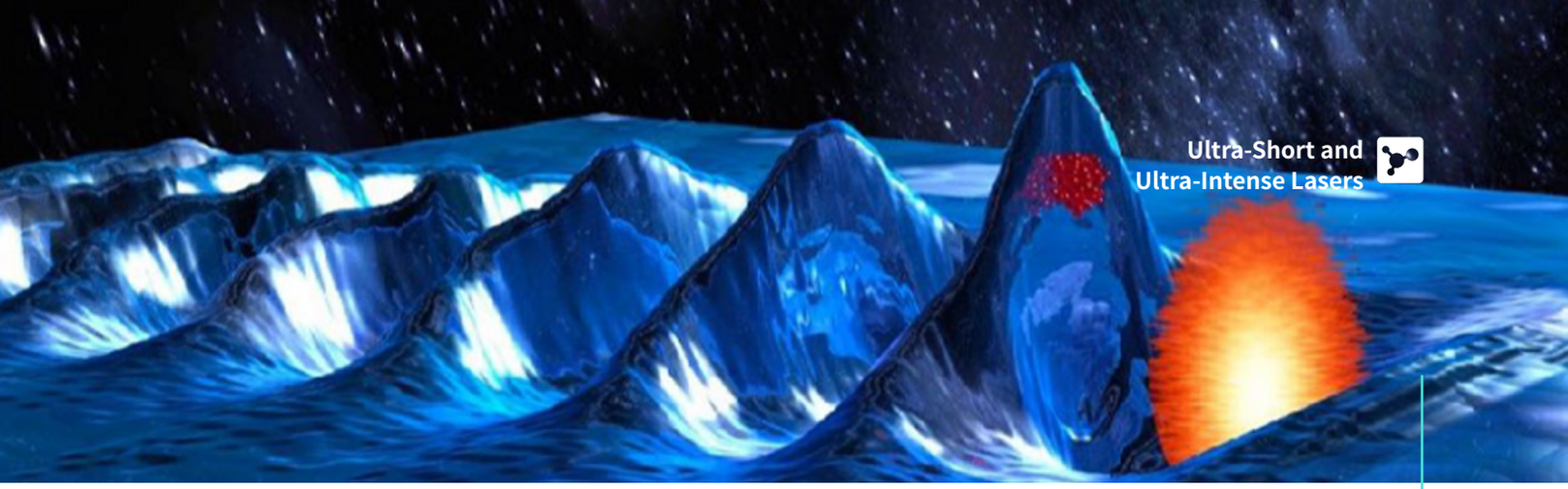


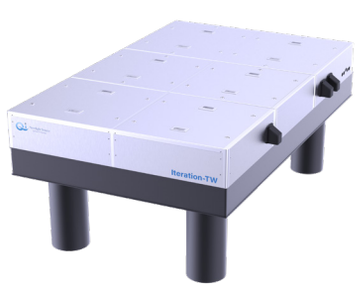
Iteration-TW

Ultra-short and ultra-intense laser facility

The Iteration-TW is the compact terawatt ultrashort ultra-intense laser facility with industrial-grade reliability. It can output pulsed laser with the pulse width of 25 fs, pulse peak power up to 45 TW, and repetition rate up to 10 Hz.

The Iteration-TW uses the Lancer regenerative amplifier as the prestage and the Flare multipass amplifier as the main amplification module. The system uses cross-polarized wave (XPW) technology to achieve picosecond pulse contrast in the order of 10^{10}. The precision deformable mirror technology perfectly corrects the laser wavefront distortion, so that the output pulse can combine high energy and high beam quality. The pointing stability of the Iteration-TW laser system is only 5 μrad, thanks to its large number of integrated mechanical supports and Trione's flexible frame structure.

Particle accelerator devices based on Iteration-TW lasers can be up to "tabletop level" in size and are potential replacements for bulky traditional accelerators. The high reliability of Iteration-TW will push laser



Product Features

- High level of integration
- Industrial-grade reliability
- Pulse peak power up to 45 TW
- Pointing stability up to 5 μrad
- Repetition rate up to 10 Hz
- Picosecond pulse contrast is better than 10^10
- Precision deformation mirror technology
- Phase-locked synchronization optional, timing jitter<150fs

Typical Applications

- Laser wake field acceleration
- Ultrafast electron diffraction
- High-energy physics
- Attosecond pulse generation
- Prestage light source for hundreds of TW and PW large scientific facilities

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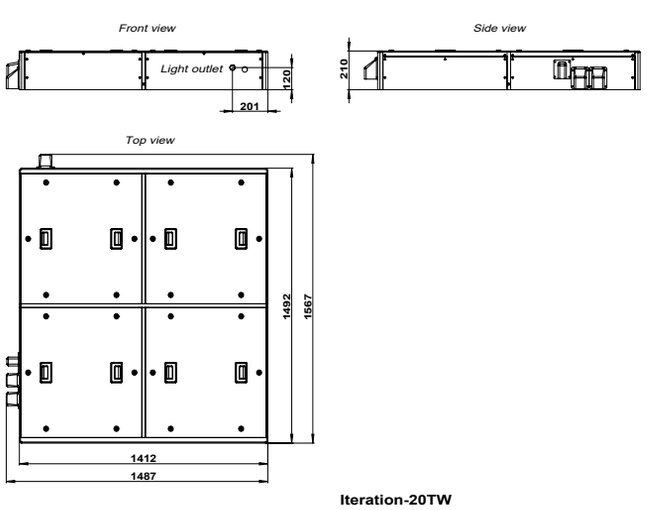
Specifications [1]

