

# INSPIRE THE WORLD

**BWT Company and Products Profile**

**Earliest**

In 2003

The earliest domestic private laser manufacturer with mass production capacity

**18 Years**

Focus

Focus on development and market application of laser products for 18 years

**First**

China

Market share in the semiconductor laser segment ranks No. 1 in China

**The most sorts**

World

Possess the most sorts of semiconductor lasers in the world

**10 million**

Dispatched

More than 10 million lasers are dispatched to the world

01/ **About BWT**

02/ **Technological strength**

03/ **Business system**

04/ **Industry application**

# 01 About BWT

# About BWT

Founded in 2003, BWT is committed to creating better laser products and working hard to build a more efficient and better world.

BWT provides laser diode, fiber laser, and ultrafast laser products and solutions to global customers.

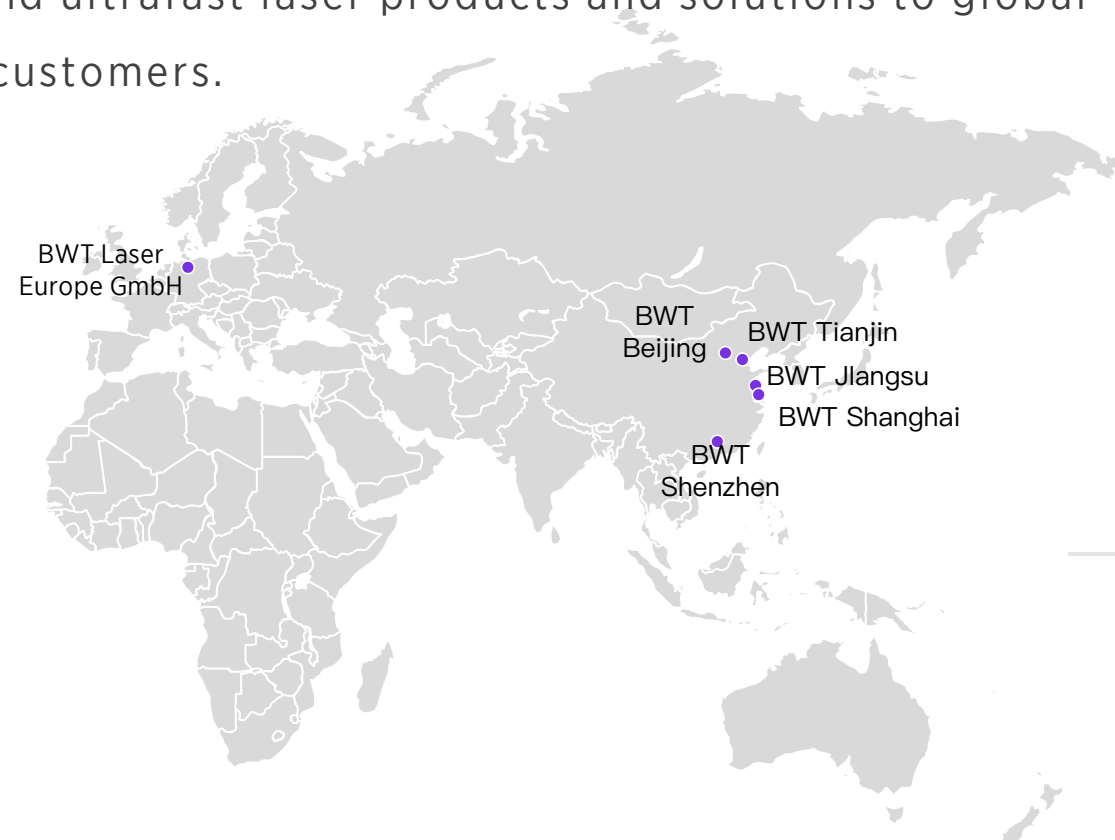
**1000<sup>+</sup>**  
Employees

**200<sup>+</sup>**  
R&D Engineers

**80<sup>+</sup>**  
Core patent

**6**  
Locations

**70<sup>+</sup>**  
Export countries





Enterprise Vision

# Enterprise Vision

“

**INSPIRE THE WORLD**

”

