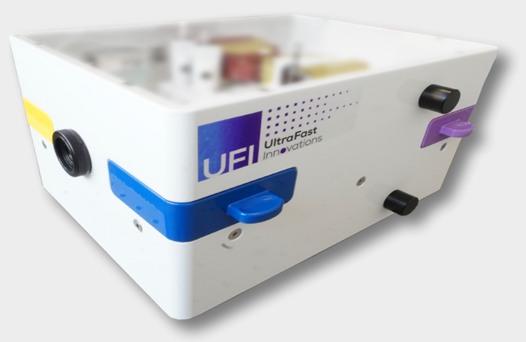
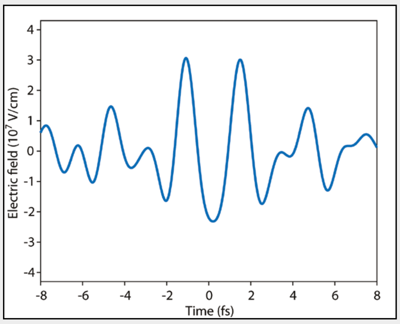
YOUR KEY to innovation and success

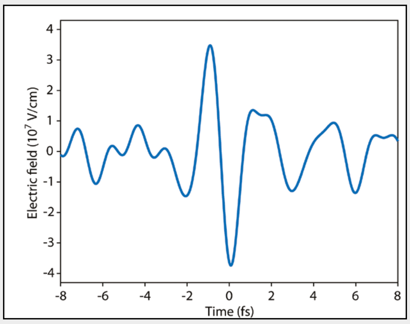
Light Field Synthesizer

CAPELLA

We present the first commercial Light Field Synthesizer enabling synthesis and sub-femtosecond control of super-octave light transients.







Key Product Features:

- **Shortest pulse available**
  2 fs FWHM
- **Overall transmission**
  >60% @ 9 mm beam
  >70% @ 7 mm beam
- **Parallel pulse compression of multiple channels:**
  <9 fs (700-1000 nm)
  <8 fs (500-700 nm)
  <10 fs (400-500 nm)
- **Attosecond-scale delay among the channels**
- **Interferometric stability**
  Short term passive stability: <100 mrad
  Long term active-loop stability: <50 mrad
- **Incident polarization:**
  s or p polarization
- **Laptop and user-friendly software interface included**
- **Small Footprint:**
  30 x 20 cm^2

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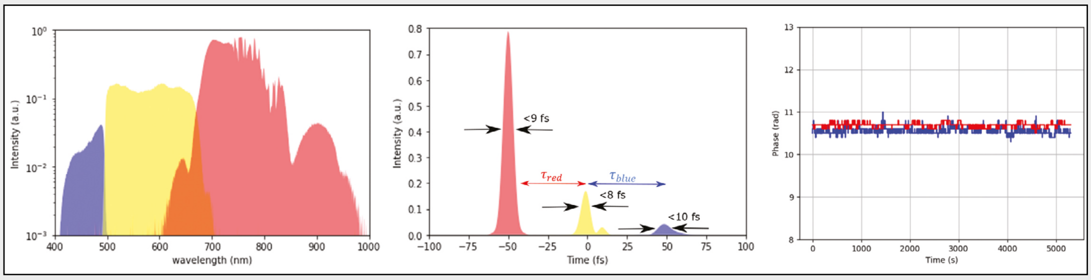
UltraFast Innovations is a spin-off from the LMU Munich and the Max Planck Society.

Specifications:	CAPELLA		
Number of channels	3		
Wavelength range	400-1000 nm		
Required Input energy	›290 µJ (700-1000 nm)	›60 µJ (500-700 nm)	›14 µJ (400-500 nm)
Polarization	s- or p-polarized input light		
Introduced dispersion	› -380 fs²	› -370 fs²	› -560 fs²
Temporal accuracy	2 nm ≙ 7 as		
Maximum delay	60 ps		
Optics size	0.5 inch		
Overall transmission	›60% @9 mm beam ›70% @7 mm beam		
Footprint	30 x 20 cm²		

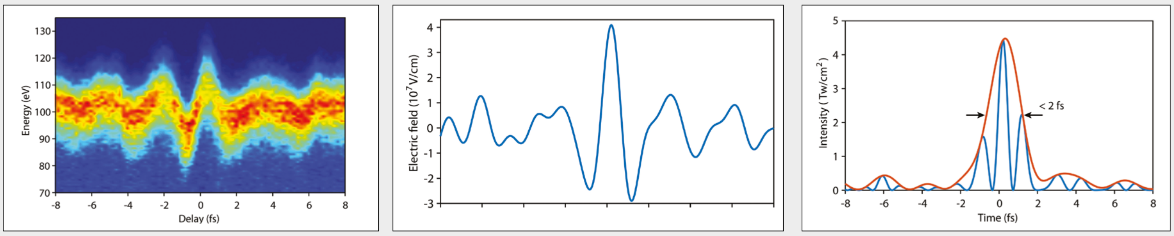
Working principle:

Capella is based on spectral division of a coherent supercontinuum into three different bands (channels) by chirped dichroic beamsplitters [1]. Using an interferometric spatio-temporal superposition a field waveform can be controlled and synthesized. All constituent pulses from the channels of CAPELLA are temporally compressed by chirped mirrors down to pulse duration of ‹10 fs. Introducing different time-delays among the channels enables the shaping and sub-cycle control of the field waveform [2].



Left: Spectral splitting of the different channels.
Center: Parallel channel compression and temporal overlap with attosecond resolution.
Right: Passive interferometric stability between different channels over more than an hour.

Due to its solidness, compactness and excellent thermal capabilities, CAPELLA can maintain the optical pathlength stable among the different channels for many hours. Furthermore, an extra active-controlled loop improves the interferometric stability to ‹50 mrad. Apart from the generation of waveforms, CAPELLA offers the shortest pulses available in market to date, see below:



References:

[1] A. Wirth et al., “Synthesized Light Transients,” Science **334** (6053), 195-200 (2011).
[2] M. Th. Hassan et al., “Optical attosecond pulses and tracking the nonlinear response of bound electrons,” Nature **530**, 66-70 (2016).