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-HE High-energy femtosecond solid-state laser

Application Areas

- Laser Ablation
- Precision Laser Cutting and Engraving
- Laser Welding
- Photolithography
- Ultrafast Laser Physics Research
- Laser-Driven Particle Acceleration
- Nonlinear Laser Effects
- Terahertz Generation

Parameter Specifications

Parameter	HELIOS-10W-HE	HELIOS-20W-HE
Maximum output power	10W	20W
Maximum single pulse energy	1mJ	2mJ
Pulse duration	<190fs	
Pulse width adjustment range	190fs - 10ps	
Repetition frequency range	10kHz - 1MHz	
Pulse selection	Selectable within single shot to ~MHz	
Central wavelength	1030 ± 10nm	
Polarization	Linear polarization	Vertical
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)	831 × 585 × 218mm (L×W×H)
Weight (kg)	50kg	100kg

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 ; Water-cooled machine: 220V/0.6-7.7A/1.26kW (CWUP-20AI)

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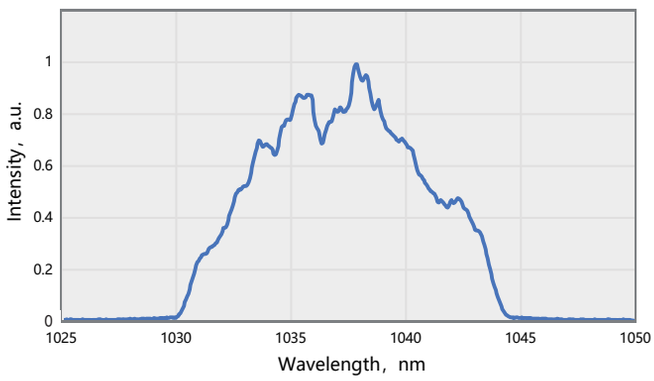
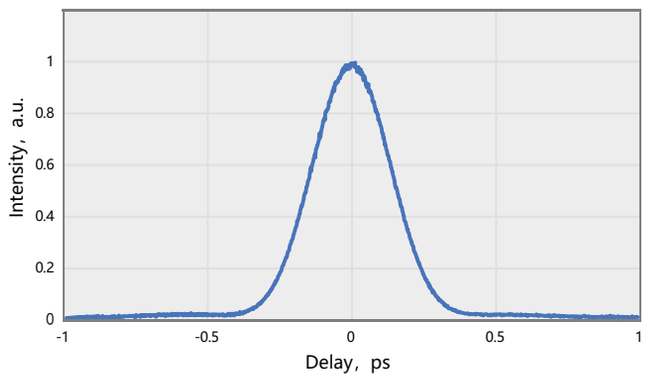
The HELIOS-10W-HE and HELIOS-20W-HE belong to the high-energy series, specifically designed for research experiments and industrial applications requiring high-energy pulse output. This series of lasers achieves millijoule-level high single-pulse energy output by optimizing the gain medium and laser cavity design, providing continuous and stable laser output to meet the demands of various high-energy laser applications. The design of the HELIOS high-energy series lasers emphasizes efficient thermal management and stability, using a water-cooling system to maintain temperature stability even during prolonged high-power output. The modular design of the lasers allows for more flexible system integration, enabling users to customize the system's functionality and configuration according to their needs.

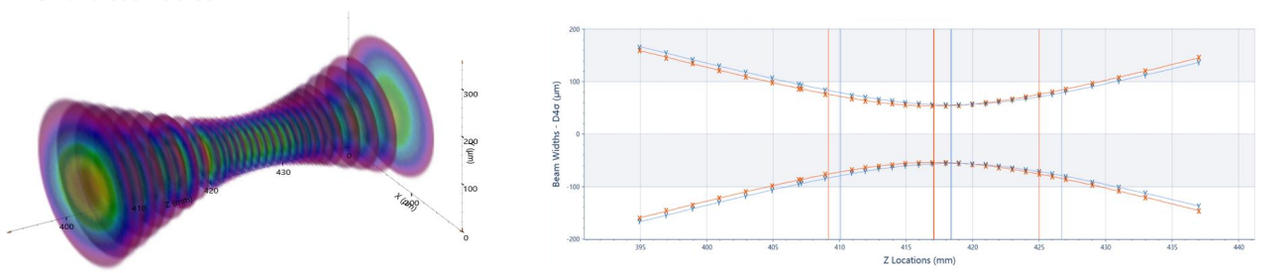


Typical spectrum of the HELIOS series (FWHM=8.55nm)

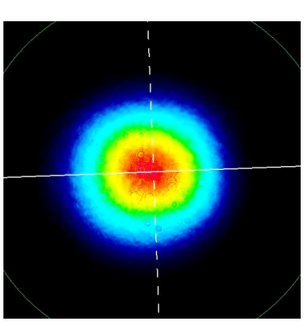


Typical pulse duration of the HELIOS series (FWHM=228.1fs)

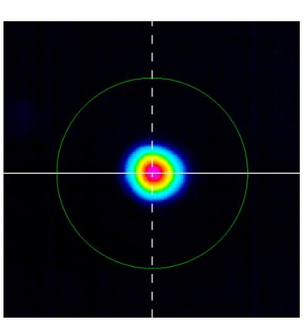
Beam Characteristics



HELIOS series M² measurement data (M²<1.2)

