

# KALEIDOSCOPE™

## Hollow Fiber Compressor

| sub-7 fs |

| > 30 % throughput |

| sub-7 fs |

### Applications

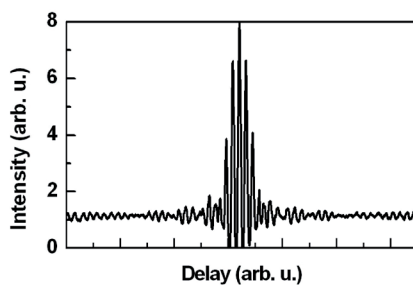
- Attoscience
- High harmonic generation
- Amplifier seeding
- Ultrafast spectroscopy
- Materials processing



Gain narrowing prevents the generation of few-cycle pulses directly from femtosecond amplifiers. Sub-35 fs pulses with energies between 0.4 mJ and 2 mJ can be efficiently spectrally broadened in noble-gas filled hollow fibers.

Increasing the coupling efficiency and minimizing the bending losses of the hollow fiber are key prerequisites for obtaining a high throughput compressor. To this end we have developed a high-precision straight V-groove fiber holder and an accurately positionable fiber chamber.

Compensation of the chirp carried by spectrally broadened pulses is achieved with an ultra broadband chirped mirror compressor resulting in near bandwidth limited sub-7 fs pulses.



*6-fs pulses obtained by compressing the output of the hollow Fiber with a broadband chirped mirror set.*

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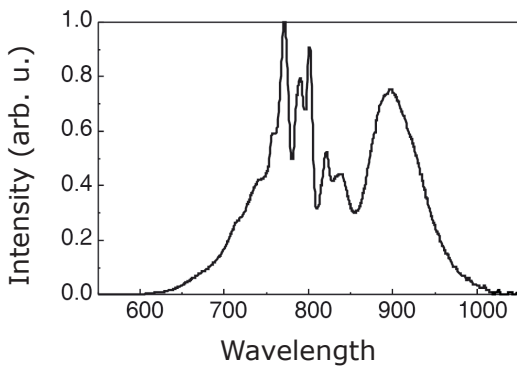
## Hollow Fiber Compressor

### Extraordinary Features

Ultrashort few cycle pulses

### Hollow Fiber Compressor

The KALEIDOSCOPE™ hollow fiber compressor consists of an hollow fiber chamber, an ultra broadband chirped mirror compressor, focusing and recollimation as well as beam steering optics incl. mounts. The hollow fiber chamber is equipped with a V-groove fiber mount, Brewster-angled input and exit windows, lateral observation window, gas inlet/outlet, mounted on two xz translational stages. The hollow fiber chamber is filled with a noble gas of given purity at a given pressure. The type of noble gas, purity and pressure will be determined by FEMTOLASERS™ prior to installation. The broadband dispersive mirror compressor consists of 5-8 mirrors including mirror mounts and posts.



Output spectrum of a hollow fiber chamber seeded with 0.8 mJ, 25-fs pulses.

### CEP stability

The stability of the CE-Phase is preserved by the compressor, provided that < 30 fs CEP-stabilized pulses are employed.

### Options

The KALEIDOSCOPE™ can be purchased as complete package including installation. The hollow fiber chamber, including 1 meter of hollow fiber, can be ordered separately. FEMTOLASERS™ also offers the ultra broadband mirror compressor set including test autocorrelation (< 7 fs) and complete characterization (GDD) as separate item.

## KALEIDOSCOPE™

Throughput (complete setup) > 30 % (at mirror compressor output)

Pulse duration (compressed) < 7 fs (FWHM)

### Hollow Fiber Chamber

Throughput (evacuated hollow fiber chamber)<sup>2)</sup> > 40 %

### Ultra Broadband Mirror Compressor

Wavelength range (HR and GDD) 620 - 900 nm (other ranges available)

Total GDD (nom.) < -180 fs<sup>2</sup> @ 800 nm (5 - 8 bounces)<sup>1)</sup>

Dimensions (set of 5 - 8 pieces)<sup>1)</sup> Diameter: 1" | Thickness: 6.35 mm | Material: BK7 or fused silica

Supported pulse duration < 7 fs

1) Depending on GDD of available mirrors

2) Beam diameter (1/e<sup>2</sup>) at fiber entrance equal to 165 +30/-10 μm, M<sup>2</sup> < 1.5 in both directions, pulse energy between 0.4 mJ and 2 mJ.

All specifications are subject to change without notice



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FEMTOLASERS' laser products are certified to comply with the Federal Regulations (21 CFR Subchapter J) as administered by Center of Devices and Radiological Health on all systems ordered for shipment after October 1, 2003.