

# FemtoTune SERIES



*FemtoTune* femtosecond optical parametric amplifier is designed to meet the demanding specifications of modern ultrafast science, while introducing valuable features that enhance measurement efficiency, convenience, flexibility, and reliability.

*FemtoTune* is based on Ekspla's extensive experience in developing picosecond and nanosecond tunable systems, as well as optical parametric chirped pulse amplifiers (OPCPAs) with pulse energies up to 1 joule and durations as short as 10 fs. *FemtoTune* delivers a compact, high-repetition-rate (up to 100 kHz) solution with sub-50 fs pulse duration across the broad wavelength tuning range, tailored for modern ultrafast spectroscopy and imaging.

The time-synchronised motor positioning enables fast and smooth wavelength tuning, allowing users to scan the full range in just a few seconds or access specific wavelengths within several tenths of a second. Continuous, gapless tuning in the mid-IR (2.5–10  $\mu\text{m}$ )

with a single polarisation eliminates the need to switch between signal and idler waves. This results in faster, more stable measurements ensuring excellent beam pointing stability.

For applications requiring narrow spectral bandwidths, such as SFG or CARS, *FemtoTune* offers an additional narrowband channel at 1030 nm or 515 nm, providing  $<8\text{ cm}^{-1}$  bandwidth without the need for complex spectral narrowing techniques. Optical synchronisation with most of our picosecond lasers and wavelength tunable systems allows achieving even narrower bandwidth ( $<3\text{ cm}^{-1}$ ) enabling simultaneous high temporal and spectral resolution measurements.

Pumped by robust award-winning industrial-grade FemtoLux series laser, *FemtoTune* offers long-term stability, hands-free operation, and minimal maintenance.

*FemtoTune* delivers ultrashort pulses at high repetition rate, enhanced by advanced functionality, all in a compact system.

## Tunable Femtosecond System for Ultrafast Applications

### FEATURES

- ▶ **650–950 nm & 1100–2000 nm** tuning range
- ▶ Extension to **UV - VIS** (330–470 nm & 550–650 nm)
- ▶ Extension to **Mid-IR** (2300–10 000 nm) gapless tuning
- ▶ **< 50 fs** pulse duration featuring integrated dispersion compensation
- ▶ **Single shot–100 kHz** repetition rate
- ▶ Scan of full wavelength range in a few seconds and **fast wavelength sweep**
- ▶ Pumped by reliable **Femtolux** series lasers featuring dry or water cooling
- ▶ Additional **narrow spectral bandwidth** optically synchronised output at 1030 nm or at 515 nm less than  $8\text{ cm}^{-1}$
- ▶ Optical synchronisation with picosecond Ekspla laser sources: e.g. PL2231, PT501 (bandwidth below  $3\text{ cm}^{-1}$ )

### APPLICATIONS

- ▶ **Ultrafast non-linear spectroscopy:**
  - Pump-probe
  - SFG
  - CARS
- ▶ **Multiphoton imaging**

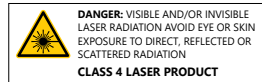
SPECIFICATIONS <sup>1)</sup>

| Model                                       |         | FemtoTune                              |
|---------------------------------------------|---------|----------------------------------------|
| <b>MAIN SPECIFICATIONS</b>                  |         |                                        |
| Tuning range                                |         | 650–950 nm & 1100–2000 nm              |
| Pulse energy <sup>2)</sup>                  | 800 nm  | > 30 µJ                                |
|                                             | 1500 nm | > 10 µJ                                |
| Pulse duration at 700 – 900, 1100 – 1900 nm |         | < 50 fs                                |
| Long-term power stability, 9 hours          |         | < 1 %                                  |
| Pulse-to-pulse stability, 10 sec            |         | < 1 %                                  |
| Repetition rate                             |         | Single shot–100 kHz <sup>3)</sup>      |
| <b>PUMP LASER</b>                           |         |                                        |
| Model                                       |         | FemtoLux series                        |
| <b>OPERATING REQUIREMENTS</b>               |         |                                        |
| Mains requirements                          |         | 100 – 240 V AC, single phase, 50/60 Hz |
| Operating ambient temperature               |         | 18 – 27 °C                             |
| Relative humidity                           |         | 10–80 % (non-condensing)               |
| Air contamination level                     |         | ISO 9 (room air) or better             |

<sup>1)</sup> Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture.

<sup>2)</sup> Please see picture Fig. 1. Pulse energy at 10 kHz repetition rate.

<sup>3)</sup> Max repetition rate is fixed.



## OPTIONS AND ACCESSORIES

| Option                             | Value                        |
|------------------------------------|------------------------------|
| Extension to UV–VIS                | 330–470 nm & 550–650 nm      |
| Extension to Mid-IR                | 2300–10000 nm gapless tuning |
| Additional output (simultaneously) | 1030 or 515 nm               |

