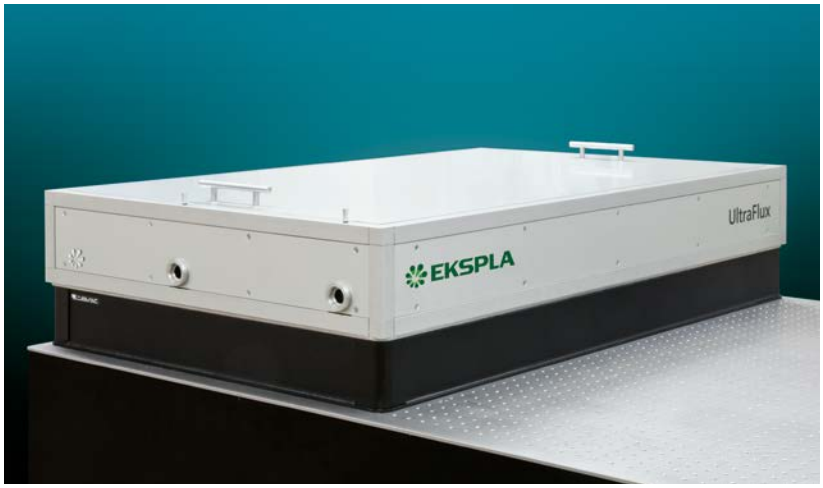
UltraFlux
FT300 SERIES

Tunable Wavelength Femtosecond Laser Systems



UltraFlux FT300 series is a compact high energy tunable wavelength femtosecond laser system which incorporates the advantages of ultrafast fiber laser, solid-state and parametric amplification technologies. Novel OPCPA front-end technology uses the same picosecond fiber laser for seeding both picosecond DPSS pump laser and femtosecond parametric amplifier by spectrally broadened output. This approach greatly simplifies the system – excludes femtosecond regenerative amplifier and eliminates the need of pump and seed pulse synchronization. In addition to that, contrast of the output pulses in picosecond to nanosecond time scale is potentially increased.

All UltraFlux series laser systems are assembled on a rigid breadboard to ensure excellent long-term stability. Modular internal design offers high level of customization and easy scalability. These systems can be customized according to customer requirements.

Incorporation of parametric amplification technology together with a novel ultrafast fiber laser helped to create and bring to the market a new tool for femtosecond pump-probe, nonlinear spectroscopy, emerging high harmonic generation experiments and other femtosecond and nonlinear spectroscopy applications. With this laser ultrafast science breakthrough is closer to any photonics lab than ever before.

FEATURES

- *Based on the novel **OPCPA** (Optical Parametric Chirped Pulse Amplification) technology – simple and cost-efficient operation*
- *Patented front-end design (patents no. EP2827461 and EP2924500)*
- *Hands free wavelength tuning*
- *Up to **1 kHz** repetition rate*
- *Up to **3 mJ** pulse energy*
  - *Excellent pulse energy stability: < 1.5 % rms*
  - *Excellent long-term average power stability: < 1.5 % rms over > 12 hour period*
- *High contrast pulses without any additional improvement equipment*

APPLICATIONS

- *Broadband CARS and SFG*
- *Femtosecond pump-probe spectroscopy*
- *Nonlinear spectroscopy*
- *High harmonic generation*

OPTIONS

- ***SH/TH** harmonics module: SH **375 – 480 nm,** TH **250 – 320 nm***
- ***SH/TH/FH** harmonics module: SH **375 – 480 nm,** TH **250 – 320 nm** FH **210 – 230 nm***
- *Optically synchronized ps output*
- *PLL (Phase Locking Loop) for precise (<1 ps, rms) locking with external synchronization pulse*

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UltraFlux FT300 SERIES

SPECIFICATIONS [1]

