# HELIOS

## Femtosecond Solid-state Laser

**The HELIOS series femtosecond lasers are designed for high-precision scientific and industrial applications. Offering high stability, broad tunability, and excellent temporal resolution, this series includes compact, high energy, and high power models to meet a wide range of needs. It supports applications like ultrafast optics, laser processing, biomedical imaging, and three-photon microscopy.**

**The HELIOS series features an efficient water-cooling system and modular design, ensuring stable performance in various environments. With strict quality control and testing, these lasers are built for long-term, continuous use, and the modular design allows for flexible configuration adjustments to suit specific needs.**

## Product Features:

- **Up to 2mJ single pulse energy**
- **Adjustable pulse width from 190 fs to 10 ps**
- **Maximum output power of 40W**
- **Repetition rate from single pulse to 1 MHz**
- **Laser output in TEM00 mode, $M^2 < 1.2$**
- **Power stability < 0.5% RMS**

# HELIOS-HP Compact Femtosecond Solid-State Laser

## Application Areas

- Ultrafast Spectroscopy
- Ultrafast Lmaging
- Optical Parametric Amplifier (OPA) Systems
- Precision Laser Processing
- Laser Material Characterization
- Optical Sensing
- Time-Domain Optical Measurements
- Nonlinear Laser Effects

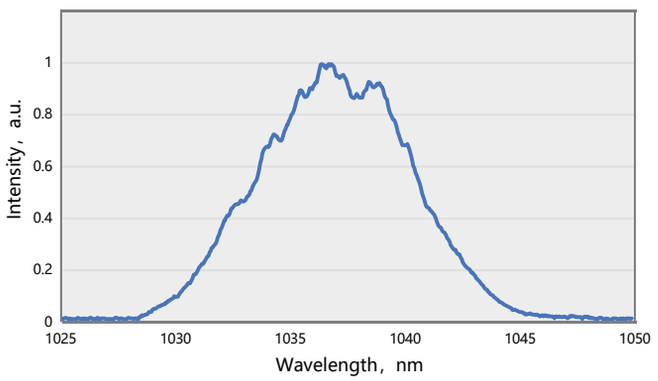

## Parameter Specifications

| Parameter | HELIOS-10W-HP | HELIOS-20W-HP |
|---|---|---|
| Maximum output power | 10W | 20W |
| Maximum single pulse energy | 400μJ | |
| Pulse duration | <190fs | |
| Pulse width adjustment range | 190fs - 10ps | |
| Repetition frequency range | 25kHz - 1MHz | 50kHz - 1MHz |
| Pulse selection | Selectable within single shot to ~MHz | |
| Central wavelength | 1030 ± 10nm | |
| Polarization | Linear polarization | |
| Beam quality | $M^2$ <1.2 | |
| Beam diameter | 5 ± 1mm | |
| Pulse pointing stability | < 20 μrad/℃ | |
| Pre-pulse contrast | <1:1000 | |
| Post-pulse contrast | <1:500 | |
| Pulse energy stability | <0.5% RMS @24h | |
| Long-term power stability | <0.5% RMS @100h | |
| Dimensions (L×W×H) | 733 × 400 × 219mm (L×W×H) | |
| Weight (kg) | 50kg | |

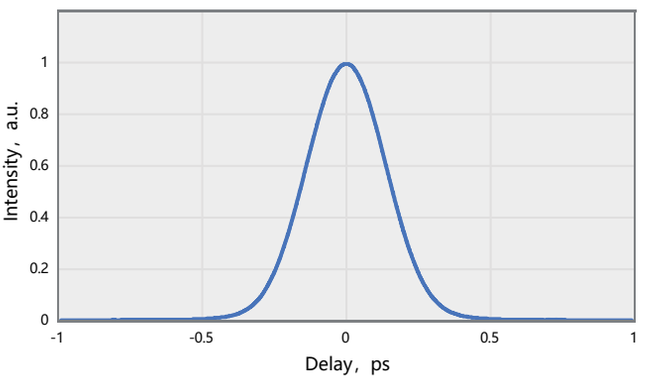
| Expansion Options | |
|---|---|
| Harmonic output | Integrable, 515 nm, 343 nm, 257 nm |
| Optical parametric amplification output | Integrable, 210 - 16000nm |
| MPC short pulse output | Integrable, output pulse width <45 fs, energy transmission efficiency >90% |
| Remaining weight (kg) | 24kg (Water-cooled machine) +5kg (frequency doubling) |
| Power supply requirements | Laser head: AC 220V/10A ;<br>Water-cooled machine: 220V/0.6-7.7A/1.26kW (CWUP-20AI) |

# HELIOS-HP Compact Femtosecond Solid-State Laser

HELIOS-10W-HP and HELIOS-20W-HP are compact series lasers designed for scientific and industrial applications that require lower single-pulse energy but high repetition frequency. They provide stable low single-pulse energy and high repetition frequency output. Whether aiming for high time resolution in research experiments or improving processing efficiency in industrial applications, they offer strong support.