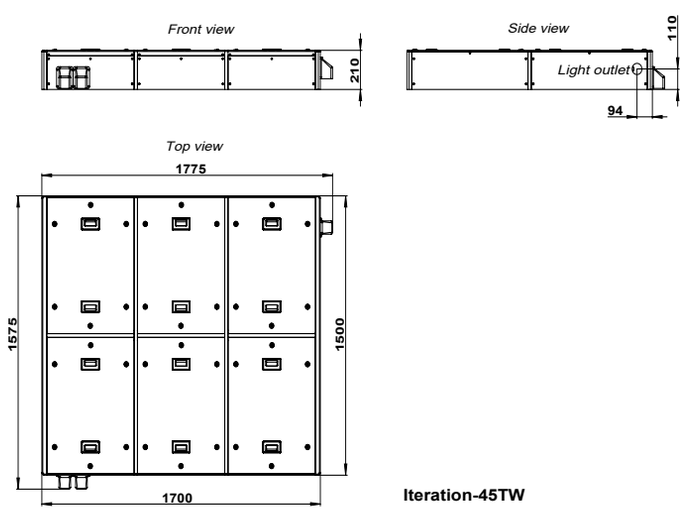
	Iteration-2TW	Iteration-10TW	Iteration-20TW	Iteration-45TW
Central wavelength[2]	780-820 nm(nominal),SHG/THG optional			
Peak power	＞2 TW	＞10 TW	＞20 TW	＞45 TW
Pulse energy[3]	＞ 50 mJ	＞250 mJ	＞500 mJ	＞1200 mJ
Energy stability[4]	＜1.2%(RMS)			＜1% (RMS)
Pulse width	Min 25 fs			
Max repetition rate	10 Hz			
Nanosecond pulse contrast[5]	$>10^8$:1			
Picosecond pulse contrast[6]	＞10^4:1@1ps; ＞10^6:1@5ps; ＞10^8:1@10ps; ＞10^{10}:1@100ps			
Beam dimension ($1/e^2$)	~20 mm	~25 mm	~35 mm	~45 mm
Strehl ratio	＞0.85 (deformation mirror technology)			
Beam pointing stability[7]	<5 μrad(RMS)			
Polarization	Linear, horizontal			
Phase-locked synchronization	Optional, timing jitter <150fs			

1 All specifications apply at 800nm. Due to continuous product improvements, specifications are subject to change without notice.
2 Customer-specified central wavelength.
3 Customer-specified Pulse energy.
4 Energy stability measured for 8 hours under stable ambient conditions.
5 Customer-specified nanosecond pulse contrast ratio.
6 Customer-specified picosecond pulse contrast ratio.
7 The RMS measured for 8 hours at full energy and at an ambient temperature of 21°C ± 0.5°C.

External Dimensions



Dimensions of Iteration-20TW



Dimensions of Iteration-45TW

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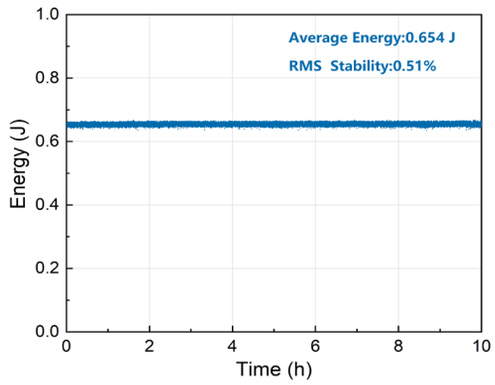
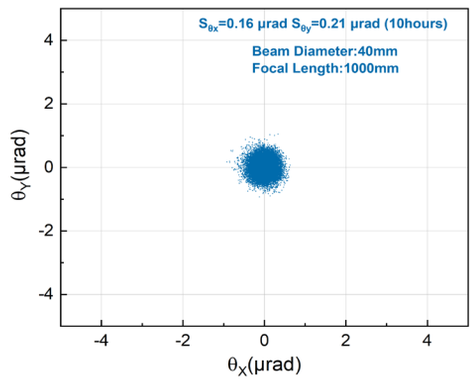
Typical Data