## **Mission**

Let the dream drive  
the light

## **Vision**

Global Leader in Laser  
Solutions

## **Value**

Outstanding  
Innovation



# Management Team

Xiaohua Chen

CEO

PhD, Tsinghua University

MBA, Tsinghua University

Outstanding Graduate of Tsinghua University



**MD Dr. Jens Biesenbach**

PhD, Mechanical  
Engineering  
Laser Technology



**MD Dr. Marcel Marchiano**

Marcelo Prof Dr  
Marchiano



**VP Dr. Xinhua Gu**

Master of Chinese  
Academy of Sciences

Doctor of USA Bowling  
Green State University



**VP Dr. Jie Dong**

Master of Tsinghua  
University

Doctor of Tokyo  
Institute of Technology



**VP Dr. Caobolin**

Doctor of Xian Jiaotong  
University

Postdoc of Queen's  
University Belfast

# Development History

2003

Established 300m<sup>2</sup> clean room workshop in Fengtai Park, Zhongguancun Science and Technology Park, Beijing

2011

Launched 9xxnm 106.5um 70W series pump diode lasers

2004

Launched the first generation of 830nm laser products and entered printing market

2014

Selected as the "Annual Innovative Product" and "Annual Laboratory Recommended Brand" among China Photonics Products

2005

First 1000pcs BWT LDs entered into the USA medical market

2017

Established fiber laser BU & ultrafast laser BU at Tianjin new factory. Ship out 300kpcs LDs

2008

Established COS package line Participate in the Peking Olympic Games laser display project

2018

Launched New Beam<sup>TM</sup> LDs (High Power High Brightness)

2010

Exported 100,000+ LDs to the European and American laser medical markets

2020

Established German subsidiary in Mainz Approved for "Postdoctoral Programme"



# Talents System

Benefit from excellent human resource system , a number of national and municipal distinguished experts and internationally renowned laser technology experts have joined BWT.

BWT also has an elite team composed of more than 100 doctors and masters from key universities of China.

## Enterprise certification platform

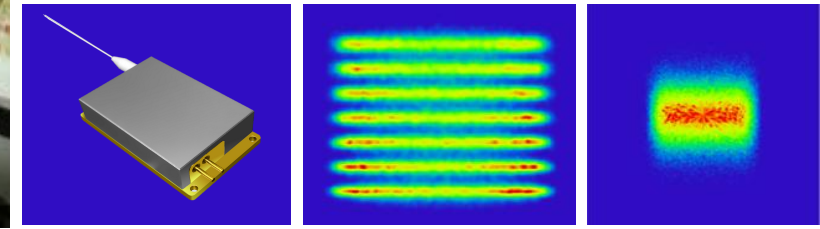
- Postdoctoral Research Station
- Beijing Enterprise Technology Center
- Beijing International Science and Technology Cooperation Base
- Ministry of Industry and Information Technology's first batch of specialized and new "little giant" enterprises



# 02 Technical Strength

# Core Technologies

Laser manufacturing: control every process link from diode laser chip placement to fiber coupling

