

HiLASE Centre is pleased to invite you to attend the seminar:

## Pulse compression results with Perla C

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Laser systems with a high pulse energy and high average output power are typically based on chirped pulse amplification technique (CPA). Perla C in our laboratory is a CPA system with parameters of up to 500 W of average output power and 89 kHz. Compressors are an essential part of these systems whose aim is to shorten the amplified laser pulses close to their transform limit. Development of CPA system requires a suitable compressor which will not affect output beam parameters.

During the development of the compressor for Perla C, two different types of compressors were tested in detail. For this reason, Perla C has currently two possibilities how to compress laser pulses. Chirped Volume Bragg grating (CVBG), a piece of glass with a Bragg grating with a linearly changing period incised in it, is the first option. This robust and space-saving device could be a good choice for CPA laser systems. However, due to thermal effects which are caused by high-power laser beam, the quality of the beam diffracted by the CVBG deteriorates. Moreover, CVBG is strongly affected by any mechanical stress. At a full tested incidence power of 270 W, the quality of the beam, represented by the  $M^2$  parameter, reaches almost 4.5 (compared to 1.5 before compression) with pulse duration higher than 2.3 ps and 80% diffraction efficiency. In an effort to improve the output of the laser system, compressor based on dielectric transmission diffraction gratings was developed. It exhibits almost ideal parameters and has only a slight influence on the compressed beam even at high-power levels. Pulse compression up to 300 W has been demonstrated, with pulse duration of 1.1 ps, extraction efficiency exceeding 96% and  $M^2$  around 1.5.

When: Thursday, **June 17, 2020 at 2 pm**

Where: Seminar room, HiLASE Centre