1



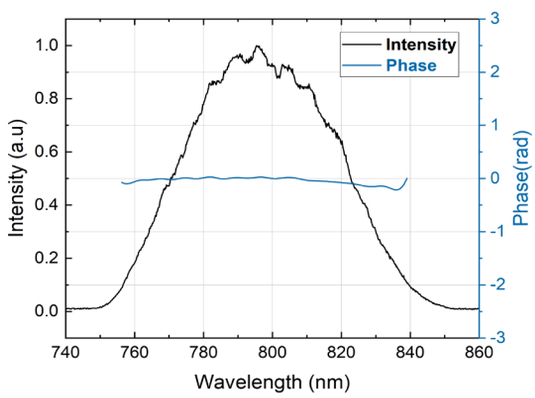
20TW energy stability

2



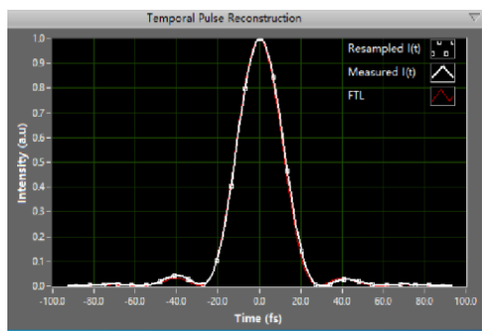
20TW beam pointing stability

3



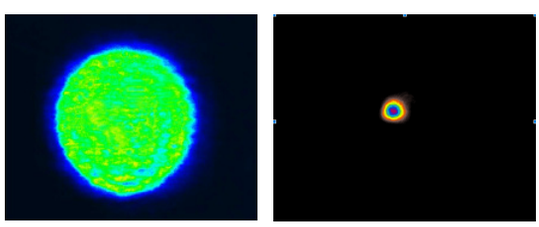
20TW spectrum and phase

4



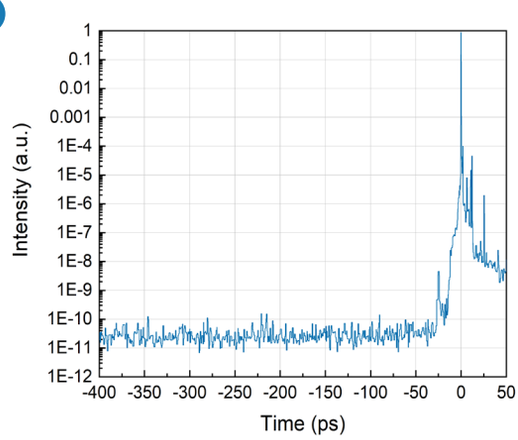
Measured pulse width and reconstructed pulse width (pulse width 25.1 fs, Fourier transform limit 24.8 fs)

5



Near-field spot (left) and far-field spot (right)

6



Picosecond pulse contrast ratio

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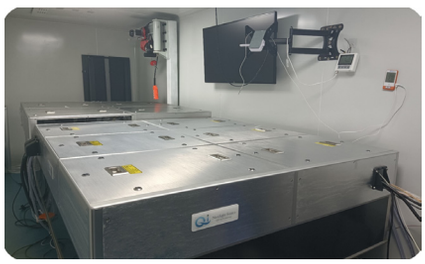
Typical applications

▲ Iteration-40TW
Vehicle mounted Container System External



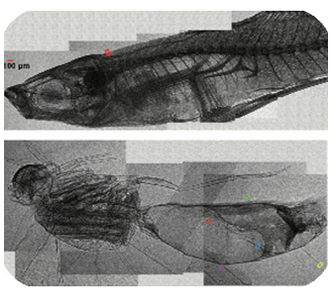
▲ Internal structure of Iteration-40TW
vehicle mounted container system

1

Mobile TW laser system

Provide an onboard TW system for a confidential unit in Beijing

▲ Iteration-20TW Integrated Betatron Desktop Light Source System

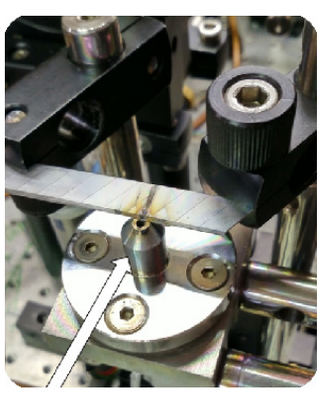


▲ Imaging results based on Betatron micrometer scale resolution proportionality

2

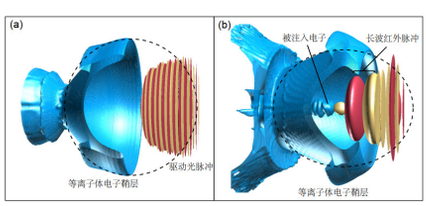
laser wake field acceleration: Betatron driven light source

Thank you to Beijing Academy of Quantum Information Sciences for providing relevant pictures



Drive light

▲ Special plasma generated by ultra short and ultra strong laser combined with blade nozzle structure



3

Generation of near single cycle of ultra-short and ultra-strongmid-infrared

Thank you to Tsinghua University for providing relevant pictures

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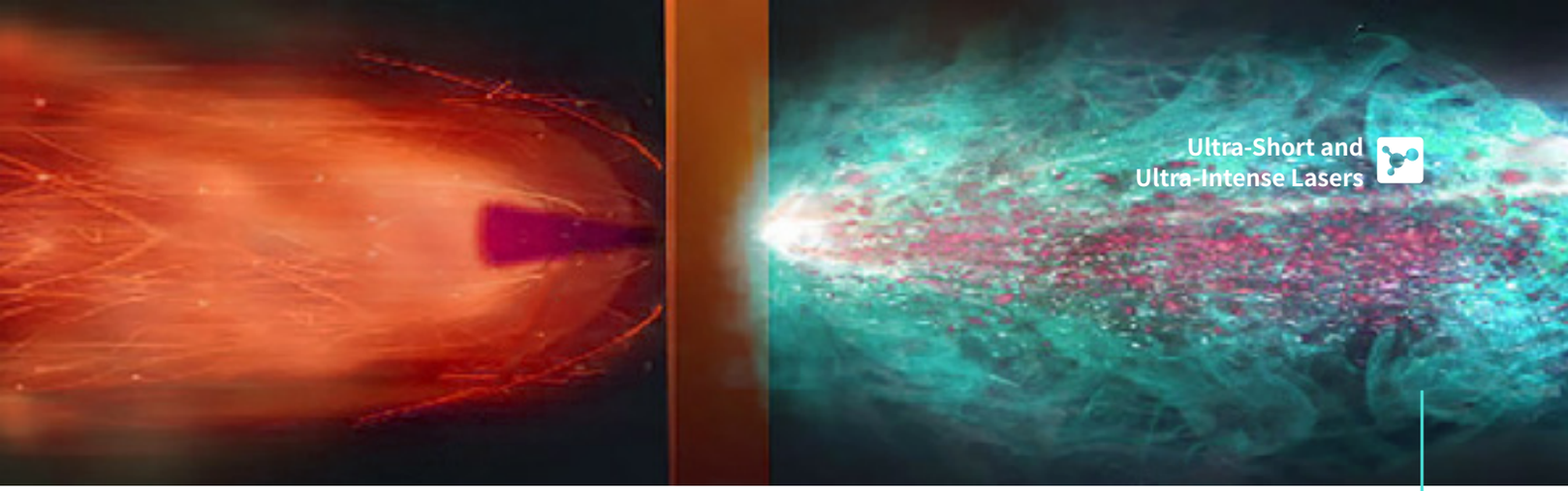