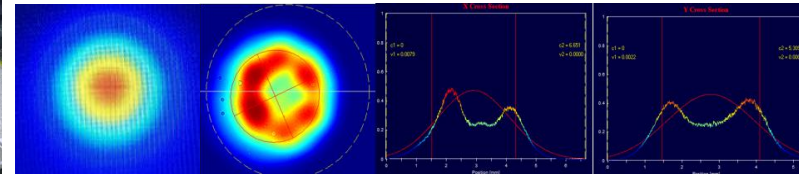
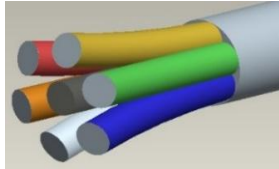
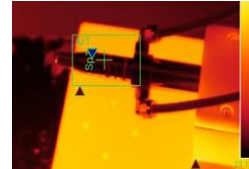
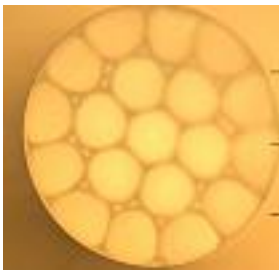
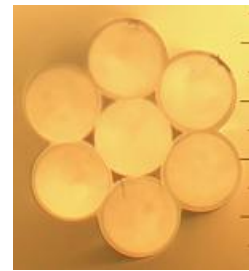
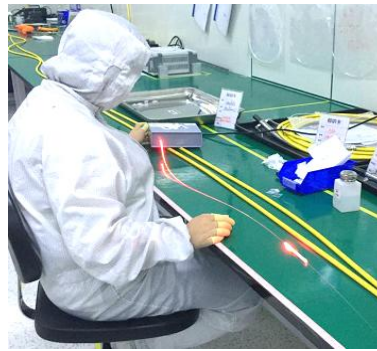


## Key Technologies of diode laser

- High-power diode laser chip patch
- Beam shaping, beam quality optimization
- Multi-optical path spatial combining and high-precision fiber coupling
- Diode laser package



# Core Technologies

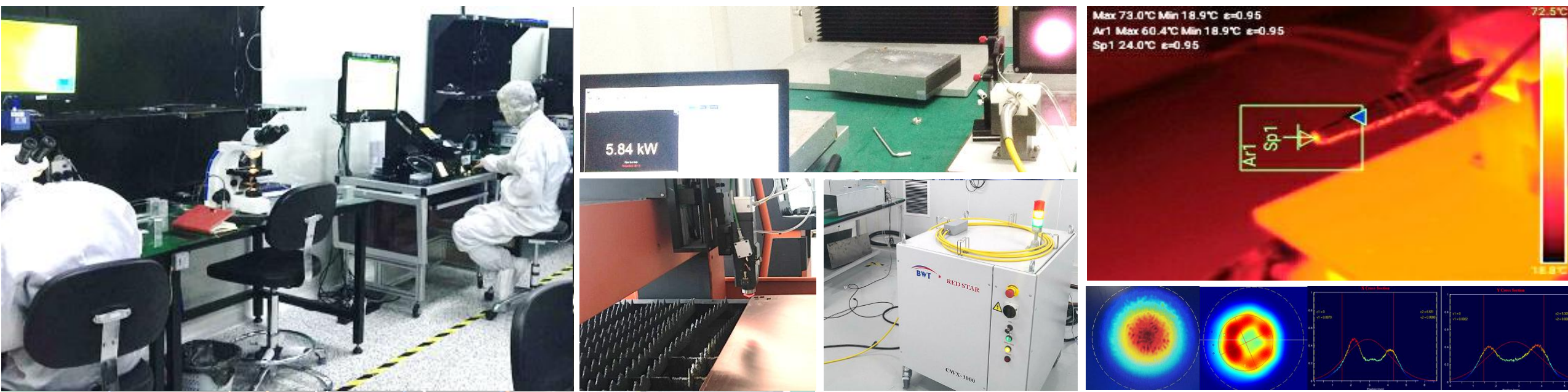


## Key passive components

- High-power fiber laser pump beam combining technology
- High-power laser energy beam combining technology

- Cladding optical filter technology
- Laser energy transfer output technology

# Core Technologies



## Diode laser system integration

- Pump diode laser and fiber cooling
- Stable fiber fusion splicing technology
- Laser mode control
- Anti-high reflection light structure
- Good anti-jamming software control and electric control



