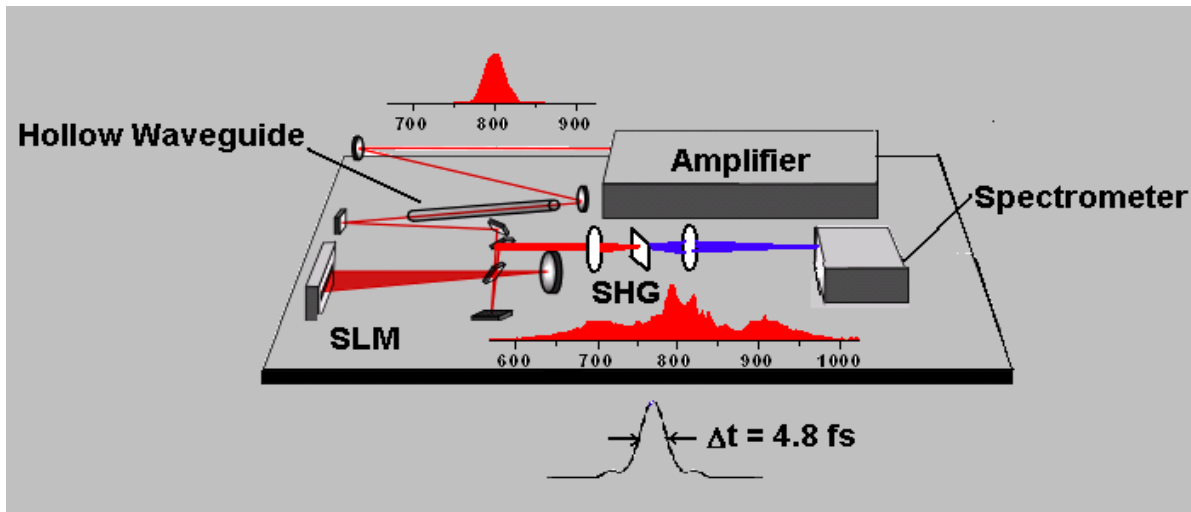


MIIPS[®] Application Notes

Compression of Hollow Waveguide Supercontinuum

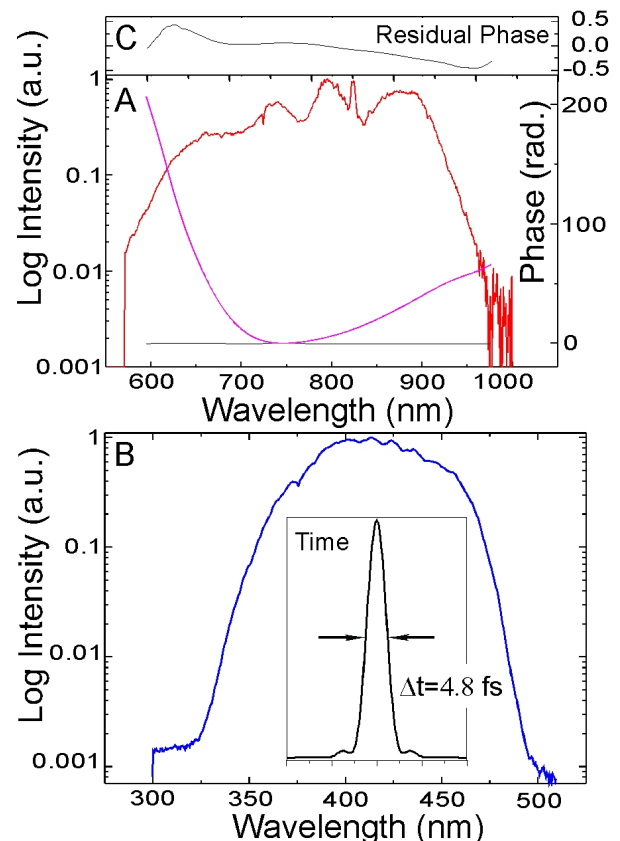


Here we demonstrate the generation of amplified <5 fs, $300 \mu\text{J}$ laser pulses at 1 kHz repetition rate using multiphoton intrapulse interference phase scan (MIIPS[®]) [1,2]. The laser source (top figure) consists of a Micra oscillator and a Legend regenerative amplifier, both from Coherent. The spectrum of the laser was broadened by self phase modulation in a hollow waveguide filled with a noble gas. The key to this development is our ability to measure and correct the significant phase distortions in the supercontinuum spectrum using MIIPS[®] as shown in the figure on the right.

The figure on the right shows the measured phase after MIIPS[®] scan. The pulse duration before and after compression was about 120 fs and 4.8 fs, respectively. No prism-pair or chirped-mirror compressor was used.

To summarize, intense ultrashort pulses are obtained using a commercially available femtosecond laser system and MIIPS[®]-enabled pulse shaper for automated pulse characterization and compensation of phase distortions.

Fig. (A) Spectrum and measured phase of pulses; (B) SHG spectrum and time profile of pulses; (C) Residual phase after MIIPS[®] pulse compression. The figure is adapted from ref. [1].



References

- [1] H. Li, D. A. Harris, B. Xu, P. J. Wrzesinski, V. V. Lozovoy, and M. Dantus, *Optics Express* 16, 5499 (2008).
- [2] B. Xu, J.M. Gunn, J.M. Dela Cruz, V.V. Lozovoy, M. Dantus, *J. Opt. Soc. Am. B* 23, 750 (2006).