

POST COMPRESSION WITH SPATIALLY CHIRPED PULSE TECHNOLOGY

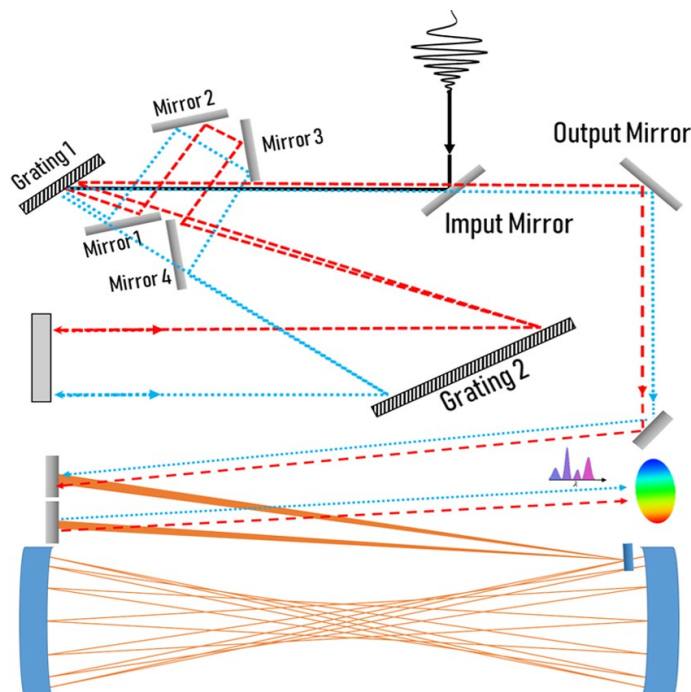
A new technique enables us to have compact multi-pass cell for pulse post compression purpose by utilizing spatially chirped pulses made with the help of pairs of mirrors in the compressor scheme. The broadening of the spatially chirped pulses in the MPC is comparable with the beam without spatial chirp.

BACKGROUND

External pulse compression with multi-pass gas cell (MPC) is a powerful technique for shortening the duration of sub-ps laser pulses. Despite its widespread usage and versatility, the MPC method faces the challenge of energy scaling compared to the geometry scale.

TECHNOLOGY

The presented work is a cost-effective method to reduce the setup size for high-energy pulses with a new compressor scheme. We propose and experimentally demonstrate the feasibility of reducing the MPC length relative to the target pulse energy with preferably increasing the beam spot sizes in one dimension by adding spatial chirp to the beam on the collimated output beam from a grating-pair pulse compressor in a fs Yb CPA system. In this case, the spatial chirp remains on the beam after the spectral broadening and pulse recompression is not critical in many applications. Focusing converts spatial chirp to angular chirp which opens up more applications, but also it is possible to remove the spatial chirp from the beam with applicable techniques and make compressed pulses.



ADVANTAGES

- Compact setup for higher energy pulses
- Control over spatial chirp of the beam
- Cheap implementations in the compressor and simple adjustable setup
- Quite stable as normal compressor scheme and broadening for post-compression

REFERENCE:

M017/2023

DEVELOPMENT STATUS:

TRL 4-5

APPLICATIONS:

Sub-ps pulse compression with mJ energy scale

KEYWORDS:

Spatially chirped pulses,
Multi-pass cell,
Spectral broadening

IPR:

AT patent application filed
PCT application filed

OPTIONS:

R&D cooperation,
Development partnership,
License agreement

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