

# AOSense Injection Locked Laser Unit

Our External Cavity Diode Lasers (ECDLs) offer narrow linewidths and excellent stability in a compact package. However, real-world atomic sensors and experiments often require more optical power than can be delivered by a single direct diode.

Injection locking is a well-established method for generating more optical power, while retaining the performance and narrow linewidth of an ECDL. A seed ECDL is coupled into the optical cavity of a non-AR-coated higher power diode without an external cavity, stimulating emission at the desired frequency. Compared to Tapered Amplifiers (TAs), Injection Locking has better beam quality, lower phase and intensity noise, and lower risk of equipment damage. However, injection locking requires stable alignments and is often sensitive to environmental perturbation. necessitating additional servos and frequent re-alignment.

Leveraging our experience building compact and ruggedized laser systems for field use, AOSense has developed an extremely compact integrated injection locking system with excellent passive stability. This system can either be fully self-contained with both the seed and Injection Locked Amplifier (ILA) or have a fiber input to act as a gain-stage for an existing seed laser.



#### Features

- Excellent multi-day passive injection lock stability in a compact package
- Integrated optical isolation for seed and ILA lasers
- AOSense miniature kinematic mounts pre-aligned for optimal injection coupling



#### INTEGRATED SEED CONFIGURATION



FIBER-IN CONFIGURATION



## Specifications

Injection Locked Laser Unit	
Model No.	IJLL Integration
Dimensions (L x W x H)	7.5 [190] x 4.50 [114] x 1.70 [43] in [mm]
Weight	< 1.5 kg
Laser Properties	
Wavelength	Seed laser dependent
Output Power	Wavelength dependent, see table below
Instantaneous Linewidth	< 200 kHz, seed laser dependent
Polarization	S polarized, PER > 30dB

### Selected Wavelengths

Wavelength (nm)	Expected ILA Power (mW)
698/689 (Sr)	200 ILA + 30 seed
461 (Sr)	500 ILA + 200 seed
423 (Ca)	120 ILA + 30 seed
399 (Yb)	200 ILA + 10 seed







More injection wavelengths are possible on request. For more information, contact us at <u>sales@aosense.com</u>.