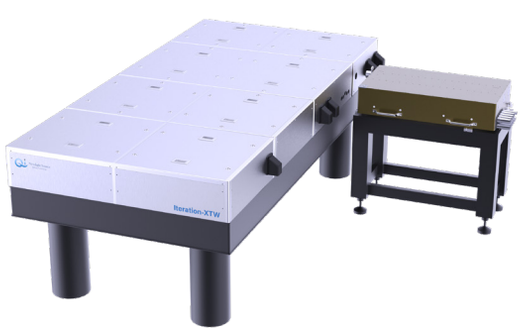
Iteration-XTW

Ultra-short and ultra-intense laser facility

The Iteration-XTW is currently the the most compact hundreds of TW ultra-short and ultra-intense laser facility, and has an industrial-grade reliability. Pulse peak power can be up to 200 TW and repetition rate up to 10 Hz.

A variety of advanced technologies are used for Iteration-XTW to guarantee perfect specifications at high energy. Dual CPA, XPW, multi-pass pulse cleaning technology can improve picosecond pulse contrast ratio to the order of 10^{10}. Deformable mirror technology corrects laser wavefront distortion for higher beam quality. Dazzler and Wizzler form a closed loop of laser spectral phase measurement and feedback to achieve more accurate compression of pulse width.

In terms of engineering, the Iteration-XTW laser system uses a large number of integrated mechanical devices and Triones flexible frames to achieve pointing stability of up to 1.5 μrad. The overall system adopts intelligent and visual network for measurement and control, so as to realize real-time module monitoring and efficient human-machine interaction.



Product Features

- Ultra-compact hundred-TW system
- Industrial-grade reliability
- Pulse peak power up to 200 TW
- Pointing stability better than 1.5 μrad
- Repetition rate up to 10 Hz
- Pulse contrast ratio better than 10^10
- Dual CPA technology
- Precision deformation mirror technology
- Intelligent real-time control system

Typical Applications

- Laser wake field acceleration
- Inverse compton scattering
- High-energy physics
- Higher harmonic generation (HHG)
- All optical electronic knife
- Pre-stage light source for PW large scientific Installations

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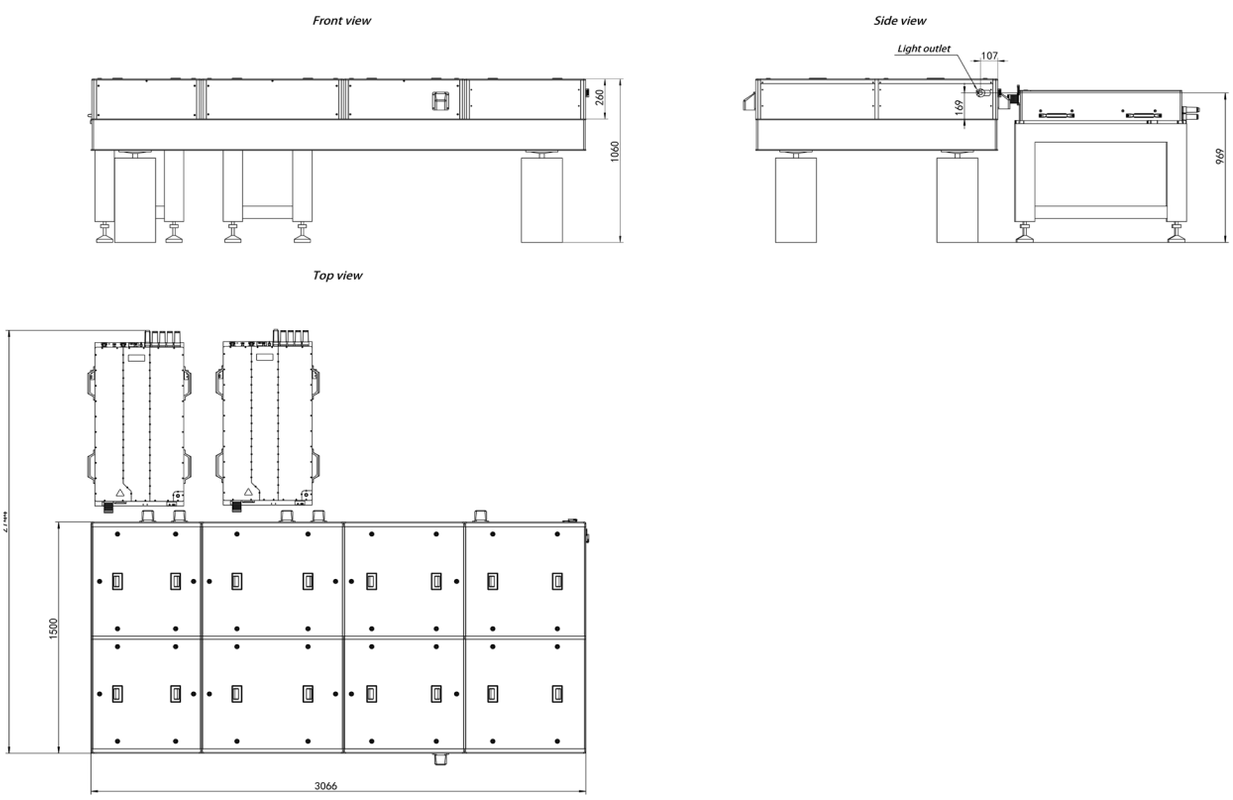
Specifications[1]