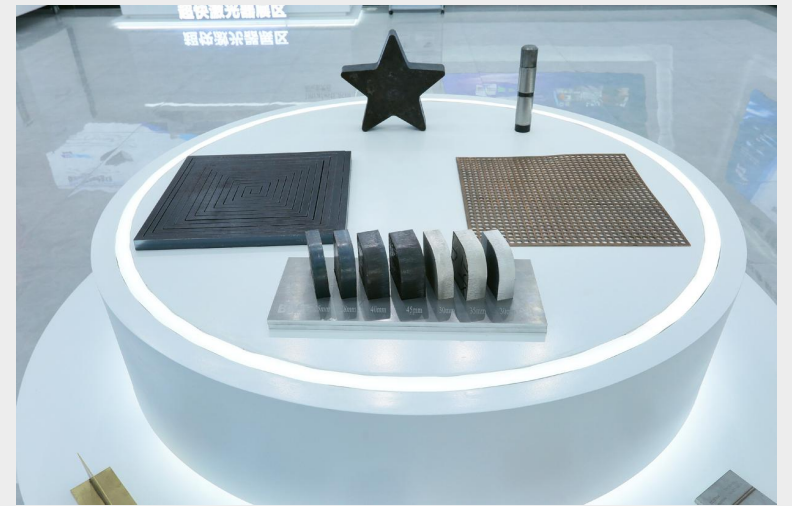
# Industrialization Capability



- High-precision automatic placement machine
- FAC, mirror automatic coupling system
- Components and COS automatic wiring equipment
- High-precision dicing equipment
- Automated component brightness test system
- High reliability aging screening equipment with independent intellectual property rights



# Tianjin Automation Production Base



## Process Team

BWT has a well-trained and experienced team of engineers and technicians.

70%<sup>+</sup>

Team members with more than ten years of engineering experience


80%<sup>+</sup>

Team members with bachelor degree or above

10 million<sup>+</sup>

Diode lasers have been dispatched to the world





Quality Control

# Quality Control

“

”

## ISO

ISO-9001:2015 international  
standardized quality system  
certification.

## 100%

100% products have to pass multiple  
strict quality control test before reach  
our customers (e.g. high temperature  
aging test, low and high temperature  
cycle test, air tightness, etc. )

## Quality inspection posts

Quality inspection posts  
including IQC, SQE, PQC,  
PQE, OQC, CQE etc.

# Technology Transfer

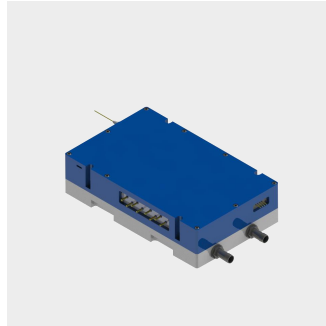
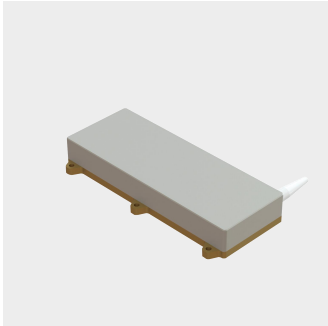
Facing the world's laser cutting-edge technology, BWT provides cost-effective products and services to customers around the world based on independent research and development and continuous innovation.

- In 2017: 600W high brightness diode laser pumping source;
- In 2018: High brightness kW-class direct diode laser;
- In 2020: Kilowatt wavelength-stabilized CW and QCW diode laser;
- In 2021: KW-level high brightness blue diode laser; Thermal characteristics analysis of high power 808nm bar facial array.



# 03 Business System

# Business System



## *Diode Laser BU*

- Fiber coupled diode laser
- Bar stacked diode laser
- Diode laser system
- Diode laser accessories



## Fiber Laser BU

- Single mode linear-cavity fiber laser
- Combined fiber laser
- Direct diode laser



## Ultrafast Laser BU

- Picosecond laser
- Femtosecond laser





# Diode Lasers

BWT has the most complete diode laser product line in the industry, provides users with flexible and diverse solutions in industrial pumping, industrial processing, medical beauty, scientific research, sensor detection, security lighting and other application fields.

