Abstract for Bachelor's Thesis

«Induced Raman mechanism of contrast degradation during chirped pulse amplification in titanium-doped sapphire crystal»

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In this study the possibility of pre- and post-pulses formation with amplification in a CPA system on a titanium-doped sapphire crystal due to stimulated Raman scattering in an amplifier was experimentally and theoretically investigated.

Numerical simulation shows that in case Stokes radiation originates from amplified spontaneous emission of the previous amplifier stage, the contrast ratio before the compressor can be 10^{-7} for a pulse with intensity of 10^{10} W/cm^2.

The temporal beam profile of the Stokes and anti-Stokes pulses formed in the compression of amplified radiation was theoretically studied. It is shown that the Stokes component corresponds to the post-pulse, and the anti-Stokes component corresponds to the pre-pulse. The duration of Stokes and anti-Stokes pulses constitute tens of durations of the main pulse.

The experimental set-up for Stokes radiation detection was assembled. Preliminary experiments on registration of Stokes radiation were conducted.