	Iteration-100TW	Iteration-200TW
Central wavelength[2]	800±10nm,SHG/THG optional	
Peak power	＞100 TW	＞200 TW
Pulse energy[3]	＞2.5 J	＞5 J
Energy stability[4]	＜1.0% (RMS)	
Pulse width	25 fs	
Max repetition rate	10 Hz	5 Hz
Nanosecond pulse contrast	$>10^9$:1	
Picosecond pulse contrast	$>10^4$:1@1 ps ; $>10^6$:1@5 ps ; $>10^8$:1@10 ps ; $>10^{10}$:1@100 ps	
Beam dimension (1/e^2)[5]	85 mm (nominal)	
Beam pointing stability[6]	＜1.5 μrad(RMS)	
Polarization state	Linear, horizontal	

1 All specifications apply at 800 nm. Due to continuous product improvements, specifications are subject to change without notice.
2 Customer-specified central wavelength.
3 Customer-specified pulse energy.
4 Energy stability measured for 8 hours under stable ambient conditions.
5 Customer-specified beam dimeter.
6 The RMS measured for 8 hours at full energy and at an ambient temperature of 21°C ± 0.5°C.

External Dimensions



Dimensions of Iteration-200TW

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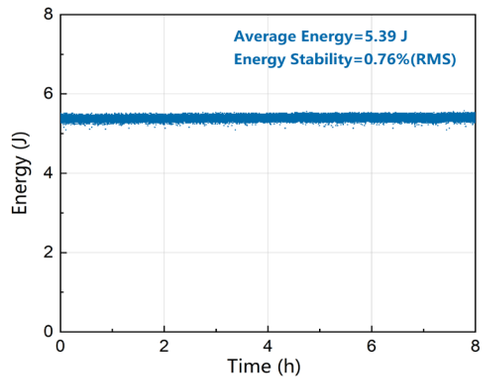
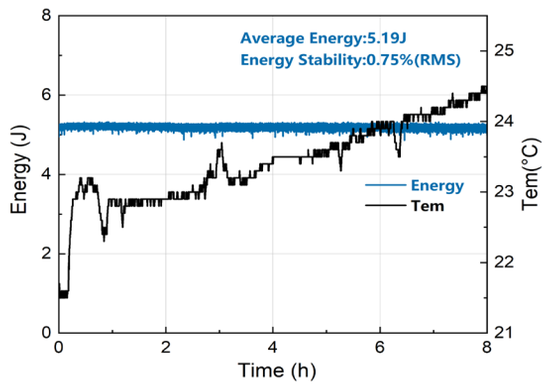
Typical applications

