RhySearch
Das Forschungs- und Innovationszentrum Rheintal

GD & GDD

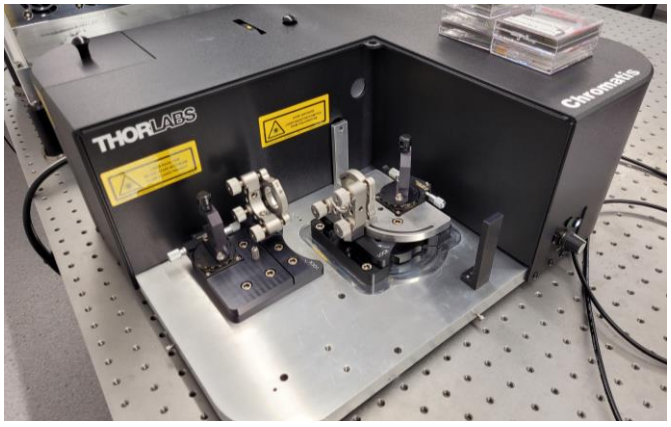
DISPERSION MEASUREMENT SYSTEM

Group delay and group delay dispersion measurements

The Chromatis dispersion measurement system from Thorlabs can measure the group delay (GD) and group delay dispersion (GDD) of optical components with high accuracy and over a broad wavelength range.

The GD of an optical element, describes the time delay a laser pulse experiences after propagation. A constant, non-zero GD means all frequencies of the laser pulse experienced the same delay. The pulse would not change its temporal shape. The GDD is the derivative of the GD with respect to the angular optical frequency and is therefore a better measure for temporal changes of a pulse. It describes how the temporal shape of a laser pulse is affected by an optical element. This is important for laser pulses in the femtosecond range. Laser optics with wrong GDD specifications will change the temporal shape of an fs laser pulse and lead to pulse broadening. Therefore, in the development of ultrafast laser optics with desired GDD specifications, it is important to be able to measure the GDD of the optic.

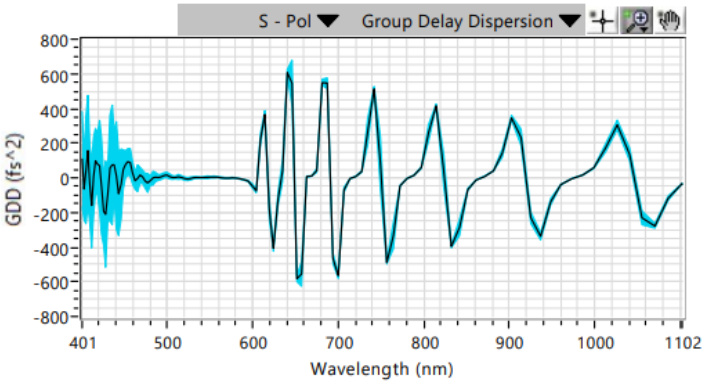
The measurement principle is based on a Michelson-interferometer, using a broadband white light source which is split along two optical paths. One path is a reference path, the other path includes the optic under test. The white light interference fringes can be measured by shifting the time delay of both paths around zero-time delay. The measured interference pattern contains information about the relative phases of both paths. From the phase of the optic, the GDD is then calculated by numerical derivatives.



Specifications
500 nm – 1600 nm
s- & p-polarization
Uncertainty: 5 fs^2

Optic Geometries
Ø1/2", Ø1"

Measurement modes
0°, 5° - 70° Reflection
0° - 70° Transmission



GDD measurement of a low GDD mirror for 532 nm

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