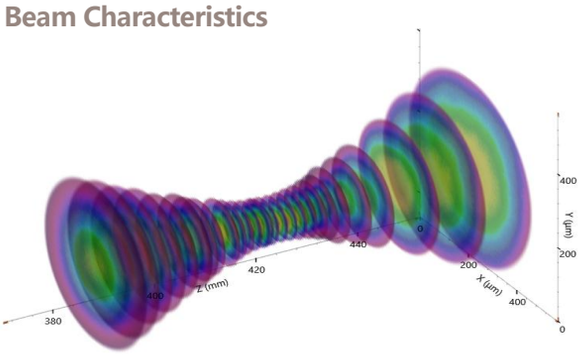



Typical spectrum of the HELIOS series (FWHM=7.49nm)

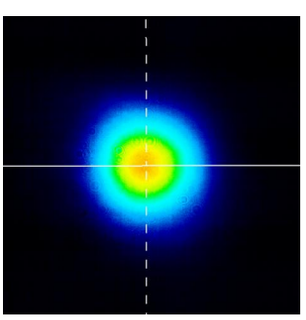



Typical pulse duration of the HELIOS series (FWHM=231fs)

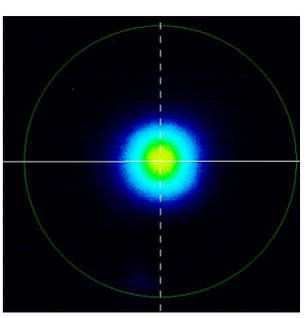
## Beam Characteristics



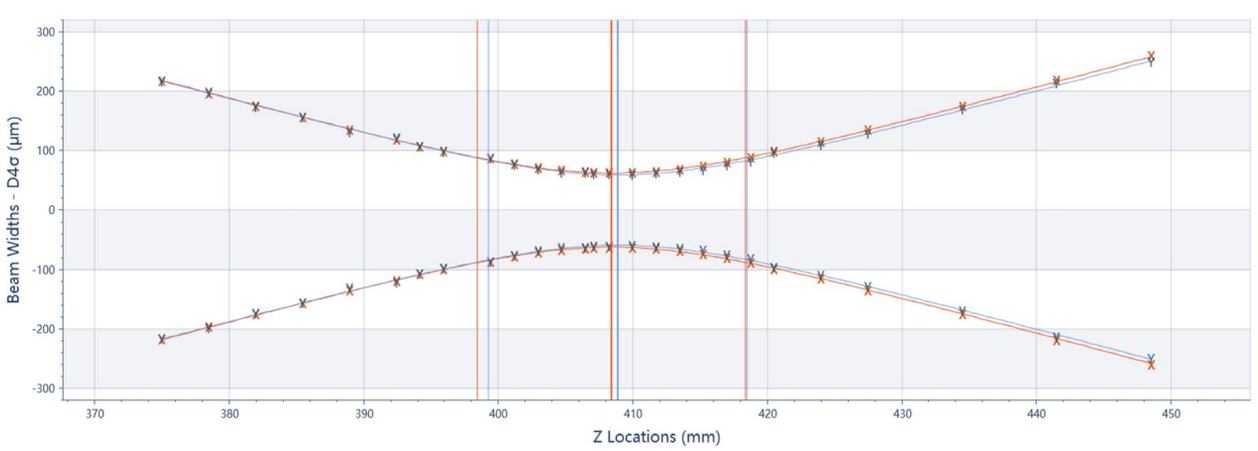

HELIOS series $M^2$ measurement data ($M^2$<1.2)