1



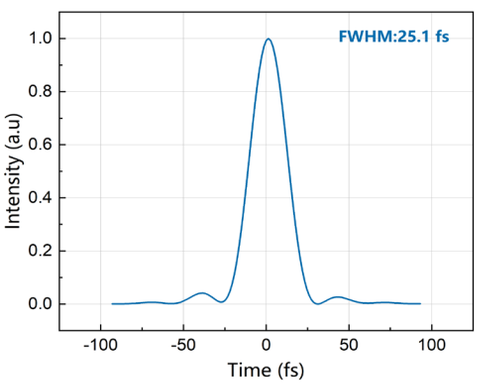
200TW pulse energy

2



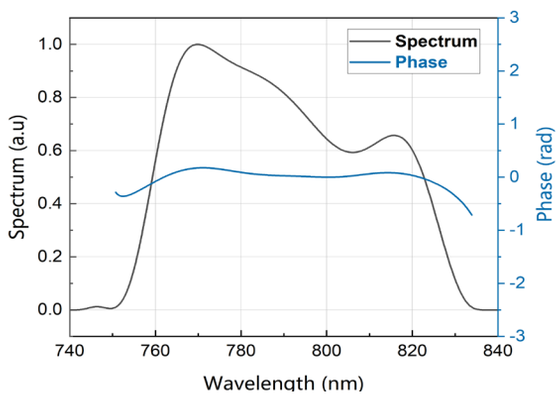
200TW energy-temperature

3



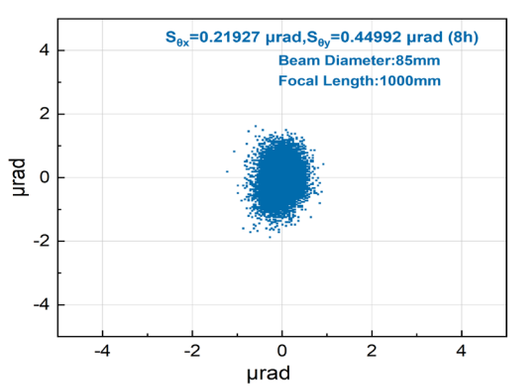
200TW pulse duration

4



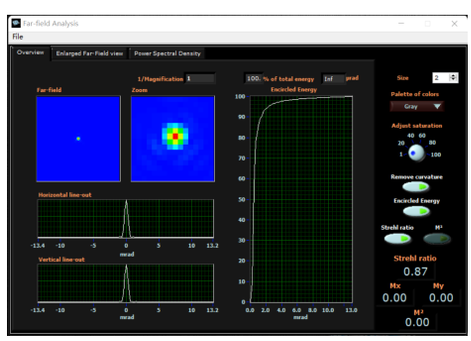
200TW spectrum and phase

5



200TW beam pointing stability

6



200TW strehl ratio

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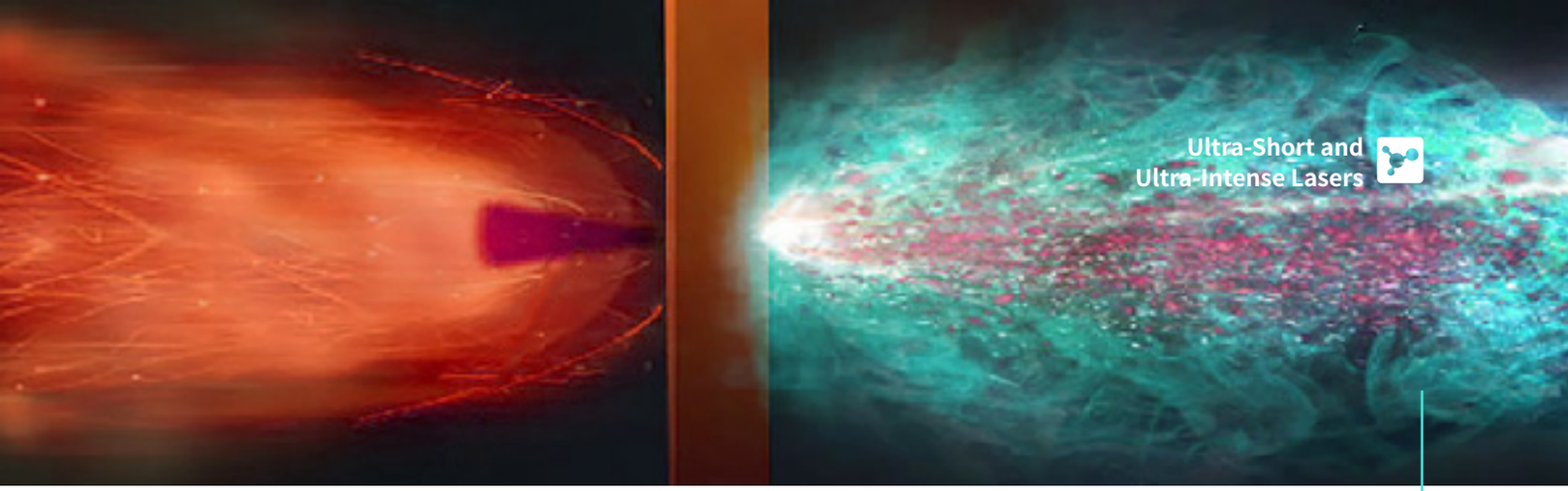


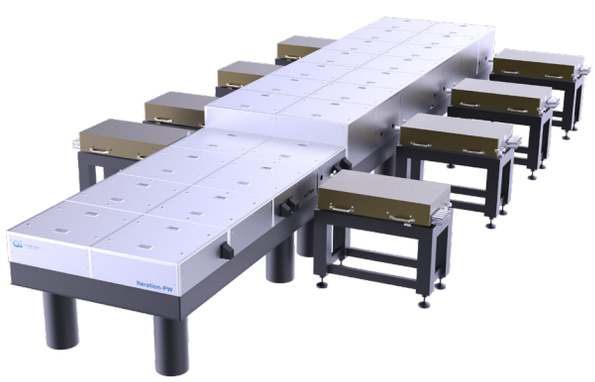
Iteration-PW

Ultra-short and ultra-intense laser facility

The Iteration-PW laser system output pulse peak power is 1 PW (10^{15}W), pulse energy is 25 J, pulse width is 25fs, which is high peak power electro-magnetic field can create.

The Iteration-PW adopts dual CPA structure with pulse contrast of up to 10^10. After systematic optimization of layout design, its area is only 16.7m^2 (including Ti:Sapphire laser is 12m^2, pump source is 4.4m^2), which is the compact PW system in the current world. A large number of high-stability integrated mechanical devices and Triones flexible frames are in the facility, which solves the problem of poor stability of large laser devices, and the reliability can reach industrialization.