Model	UltraFlux FT031k	UltraFlux FT31k	UltraFlux FT310
MAIN SPECIFICATIONS			
Max. Pulse energy	300 µJ	3 mJ	
SH output [4]	–	20 % conversion at 440 nm	
TH output [4]		5 % conversion at 290 nm	
FH output [4]		1 % conversion at 220 nm	
Wavelength tuning range			
Standard version	700 – 1010 nm	750 – 960 nm	
SH output [4]	–	375 – 480 nm	
TH output [4]		250 – 320 nm	
FH output [4]		210 – 230 nm	
Scanning steps			
SH output [4]	–	5 nm	
TH output [4]		3 nm	
FH output [4]		2 nm	
Pulse duration	35 – 60 fs	20 – 60 fs	
Pulse repetition rate	1 kHz		10 Hz
Pulse energy stability	< 1.5 %, rms		
Long-term power stability	< 1.5 %, rms		
Spatial mode	Super Gaussian		
Beam diameter ($1/e^2$)	2 mm	7 mm	
Pulse contrast [2]	≥ 10^{-6} : 1 (within ± 50 ps)		
	≥ 10^{-8} : 1 (in ns range)		
Polarization	Linear, horizontal		
Beam pointing stability	≤50 µrad, rms		
Optical to RF signal jitter [3]	< 1 ps		
Footprint on optical table	1.2 × 0.75 m	1.2 × 2.0 m	

[1] Presented parameters are from delivered systems and can be customized to meet customer's requirements.

[2] Pulse contrast is only limited by amplified parametric fluorescence (APF) in the temporal range of ~90 ps which covers OPCPA pump pulse duration and is better than 10^6 : 1. APF contrast depends on OPCPA saturation level (Fig. below). Our system is ASE-free and pulse contrast value in nanosecond range is limited only by measurement device capabilities (third-order autocorrelator). There are no pre-pulses generated in the system and post-pulses are eliminated by using wedged transmission optics.

[3] With -PLL option purchased.

[4] With SH/TH or SH/TH/FH module.

PERFORMANCE

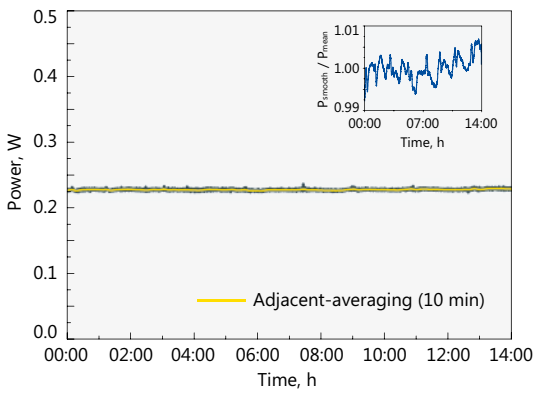

Fig 1. Long-term power stability measurement at 800 nm wavelength

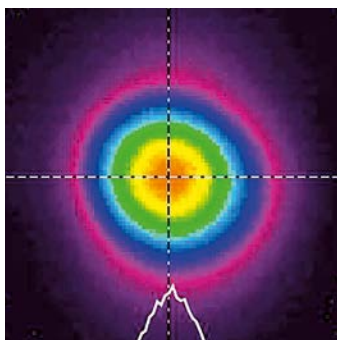

Fig 2. Typical beam profile of FT031k. Output pulse energy 0.3 mJ at 890 nm

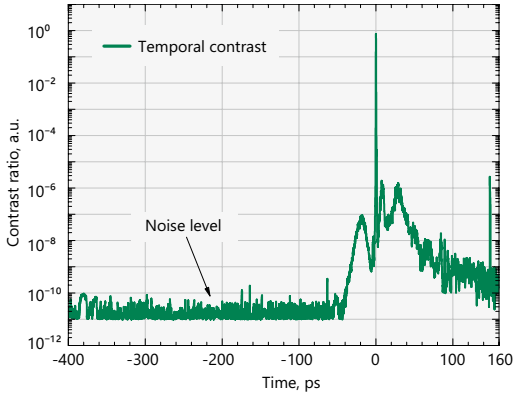

Fig 3. Typical temporal contrast of UltraFlux systems

DELIVERED SYSTEMS

UltraFlux FT310. Customised compact (1.2 × 0.9 m), fully diode pumped, tunable wavelength femtosecond laser system delivering up to 2.5 mJ pulse energy with pulse duration down to 20 fs. Optically synchronized (low jitter) fs and ps outputs available.