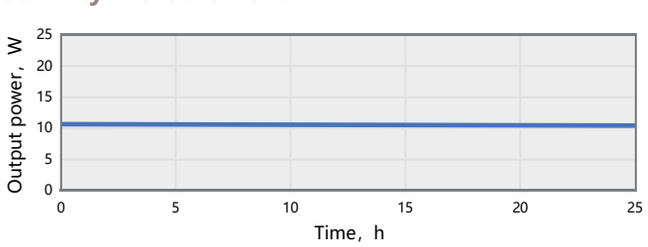
Typical near-field beam profile



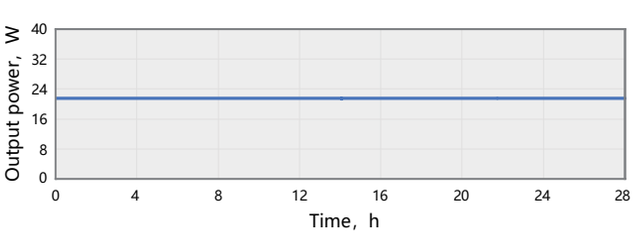
Typical far-field beam profile




## Stability Measurement

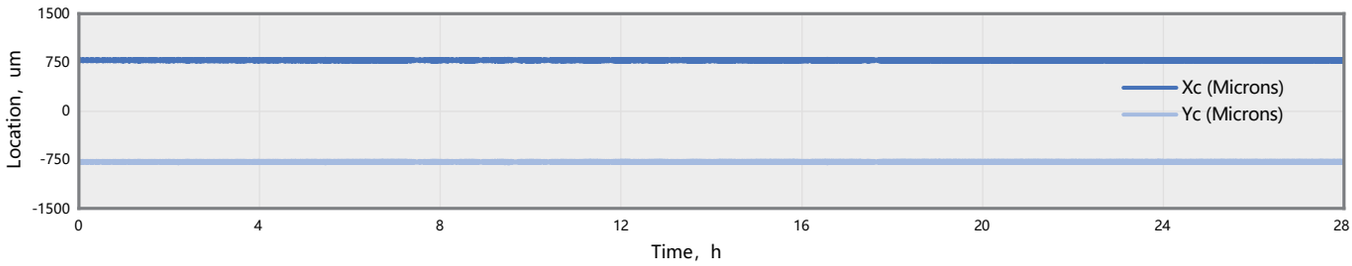



Power stability of HELIOS-10W-HP RMS=0.46%@24h
(10W/400μJ/25kHz)



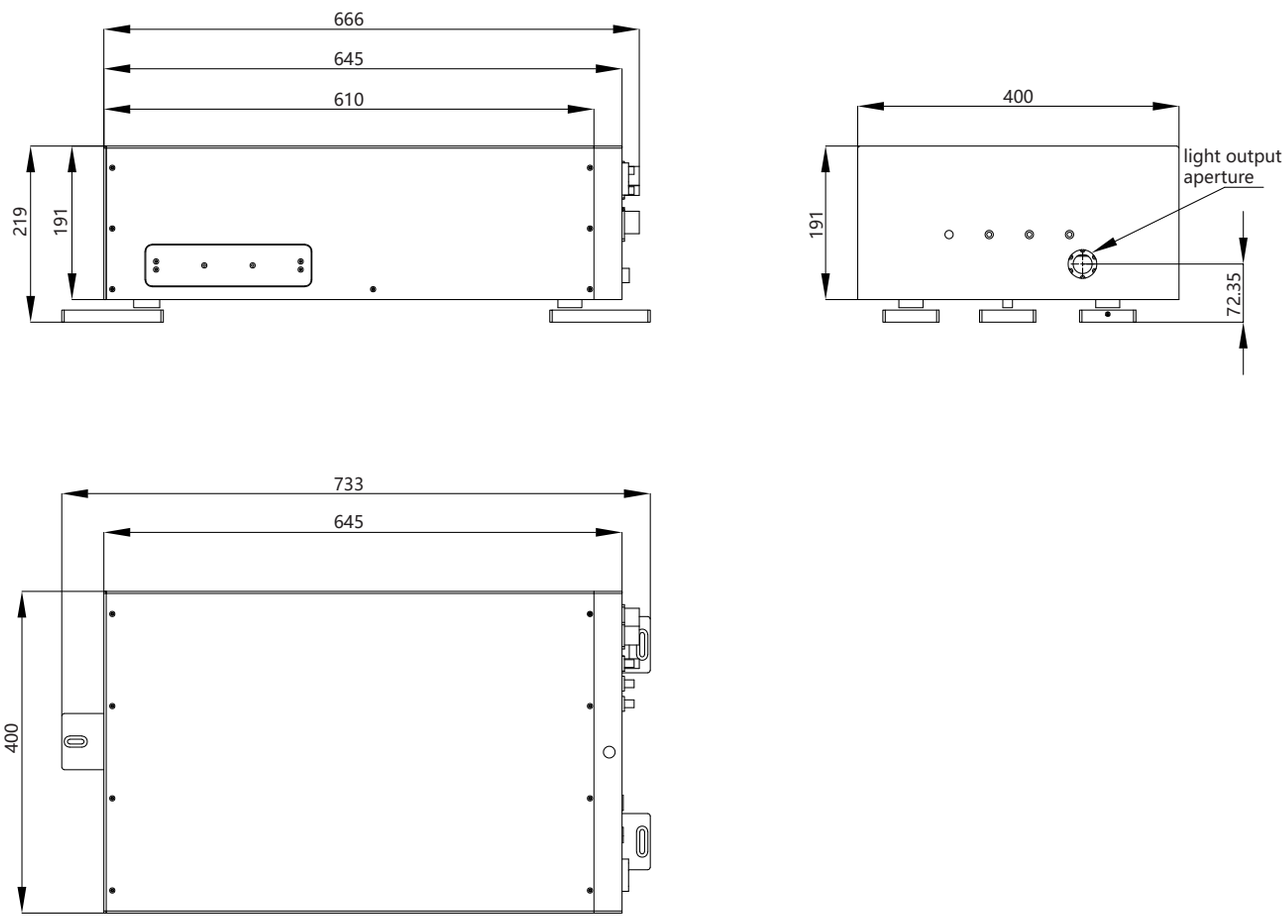

Power stability of HELIOS-20W-HP RMS=0.238%@24h
(20W/400μJ/50kHz)

# HELIOS-HP Compact Femtosecond Solid-State Laser




24-hour beam pointing stability of HELIOS-20W 24H <15μrad/° C

## Drawings




HELIOS-10W&20W-HP outline drawing