| Wavelength    | Output Power                                                          |
|---------------|-----------------------------------------------------------------------|
| 405nm         | 160mW, 10W, 30W                                                       |
| 450nm         | 800mW, 3W, 15W, 50W, 100W, 200W, 500W, 1KW                            |
| 520nm         | 5mW, 10mW                                                             |
| 635nm/660nm   | 2mW, 20mW, 50mW, 400mW, 1.8W, 5W                                      |
| 785nm VBG     | 600mW                                                                 |
| 793nm         | 4W, 8W, 12W, 16W, 30W, 50W, 80W, 140W, 180W                           |
| 808nm         | 4W, 8W, 15W, 25W, 30W, 40W, 55W, 60W, 100W, 150W, 300W                |
| 830nm         | 1W, 2W                                                                |
| 878.6nm/888nm | 30W, 65W, 90W, 120W, 170W                                             |
| 915/940/976nm | 10W, 30W, 70W, 150W, 185W, 200W, 300W, 330W, 540W, 1KW, 2KW, 3KW, 4KW |
| 976nm VBG     | 3W, 9W, 18W, 27W, 60W, 100W, 130W, 140W, 180W, 300W, 400W, 600W       |
| 1064nm        | 10W, 15W, 20W                                                         |



# Fiber Lasers

Based on the own design of pumping source, passive components, optical system and power supply system with independent intellectual property rights, BWT fiber laser has three series of products, which can meet the needs of different end-user applications.

| Direct diode laser                    |                               |
|---------------------------------------|-------------------------------|
| Power                                 | 500W–4000W                    |
| Fiber                                 | 220μm/300μm/330μm/400μm/600μm |
| Single mode linear-cavity fiber laser |                               |
| Power                                 | 500W–6000W                    |
| Fiber                                 | 14μm/20μm/50μm/100μm          |
| Combined fiber Laser                  |                               |
| Power                                 | 6000W–50000W                  |
| Fiber                                 | 100μm/200μm                   |



# Ultrafast Lasers

BWT has a full range of ultrafast laser products of picosecond and femtosecond. Using self-made mode-locked lasers, based on high-energy solid-state amplification technology, femtosecond chirp technology, frequency doubling technology, etc., the stability and technical indicators are domestically leading.

| Picosecond Laser                     |                              |
|--------------------------------------|------------------------------|
| <b>Picosecond infrared(1064nm)</b>   | 10W/20W/30W/40W/50W/75W/100W |
| <b>Picosecond green light(532nm)</b> | 6W/20W/30W                   |
| <b>Picosecond ultraviolet(355nm)</b> | 15W/30W                      |

| Femtosecond Laser |                             |
|-------------------|-----------------------------|
|                   | >50μJ, <300fs, >50W, 1030nm |
|                   | >10μJ, <500fs,>10W, 1030nm  |



# 04 Industry Application

## Industry Application

### Diode Laser

- Industrial Pumping
  - Sensing detection
  - Industrial processing
  - Plate printing
  - Medical cosmetology
  - Security lighting
  - Scientific research
- 

