CEO-ComDisC System

MePS + PhADIM-D + CEO-2D-800-V + FRINGER
Complete System for Phase- and Angular Dispersion Characterization of Ultrashort Pulses

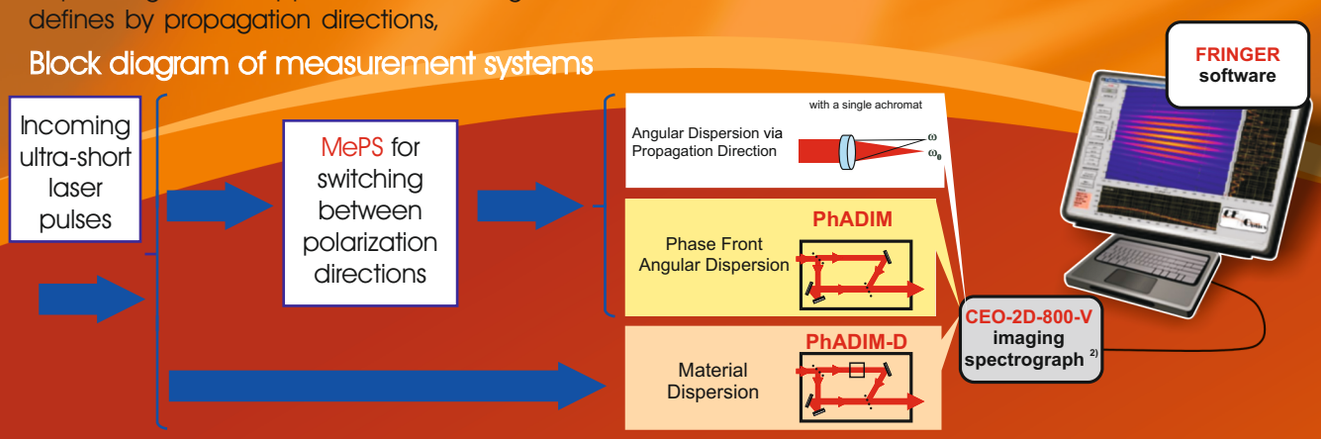
Propagation of laser pulses through any dispersive medium can cause deformation of the temporal shape of ultrashort pulses, which is detectable through their spectral phase derivatives called **group delay** (GD), **group delay dispersion** (GDD), **third and higher order dispersions** (TOD, FOD, etc.).

Spatiotemporal evolution of the pulses is more complicated if the surfaces of the media are not parallel, e.g. prisms and wedges diverts the propagation direction of different spectral components and hence spectrally disperses the beam. This effect is quantified by the angular dispersion, which has two different interpretations, depending on the approach: one defines by propagation directions, the other is by phase fronts. Difference occurs only when plane wave approximation cannot be applied.

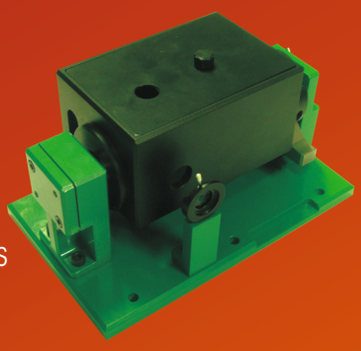
The method called **Spectrally and Spatially Resolved Interferometry** (SSRI) – which is based on a combination of a two-beam interferometer and an two-dimensional imaging spectrograph – allows us the measure the spectral phase shift of any dispersive material with extremely high accuracy. With the use of an inverted interferometer, SSRI is capable to characterize the phase front angular dispersion. Meanwhile, the propagation direction angular dispersion can be measured simply by the two-dimensional spectrograph and a single achromatic lens.

Based on these techniques, CE Optics offers a complete system for phase- and angular dispersion characterization of ultrashort pulses. **Both type of angular dispersions of ultrashort laser pulses can be determined with an extreme accuracy better than 0.1 µrad/nm and the dispersion of bulk materials and chirped mirrors also under 1% relative error.** Due to the simple realization it is easy to handle, does not require advanced skills, the alignment and measurement only take a few moments. Our devices are capable of real-time diagnostics also and independent of most pulse parameters including duration, energy, wavelength and polarization.

Block diagram of measurement systems



MePS: Mechanical Polarization Switch for easy toggle between horizontal and vertical characterizatoin of the beam



MePS

Features

- Switching between two polarization states
- Broadband UV, visible, near-IR or IR
- High-power capability
- Large aperture
- Excellent transmission
- Excellent extinction ratio
- Excellent for ultrashort pulses and extreme wavelengths

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PhADIM-D: two-beam interferometer, which is outstanding for Angular and Material Dispersion Measurement

Features

- New feature: Capable of measure of material dispersion of bulk materials (< 10 mm) and chirped mirrors (Ø1", 0° and 45°)
- All linear optical solution
- Independent of wavelength (suitable for (V)UV- (N)IR)
- Requires low input power / pulse energy
- High precision
- Real time operation
- Simple to align and operate

PhADIM-D

CEO-2D-800-V: two-dimensional imaging spectrograph with variable spectral resolution and range

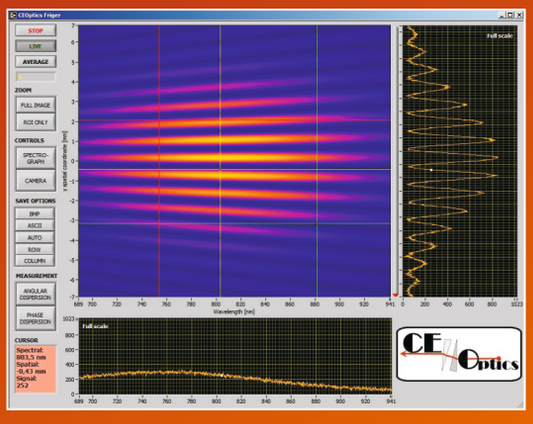
CEO-2D-800-V offers a variable wavelength range, which is inevitable when accurate spectral measurements needed for pulses with diverse bandwidths. Our device can be switched easily between three different wavelength ranges.

CEO-2D-800-V

FRINGER: powerful 2D interferogram processing software for high precision material and angular dispersion determination

Features

- Captures and evaluates interferograms
- High precision measurement of material dispersion and angular dispersions
- Triggerable
- Real time operation
- Save images in various formats
- Cross section evaluation
- Region of interest (ROI)
- Easy control of camera functions
- Requires low input laser power / pulse energy



Snapshot of Fringer

Designed for capturing and evaluation of spectrally and spatially resolved interference fringes, Fringer can measure spectral phase shift and angular dispersion of ultrashort pulses by extreme accuracy. The two-dimensional feature of the detector allows you to explore any spatial dependence along the beam diameter. Real-time evaluation of the interference patterns and triggered exposition of images are also possible with CEOptics' Fringer.

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