

## Annotation for bachelor's work

### "Spatial-temporal dynamics of sub-petawatt laser pulses"

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The goal of this diploma is to prepare for an experimental study of the temporary self-compression of subpetawatt laser pulses in a low-pressure gas. The possibility to control the phase spectrum of the amplified laser pulses was studied at the National Research Center "Kurchatov Institute" for that purpose. Transform limited 25 femtosecond pulses were obtained, the spectral broadening of laser radiation after filamentation was studied versus the duration and chirp of the incoming pulse.

During the first test experiment with a pulse energy of 2 mJ, the spatial and temporal characteristics of the filament were measured: the initial width of the spectrum 40 nm broadened to 140 nm (FWHM), the filament length was about 15 cm, peak intensity inside the filament  $3 \cdot 10^{12}$  W/cm<sup>2</sup>, the measured minimal diameter was less than 1 mm.

The obtained skills and experimental results will be used for further studies of the filamentation process in a low pressure gas. For that purpose a vacuum line of 2.5 meter length was designed, manufactured and tested.