The Iteration-PW laser facility is an ideal light source for proton acceleration and strong field physics research due to its ultra-intense electric field peak power.



Product Features

- Industrial-grade PW-level laser facility with the area of only 16.7m^2
- Peak power >1 PW
- Picosecond pulse contrast ratio up to 10^{15}
- Beam pointing stability <1 μrad
- Dual CPA design
- Multi-pass pulse cleaner
- Precision deformable mirror technology
- Real-time operation of the monitoring system

Typical Applications

- Laser proton acceleration
- High-energy physics

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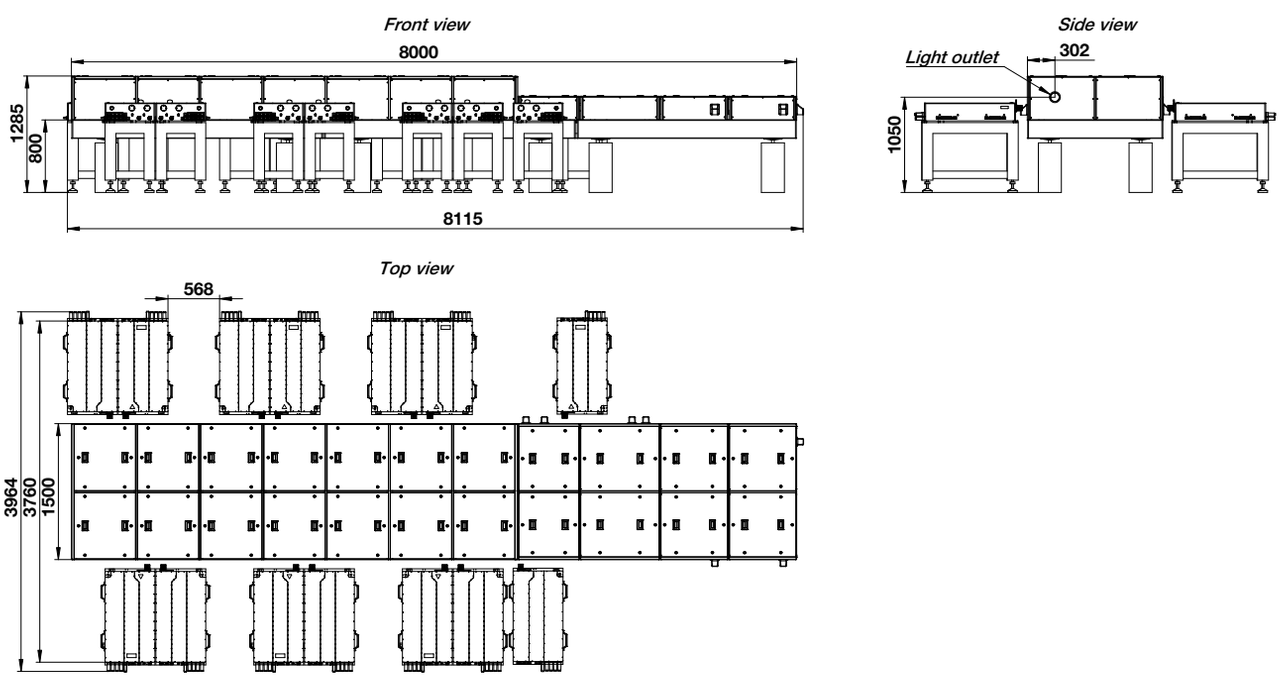
Specifications [1]

	Iteration-0.5PW	Iteration-PW
Pulse energy[2]	800±10nm,SHG/THG optional	
Peak power	>1 PW (10^{15} W)	
Pulse energy3[3]	>12.5 J	>25 J
Energy stability[4]	<1.0% (RMS)	
Pulse width	25 fs	
Max repetition rate	5 Hz	1 Hz
Nanosecond pulse contrast	>10^{10}:1	
Picosecond pulse contrast	>10^{4}:1@1 ps ; >10^{6}:1@5 ps ; >10^{8}:1@10 ps ; >10^{10}:1@100 ps	
Beam dimension($1/e^2$)[5]	190 mm (RMS)	
Beam pointing stability[6]	<1 μrad (RMS)	
Polarization state	Linear, horizontal	

1 All specifications apply at 800nm. Due to continuous product improvements, specifications are subject to change without notice.
2 Customer-specified central wavelength.
3 Customer-specified pulse energy.
4 Energy stability measured for 8 hours under stable ambient conditions.
5 Customer-specified beam dimeter.
6 The RMS measured for 8 hours at full energy and at an ambient temperature of 21°C ± 0.5°C.

