UFI UltraFast Innovations

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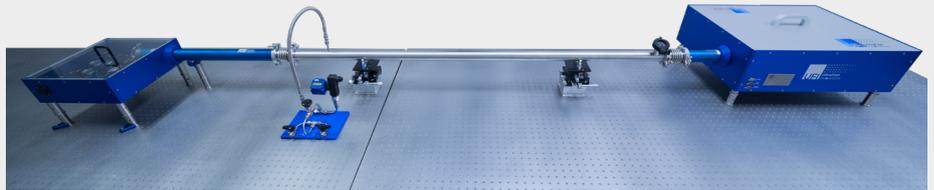
Hollow-Core Fiber Compressor
SAVANNA

SAVANNA is a hollow core fiber compressor that shortens the input pulses duration after spectral broadening. First, the spectral bandwidth is broadened by nonlinear interaction of high-energy femtosecond pulses with a noble gas inside a hollow core fiber.

The resulting supercontinuum pulses are then compressed using ultra-broadband chirped mirrors. This gives rise to 5-6 times shorter pulses since the increased spectral width supports shorter pulse durations than the original input. SAVANNA is based on our extensive expertise generating intense few-cycle pulses for attosecond research and combines high transmission with unique ultra-broadband compression. Besides pulse compression, the extremely broadband output is of interest in state-of-the-art spectroscopy experiments.

Key Product Features:

- **Input Pulse Duration:** 20 fs up to hundrets of fs
- **Input pulse energy:** 0.5-2 mJ (optimum: 1-1.5 mJ)
- **Repetition rate:** 1-10 kHz
- **Typical compression factor:** 5-6 x
- **Fiber transmission:** up to 70%
- **White light spectral bandwidth:**
  - 270-1000 nm (achievable with optimal input)
  - 400-900 nm (with commercial 25 fs laser)
- **Broadband source for spectroscopy applications**
- **Footprint:** 300 x 60 cm^2

Customization Options:

- Active beam pointing stabilization unit
- Variable spectrum selection
- Flexible dispersion management


Fiber Output Spectrum:
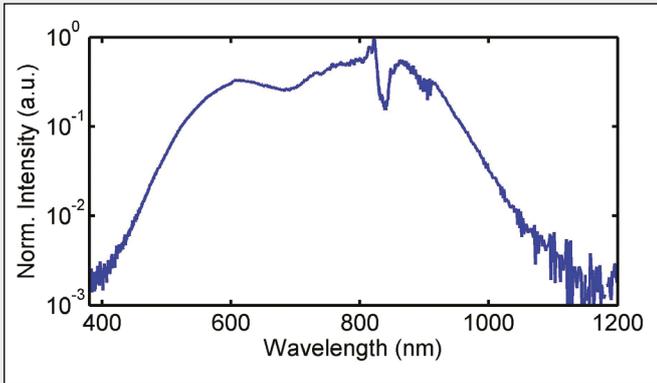
The extremely broadband fiber output spectrum (before compression) facilitates spectroscopy experiments from 400 nm up to the NIR at 1200 nm.

Ultra-broadband Chirped Mirror Technology:

Our double-angle chirped mirrors are a key component of the hollow core fiber compressor. Building on our extensive experience in ultrafast coating design, these mirrors provide unprecedented broadband compression with the proven capability to produce pulses with ‹4 fs duration. Custom solutions for specific spectral coverage and selection are available.

	SAVANNA	SAVANNA+
	PC70	PC1332
Bandwidth	500-1050 nm	450-1000 nm
Supported pulse duration	‹4 fs* [1]	‹3 fs* [2]
Reflectance per bounce	›99%	›99%
Angle of incidence	5° and 19°	5° and 19°
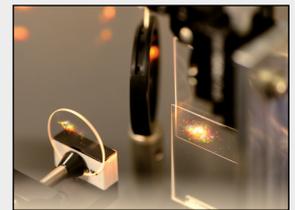
* With appropriate input spectrum.
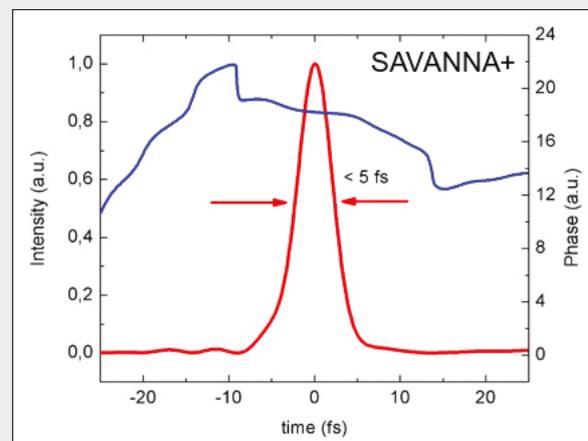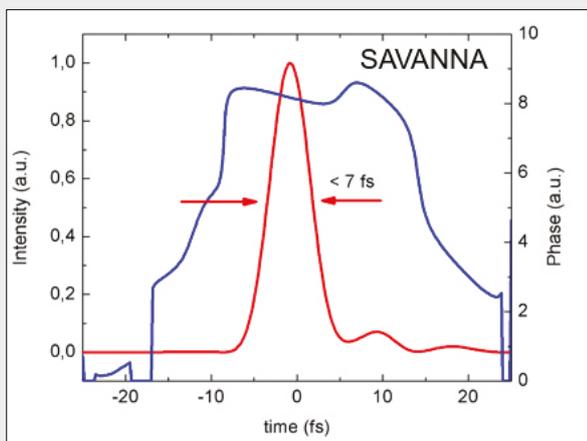
Left: Characterized pulse duration after SAVANNA.
Right: Characterized pulse duration after SAVANNA+.

References:

[1] F. Silva, M. Miranda, B. Alonso, J. Rauschenberger, V. Pervak, and H. Crespo, Optics Express **22** (9), 10181-10191 (2014).
[2] F. Silva, B. Alonso, W. Holgado, R. Romero, J. S. Román, E. C. Jarque, H. Koop, V. Pervak, H. Crespo, and I. J. Sola, Optics Letters **43** (2), 337-340 (2018).