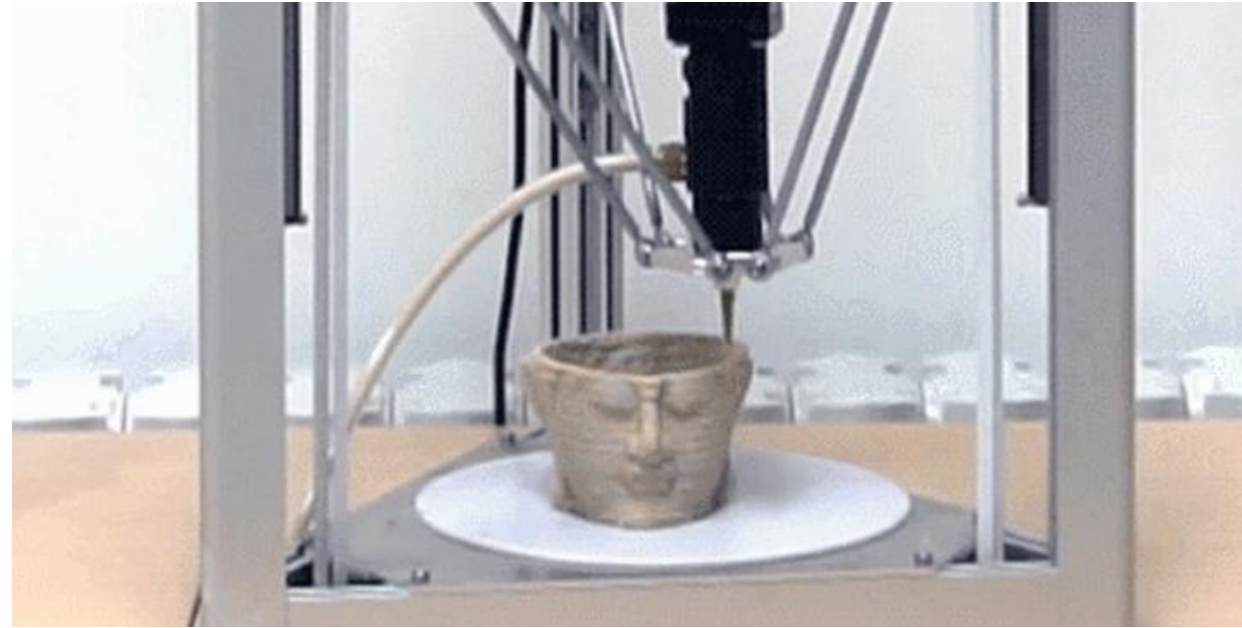
### Fiber Laser

- Cutting
  - Welding
  - Surface treatment
  - Drilling
  - Sheet metal processing
  - Lithium battery processing
  - Additive manufacturing
  - 3D printing
- 

### Ultrafast Laser

- Brittle material cutting & drilling, fine machining
  - OLED material cutting
-

## Diode laser application



### Industrial processing

- Laser welding (brazing, metal welding, plastic welding, etc.), Laser 3D printing, Laser marking, Laser cladding,
- Laser 3D printing
- Laser marking



## Diode laser application



## Plate printing



- Computer-to-plate
- Laser dyeing
- Flexible printing
- Laser direct imaging

## Diode laser application



## Medical cosmetology

- Laser surgery
- Laser dentistry
- Laser cosmetology
- Laser physiotherapy
- Photodynamic medicine

