Ultrafast **Compressor Capabilities**

To detect weak spectra in absorption spectroscopy, a common technique utilizes multipass cells to pass light through a sample multiple times, increasing the optical path length and amplifying the absorption signal. These multipass cells, also known as Herriot cells, consist of two concave mirrors, or a concave and flat mirror, with holes that act as entrance and exit apertures through the cell (***Figure 1***). This configuration ensures a long optical path length through increased reflections while being compact and stable to small perturbations.

This multipass configuration can be customized by Edmund Optics® by applying the concept to an all-mirror pulse compressor design utilizing dispersive mirrors. This technique increases the number of reflections while utilizing only 2 mirrors. ***Figure 2*** illustrates the results of a dispersive mirror with GDD of -1,000 fs² and reflectivity of >99.9% between 1010 and 1070 nm.

Adding one or more dispersive mirrors to a multipass cell configuration is advantageous in building a compact, tunable, and alignment-free ultrafast compressor. Careful optical design of the system is necessary to obtain a high quality beam. This compact compressor can be used in a Chirped Pulse Amplification (CPA) laser system or as dispersion compensation in any ultrafast laser setup that will allow for careful control and fine tuning of the pulse duration. **Contact Edmund Optics to discuss your ultrafast compressor needs.**

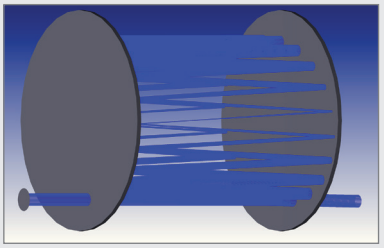

Figure 1. A scheme of a multipass cell consisting of two concave mirrors with through holes.

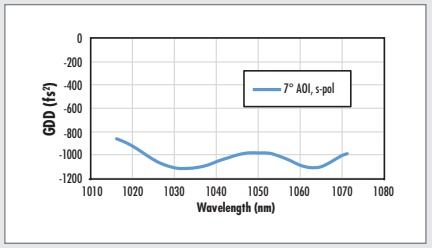

Figure 2. Measured GDD spectrum of the dispersive mirror used in the compressor cell at 7° AOI, s-pol.

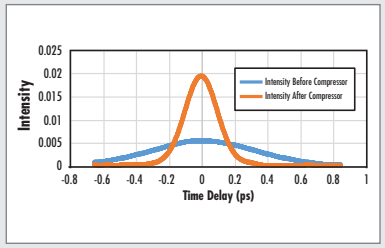

Figure 3. Autocorrelation measurement of the laser pulse duration before and after the compressor. The signal was fit using a sech² function.

Nonlinear Crystals

Dimensional Tolerance (mm): +0.0/-0.1
Thickness Tolerance (mm): +0.0/-0.1
Surface Quality: 20-10
Perpendicularity (arcmin): <5
Parallelism (arcsec): <20
Damage Threshold, Reference: 10 J/cm² @ 1064nm, 10ns, 10Hz
Surface Flatness: **BBO:** λ/8
LBO: λ/10
Configuration: **BBO:** Mounted in 25.4mm Mount
LBO: Unmounted

- **BBO Crystals for Frequency Conversion of 800nm and 1030nm Lasers**
- **LBO Crystals for Frequency Conversion of 1030nm and 1064nm Lasers**
- **High Damage Thresholds Up to 10 J/cm² @ 1064nm, 10ns, 10Hz**

Nonlinear Crystals of either β-barium borate (BBO) or lithium triborate (LBO) are used for frequency conversion of laser sources. BBO crystals feature thicknesses from 0.2mm to 0.5mm to minimize group velocity mismatch and are ideal for frequency doubling or tripling of Ti:Sapphire and Yb:doped laser pulses. The critical and noncritical phase matching LBO crystals are ideal for second or third harmonic generation of Nd:YAG and Yb:doped lasers. Nonlinear Crystals with 20-10 surface quality and λ/10 (LBO) or λ/8 (BBO) surface flatness provide the broad transparency range and large nonlinear coefficient needed for the harmonic generation of fundamental laser frequencies. Each crystal features a protective anti-reflection (AR) coating that minimizes reflection and limits fogging from ambient conditions.

BBO Nonlinear Crystals

Dimensions (mm)	Thickness (mm)	Clear Aperture (mm)	Design Wavelength (nm)	Orientation Θ/ϕ (°)	Typical Applications	Stock No.	Price
6.0 x 6.0	0.20	5.70	800	44.3/90	THG @ 800nm, Type I	#11-170	$599.00
6.0 x 6.0	0.50	5.70	800	44.3/90	THG @ 800nm, Type I	#11-168	$535.00
6.0 x 6.0	0.50	5.70	800	29.2/90	SHG @ 800nm, Type I	#11-167	$535.00
6.0 x 6.0	0.50	5.70	1030	23.4/90	SHG @ 1030nm, Type I	#11-169	$599.00
N 6.0 x 6.0	1.00	5.70	800	29.2/90	SHG @ 800nm, Type I	#15-277	$515.00
N 6.0 x 6.0	1.00	5.70	1030	23.4/90	SHG @ 1030nm, Type I	#15-278	$549.00
10.0 x 10.0	0.50	9.40	800	29.2/90	SHG @ 800nm, Type I	#11-166	$899.00

LBO Nonlinear Crystals

Dimensions (mm)	Thickness (mm)	Design Wavelength (nm)	Orientation Θ/ϕ (°)	Typical Applications	Stock No.	Price
6.0 x 6.0	0.90	1030	42.2/90	SHG @ 1030nm, Type I	#11-171	$949.00
3.0 x 3.0	10.00	1064	90/0	THG @ 1064nm, Type II	#11-174	$490.00
3.0 x 3.0	15.00	1064	90/11.6	NCPM SHG @ 1064nm, T=150°C	#11-172	$449.00
3.0 x 3.0	15.00	1064	90/13.8	SHG @ 1064nm, Type I	#11-173	$389.00