

# Broadly Tunable Laser in the Mid-IR

With integrated computer-controlled OPO for continuous tuning across  
1435 - 4138 nm ( $6968 - 2416 \text{ cm}^{-1}$ )\*



## TITAN



### KEY FEATURES

- Wide wavelength tuning across 1435 - 4138 nm ( $6968 - 2416 \text{ cm}^{-1}$ )\*
- Hands-free motorized tuning with GUI interface. Control drivers available
- Sealed, compact, and virtually maintenance-free
- Spectral monitoring with integrated spectrometer

### APPLICATIONS

- Quantum technology
- Device characterisation
- Component characterisation
- Mid-IR communications
- Metrology

**TUNE YOUR WAVELENGTH**

Broadly Tunable Laser Systems for Science & Technology

## Description

The extraordinary Titan is the pioneer commercial mid-infrared continuous-wave optical parametric oscillator (CW OPO). Introduced to the market in 2018, Titan delivers continuously tunable output wavelengths in the mid-IR, across 1435 - 4138 nm (6968-2416 cm<sup>-1</sup>)\*. The full spectral range is achieved with a single set of optics without the need to exchange any module.

Radiantis' unique expertise in frequency converted lasers has enabled the exceptional design of the Titan OPO family. As a sealed and fully-automated system, with excellent TEM<sub>00</sub> beam quality ( $M^2 < 1.3$ ) and beam pointing stability (<40 µrad), Titan delivers high CW output power (>3 W at the peak of the tuning range) with a linewidth <100 MHz in the signal range.

Hands-free operation is ensured thanks to the all-digital control electronics and user control software which can be accessed through the PC GUI interface installed on a dedicated laptop delivered with the OPO. Titan can also be controlled via remote commands.

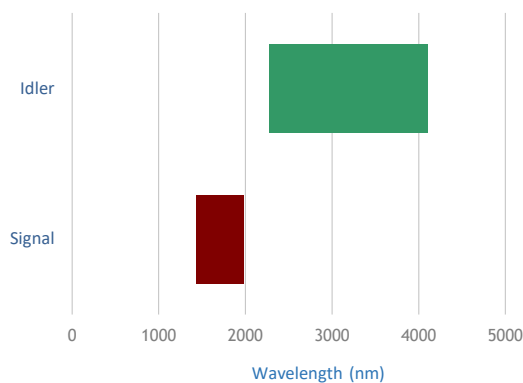
Titan integrates 4 key modules: 1) a rack DFB fiber laser and amplifier unit, 2) the OPO optical head, 3) a rack OPO all-digital control electronics and 4) a rack compact water-cooler. The fiber laser, the OPO control electronics and the water cooler are rackable. The OPO optical head needs to be positioned on an optical table to reduce vibrations and ensure maximum stability.

The broad wavelength range, narrow linewidth, and fully-automated tunability across the mid-IR enables cutting-edge research in diverse areas such as spectroscopy and microscopy for biotechnology, fundamental physics and chemistry, as well as material characterisation, device calibration and quantum technologies.

Several Titan models are available which provide different characteristics of average output power and wavelength coverage, as detailed in the specification table below.

\* (with a gap between 2000–2270 nm)

## TITAN Wavelength Coverage



### Output Ports

Titan incorporates two output ports:

- Signal                    1435 - 2000 nm  
                                  (5000 - 6968 cm<sup>-1</sup>)
- Idler                        2270 - 4138 nm  
                                  (2416 - 4405 cm<sup>-1</sup>)

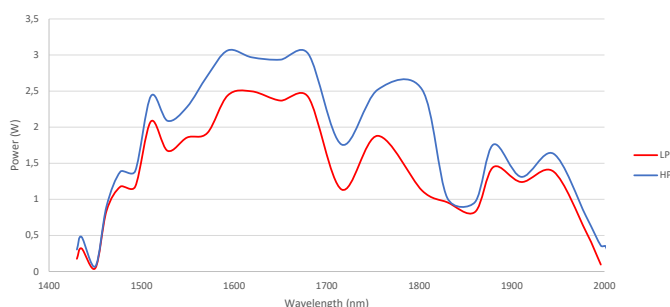
This superior spectral coverage is provided with exceptional output power across the entire range (>3 W at peak wavelength).

## Specifications<sup>(1)</sup>

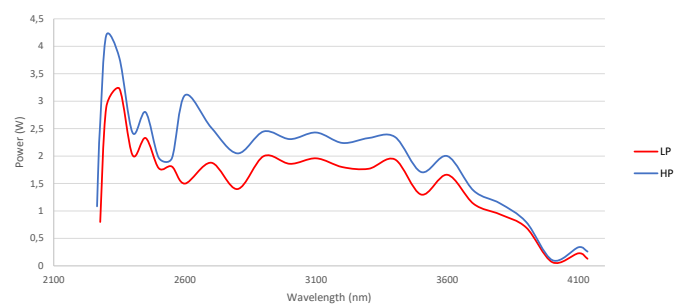
Output Characteristics	TITAN LP	TITAN HP
<b>Tuning Range</b>		
Signal output	1435 - 2000 nm (5000 - 6968 cm <sup>-1</sup> )	1435 - 2000 nm (5000 - 6968 cm <sup>-1</sup> )
Idler output	2270 - 4138 nm (2416 - 4405 cm <sup>-1</sup> )	2270 - 4138 nm (2416 - 4405 cm <sup>-1</sup> )
<b>Output Power<sup>(2)(3)</sup></b>		
Signal output	> 1.5 W	> 2.5 W
Idler output	> 2.5 W	> 4 W
<b>Linewidth</b>		
Signal output	<100 MHz	<100 MHz
Idler output	<2 GHz	<2 GHz
<b>Beam Parameters</b>		
Beam diameter at 1650 nm	<3.0 mm	<3.0 mm
Beam diameter at 3000 nm	<3.0 mm	<3.0 mm
Spatial mode	TEM <sub>00</sub> (M <sup>2</sup> ≤ 1.3)	TEM <sub>00</sub> (M <sup>2</sup> ≤ 1.3)
Beam pointing signal	<80 μrad	<80 μrad
Beam pointing idler	<20 μrad	
Beam displacement with tuning idler	<0.3 mm	
<b>Polarization</b>		
Signal	Linear - Horizontal	Linear - Horizontal
Idler	Linear - Horizontal	Linear - Horizontal
<b>Power stability</b>		
Signal	<0.5% rms <sup>(5)</sup>	<0.5% rms <sup>(5)</sup>
Idler	<0.5% rms <sup>(6)</sup>	<0.5% rms <sup>(6)</sup>
Size (W x L x H)	610 x 350 x 200 mm (24.0 x 13.8 x 7.9 inch)	

Notes: (1) Specifications are subject to change without notice. (4) Across the full spectral range.  
 (2) At Peak of OPO tuning range. (5) At 1478 nm.  
 (3) Higher powers available on request. (6) At 3800 nm.

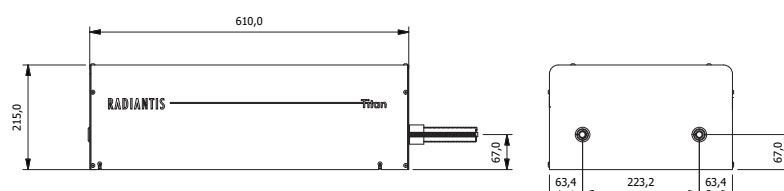
### Typical Signal Tuning Curve



### Typical Idler Tuning Curve



### Dimensions



Notes: Dimensions in mm.