

CW 赤外OPOLレーザシステム **OS 4500**

波長 1.38～2.00 μm 、 2.28～4.67 μm



All Solid State Infrared Laser Source
1.38 – 2.00 μm and 2.28 – 4.67 μm



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System Description



Fig. 1: The modular design of the OS 4500 allows for easy system upgrades.

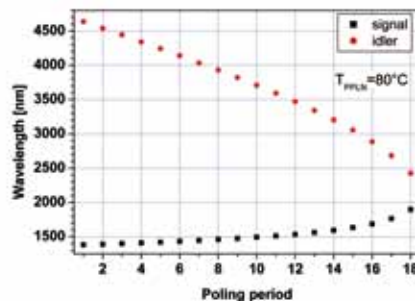


Fig. 2: Coarse tuning of OS 4500.

The **OS 4500** is a compact, all-in-one continuous-wave laser source combining excellent spectral properties with an extremely large tuning range. Features like

- Single Frequency Operation
- Narrow Linewidth
- Low Noise
- Outstanding Beam Quality

make it the ideal tool for high-resolution spectroscopy and many other applications requiring precision metrology in the infrared spectral region.

The **OS 4500** system is an optical parametric oscillator (OPO) completely equipped with control and stabilization

electronics as well as an integrated pump laser. Its output is converted into signal and idler radiation in a nonlinear crystal (periodically poled, MgO doped lithium niobate). The crystal is placed inside an optical resonator which forms the actual OPO. An intra-cavity etalon (ICE) ensures stable single-frequency operation.

The large emission range for signal (1.38 – 2.00 μm) and idler (2.28 – 4.67 μm) radiation is achieved by integrating several poling periods on a single crystal.

The system can be tuned to the desired emission frequency without changing optical components. Tuning can be performed on several levels:

Coarse tuning is done by manually changing the lateral position of the nonlinear crystal to select a suitable grating.

Temperature tuning is then used to find the desired wavelength within one grating.

Etalon tuning selects the desired cavity mode of the resonated radiation (either signal or idler) within the gain bandwidth of the OPO.

Continuous tuning without mode-hops is performed by changing the frequency of the pump laser.



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Standard Specifications

Parameters	Specifications
Pump wavelength	1064 nm
Signal emission range	1380 – 2000 nm
Idler emission range	2280 – 4670 nm
Continuous tuning range	~ 2 GHz signal, ~ 1 GHz idler
Short-term linewidth (1 ms)	< 50 kHz
Frequency drift	< 50 MHz/h
Maximum output power of idler radiation	2 x 50 mW
Maximum output power of signal radiation	2 x 20 mW
Power drift	< 5 %/h
Spatial mode	TEM ₀₀
Power requirements	115/230 V, max. 150 W
Ambient temperature	15 – 30 °C
Dimensions (knobs, connectors, ...etc. not included)	364 mm x 587 mm x 125 mm (14.33" x 23.11" x 4.92")

Options

High Pump Power Option

In its standard configuration, the **OS 4500** is equipped with a 1.2 W pump laser. The **OS 4500** can also be shipped with a 2 W pump laser, for which the output power is increased by approx. 50 %.

Galvo Option

The etalon tilt, which selects the frequency of the resonated wave (either signal or idler), is usually adjusted manually via a corresponding precision screw. Alternatively, the OPO can be equipped with a galvo scanner to adjust

the tilt electronically. The electronics then provides an analog input for the etalon tilt.

Other specifications on request.

Applications

In the past few years OS4000 / OS4500 or comparable cw-OPO systems have been applied successfully to various kinds of experiments:

- **Metrology**
[Kovalchuk et al., Opt. Lett. 30, 3141 (2005)]
- **Trace gas detection using photo acoustic or cavity ring-down spectroscopy**
[Müller et al., Opt. Express 11, 2820 (2003) ; Von Basum et al., Opt. Lett. 29, 797 (2004)]
- **High-resolution molecular spectroscopy**
[Kovalchuk et al., Opt. Lett. 26, 1430 (2001) ; Merritt et al., J. Chem. Phys. 121, 1309 (2004)]
- **Material investigations**
[Terasaki et al., JOSA B 22, 675 (2005)]

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