## Diode laser application

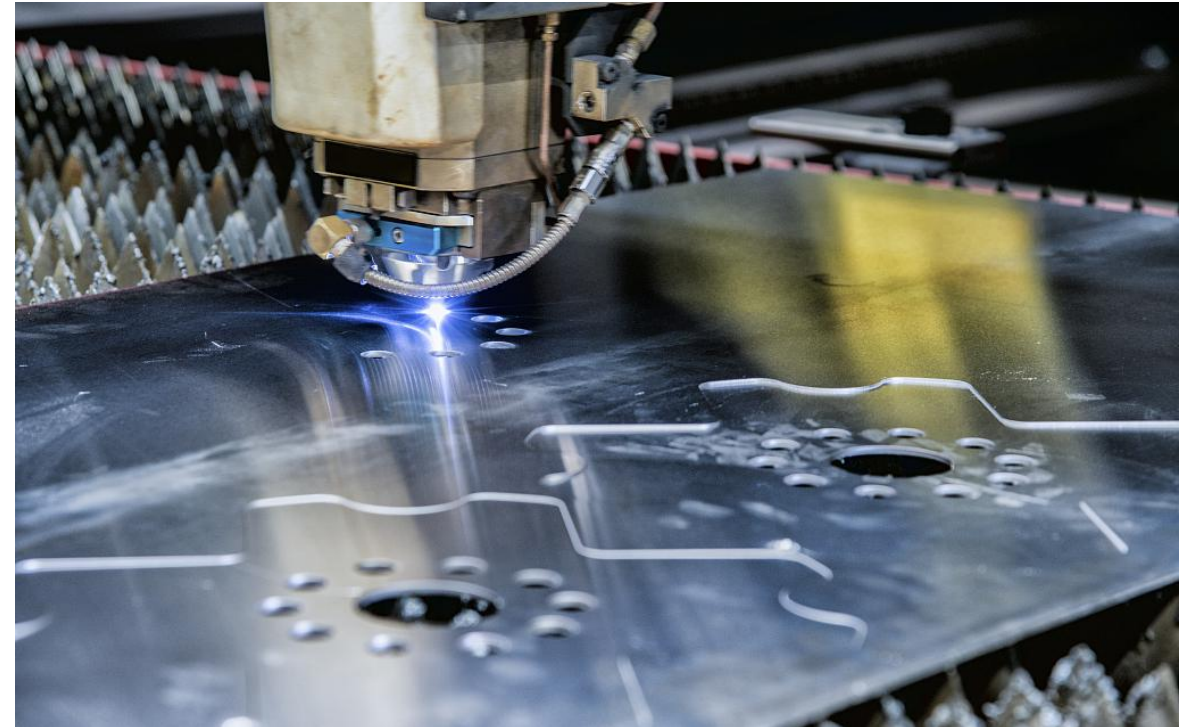


## Security Monitoring

- Railway
- Highway
- Border line
- Coast line
- Oil field



## Fiber laser application



## Laser cutting & welding

- Carbon steel
- Stainless steel
- Aluminum
- Brass
- Copper

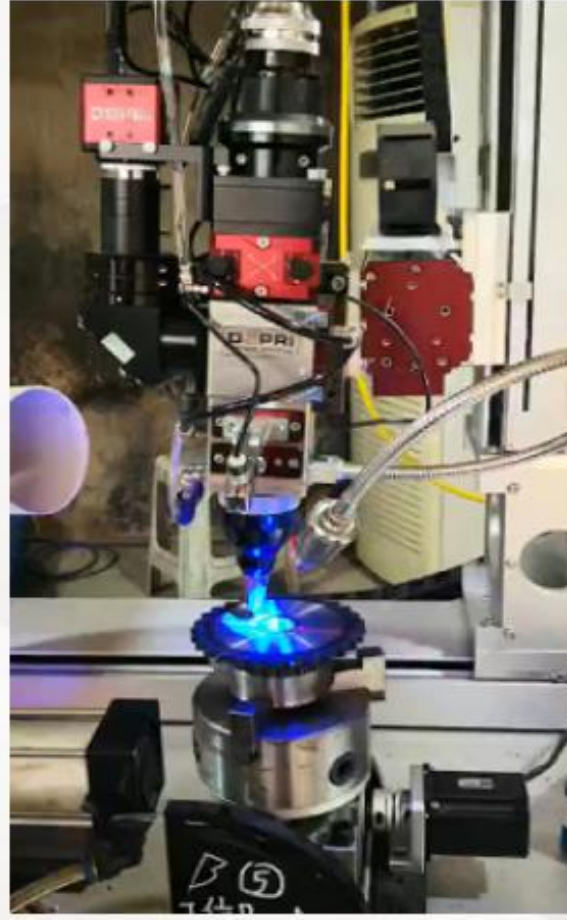
## Fiber laser application



### **Metal hand-hold welding**

- Carbon steel
- Stainless steel
- Aluminum

# Fiber laser application

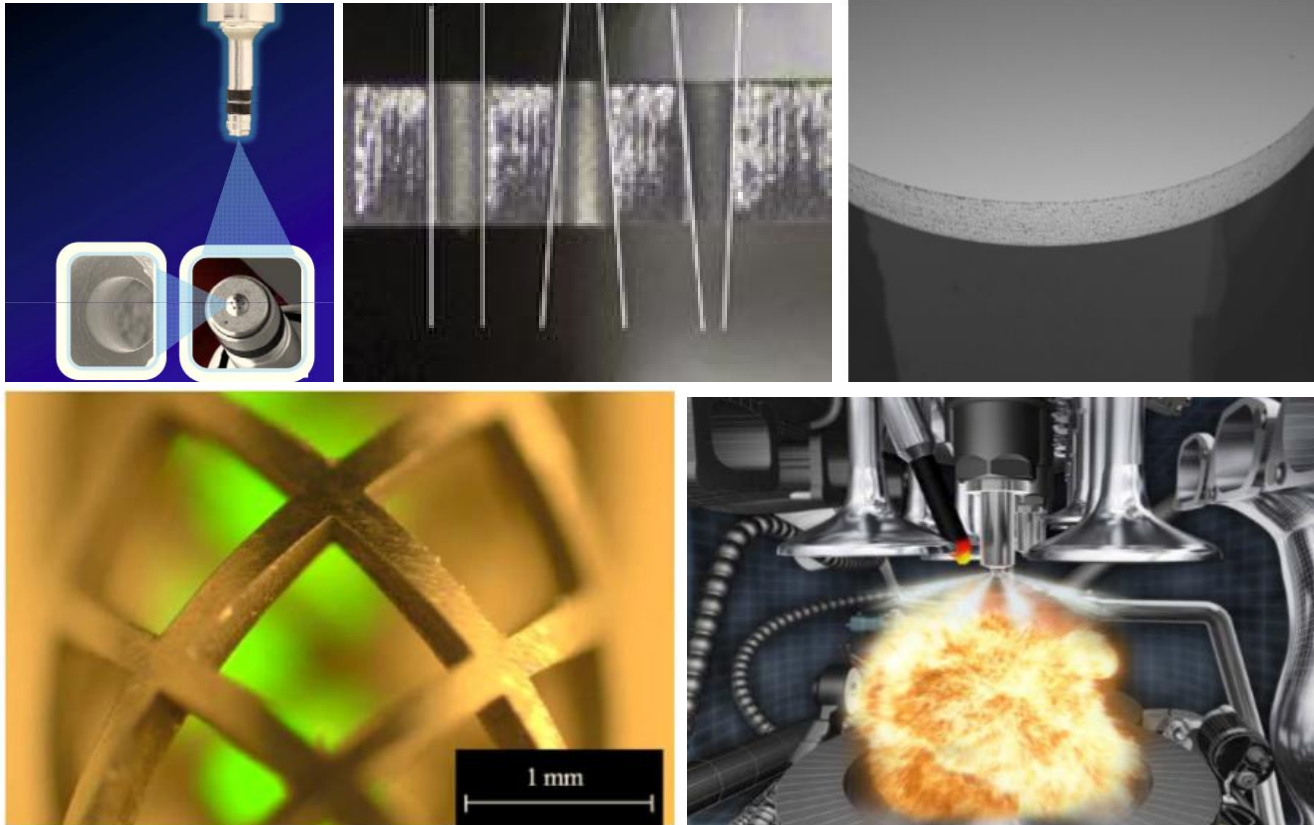


## Metal welding

- Laser: BWT-3000-4
- Material: 8mm 45# Steel
- Welding method: encircling weld
- Welding requirements: welding seam strength larger than the base metal, without cracks



# Ultrafast laser application



## Ultrafast laser

- Cutting, drilling, and fine machining of brittle materials such as metal, glass, ceramics, sapphire, etc.

## Ultrafast laser application



## Ultrafast laser

- OLED material cutting, punching, flexible screen, smart wearable products, etc.

## Being professional needs accumulation

**Customer**-oriented

**Timely and effective** service

**Leading** technological strength

**Strong** mass production capacity

**Stable** supply chain system



Provide products and services that meet customer needs



Prompt response from R&D, production and service teams



Leaded by domestic and foreign experts, R&D team of more than 100 members



The largest diode laser manufacturer in China, with an annual output of 300,000+ LDs



Wide range of partners at home and abroad

# Thanks !

