>2</sub> crystal was developed to measure the temporal profile of the radiation. The correct operation of the autocorrelator was demonstrated in experiments with YAG laser radiation acquired using a nonlinear  $\beta$ -BaB<sub>2</sub>O<sub>4</sub> crystal. The paper presents results from measurements of the spectrum and autocorrelation function for laser radiation from the third stage of the NovoFEL. Self-consistency between the spectrum and autocorrelation functions is demonstrated.

### Footnotes

### Funding Agency

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Yes

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