## PERFORMANCE

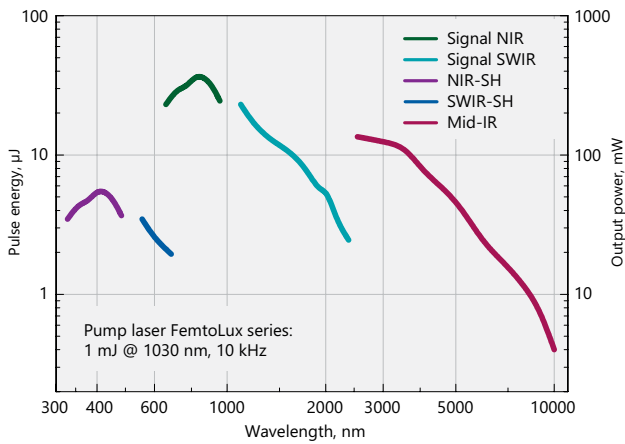


Fig 1. Spectral range and pulse energy with extensions

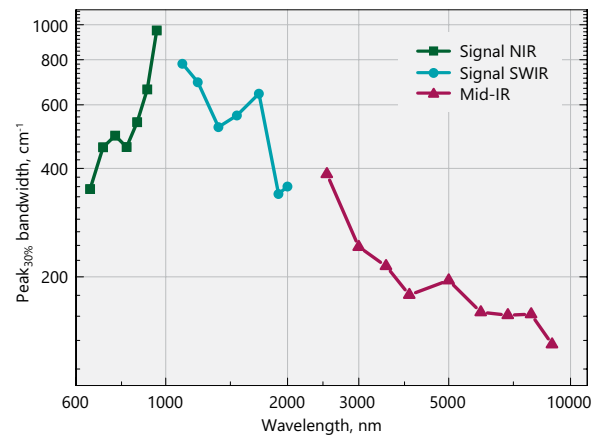


Fig 2. Pulse bandwidth in NIR, SWIR and Mid-IR wavelength ranges

## STABILITY

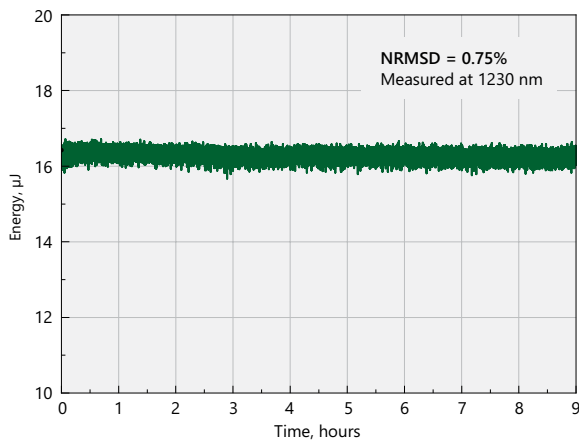


Fig 3. Pulse energy stability

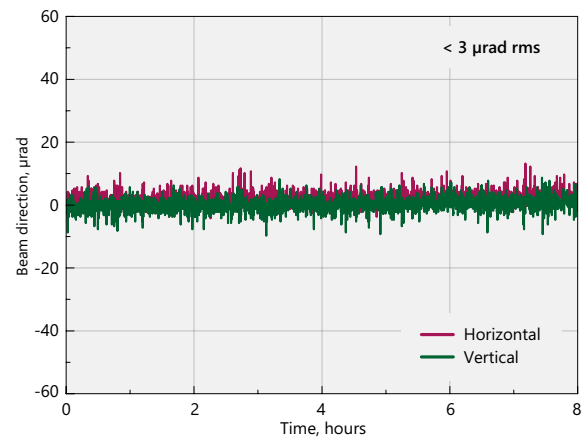


Fig 4. Beam pointing stability

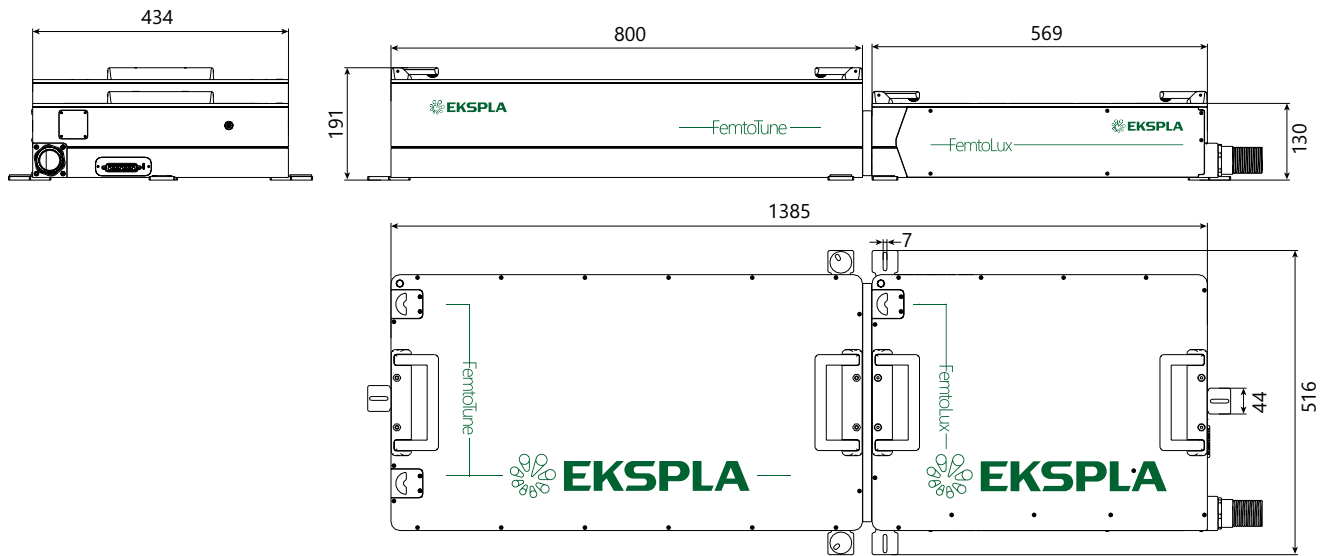
**DRAWINGS**

Fig 5. External dimensions of FemtoTune femtosecond tunable wavelength laser system



2024

# Pump Laser

## FemtoLux series femtosecond laser



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