External Dimensions



Dimensions of Iteration-PW

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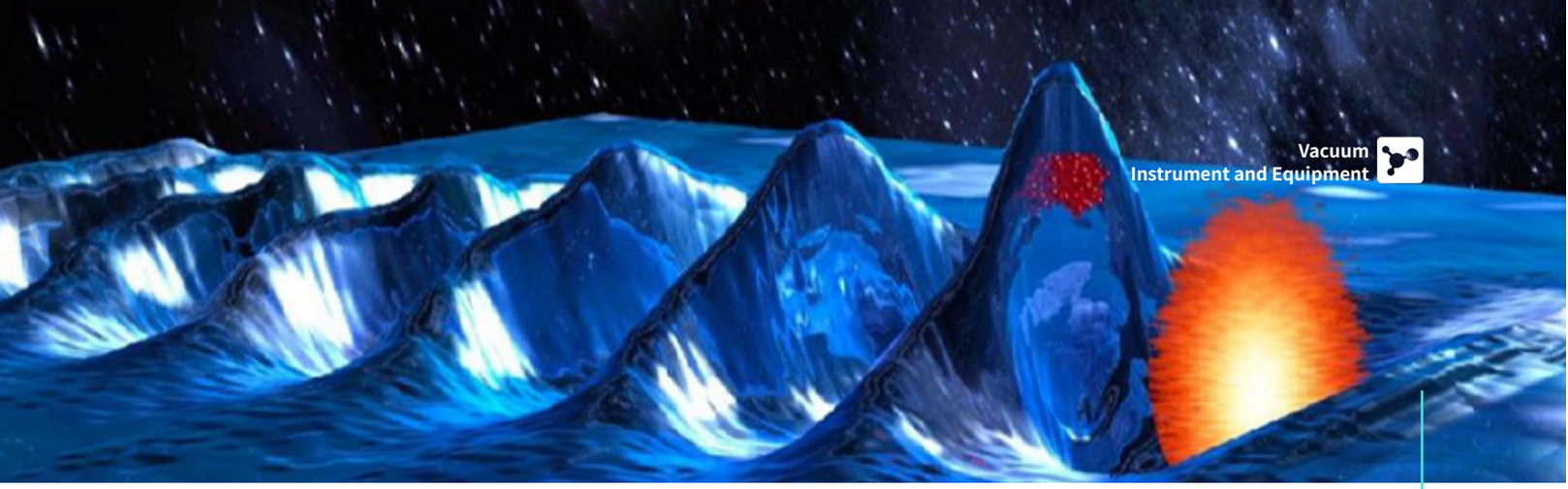

Vacuum
Instrument and Equipment

QVC-10TW-C

Laser vacuum chamber

QVC-10TW-C is a compressor and experimental vacuum chamber for ultra-short and ultra-intense laser users, which can be customized according to the actual needs of users. The professional mechanical design minimizes the cavity deformation while ensuring the vacuum degree of the cavity, ensuring the stability and consistency of optical path transmission in the cavity.

Product Features

- High vacuum degree
- Highly customizable
- Vibration isolation design
- Compatible with Iteration systems

Typical Applications

- Laser wake field acceleration
- Ultrafast electron diffraction
- High-energy physics
- Attosecond pulse generation

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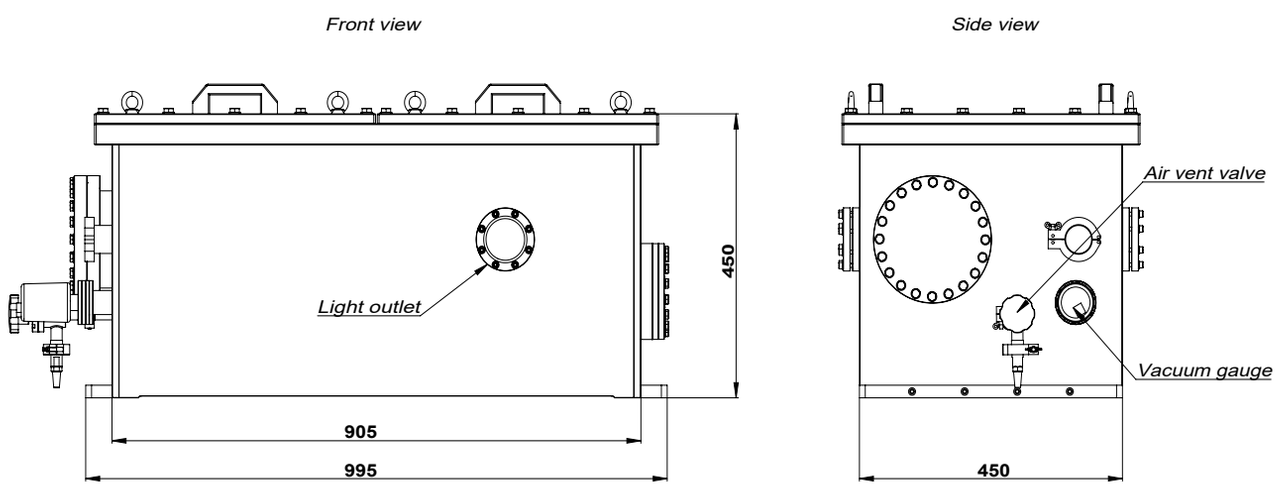
Specifications

	QVC-10TW-C
Dimensions	⩾865 mm*400 mm*450 mm
Breadboard size	⩾845 mm*380 mm*20 mm
Breadboard surface roughness	Ra⩽3.2 μm
Material	Non-magnetic stainless steel 316 L
Vacuum	$\leqslant 10^{-2}$ torr
Leakage rate	$\leqslant 1*10^{-7}$ Pa•L/s
Surface treatment	Electrolytic polishing
Mechanical pumps	Pumping speed⩾55 m^3/h(15.4 L/s), Ultimate pressure⩽3*10^{-2} mbar, Leakage rate⩽1*10-5mbar•L/s
Flange interface	DN40
Compatibility[1]	Iteration-10TW

1 We can provide users with compatible different types of laser customized products, please contact us for details.

External Dimensions



Dimensions of QVC-10TW-C

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