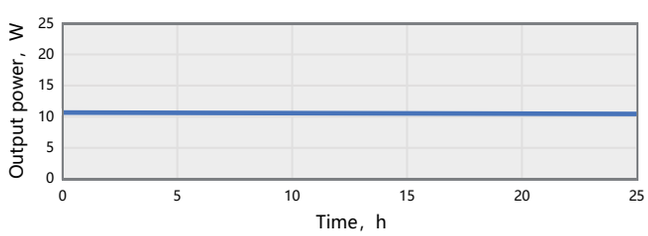


Typical near-field beam profile

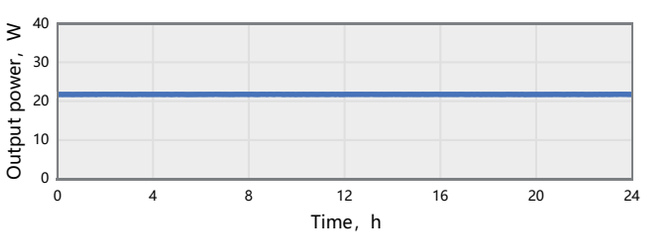


Typical far-field beam profile

Stability Measurement



Power stability of HELIOS-10W-HE RMS=0.25%@25h
(10W/1mJ/10kHz)



Power stability of HELIOS-20W-HE RMS=0.25%@24h
(20W/2mJ/10kHz)

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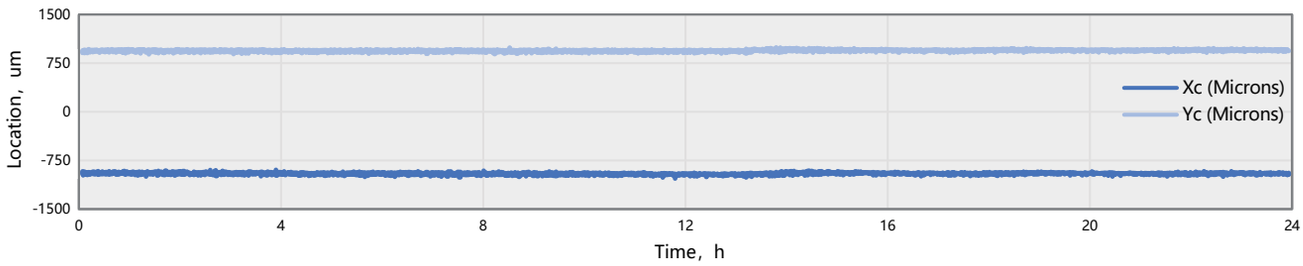
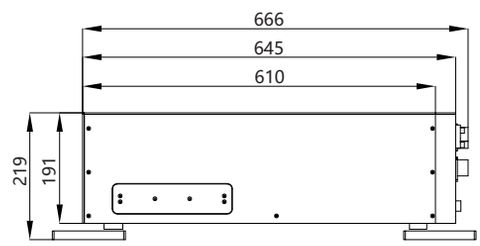
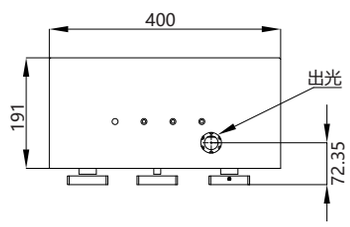
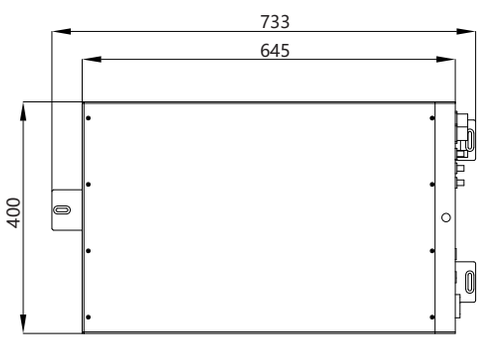


24-hour beam pointing stability of HELIOS-20W-HE <17.8μrad/° C

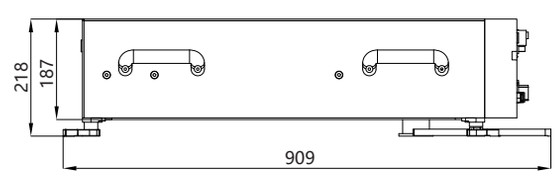
Drawings

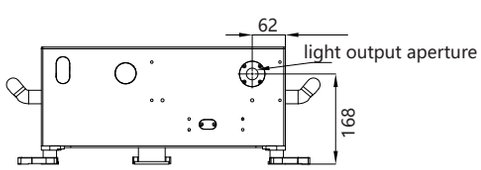


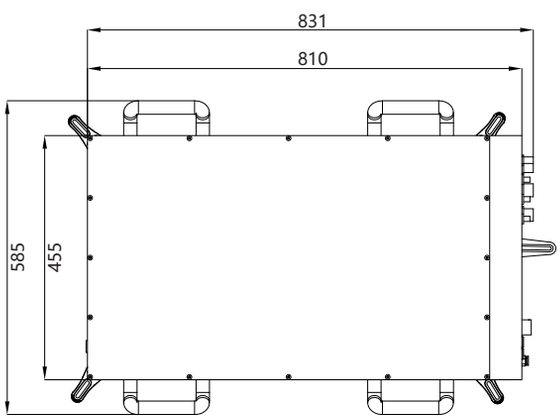




HELIOS-10W-HE outline drawing







HELIOS-20W-HE outline drawing