

AOsense *Delivering practical atomic sensors and components*



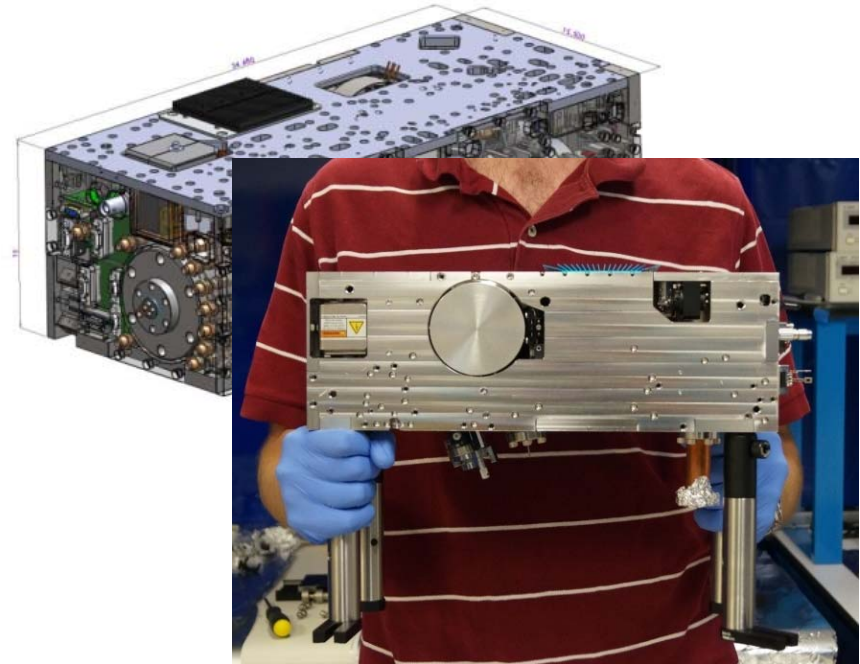
- Founded in 2004 to spin-off work from Stanford University
- Core capability is design, fabrication, and testing of atom-based inertial sensors and frequency standards
- 60k ft² R&D space located in Sunnyvale, CA.
 - 1000 ft² secure lab planned for Summer '15.
- Staff of 55 (50/50 mix of physicists and engineers)
 - One of the world's largest atomic physics teams under one roof; 24 Ph.D.s trained under 7 Nobel laureates
 - Technical capabilities: Atomic physics, laser physics, vacuum engineering, packaging, optical and optomechanical engineering, precision manufacturing, electrical engineering, embedded systems, software engineering
- Potential contributions: Lasers and optical systems, integrated vacuum systems
 - R&D partner or commercial sales

AOSense *Integrated atom-optical sensors*



AOSense commercial compact gravimeter

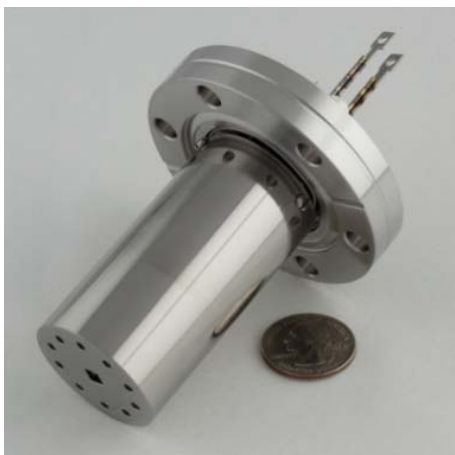
- First commercial atom-optical sensor
- Shipped November 2010



Integrated optical clock hardware

- Integrated atomic beam (oven, slower, etc)
- Cooling and clock lasers, reference cavity, spectroscopy, beam routing
- Electronics interface

AOSense High-performance atomic beam hardware



500° C Atomic beam oven

- Laboratory-grade flux
- 200x smaller outgassing
- 4 W power consumption
- No cooling water



Permanent magnet slower

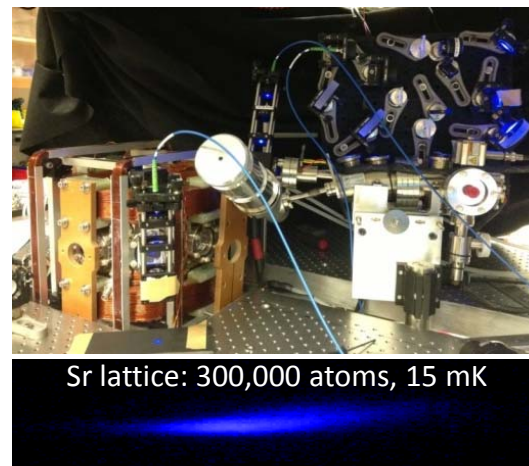
- Magnetic and thermal shielding
- Zero power consumption
- No cooling water



High-flux cold atomic beam

- In-vacuum optics, oven, and slower
- 10x larger cold beam flux than academic labs
- Pressure: 5×10^{-9} torr at oven (@ 530° C)
- Entire assembly same size as laboratory Zeeman slower

AOSense hardware in action at JILA



Sr lattice: 300,000 atoms, 15 mK

Thompson lab with AOSense atomic beam and 689 nm laser

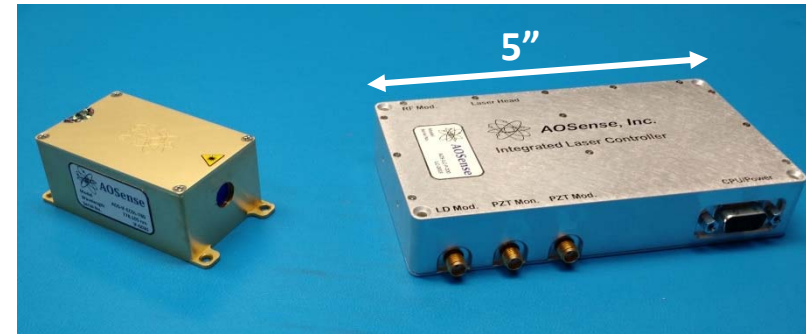
AOsense *AOsense IF-ECDL and integrated laser controller*

IF-ECDL

- Filter-stabilized laser with robust cat's eye design
 - High stability compared to traditional grating systems
- Narrow linewidth (~ 50 kHz) \ll DFB/DBR
- Architecture allows easy wavelength changes to any diode-friendly wavelength. No cavity re-design, new coatings only.
 - Demonstrated wavelengths (nm): 423, 461, 657, 689, 698, 767, 780, 852

Controller

- Current, TEC, and PZT control for IF-ECDL
- Ultra low noise, fast modulation ports
- Single +5V DC input, low power consumption
- Digital interface with GUI
- Compact, cost-effective solution for laser control



Diode laser Interference filter Cat's eye Output coupler

ILC	Spec
Laser Current	10-200 mA
Current Noise	< 100 pA / Sqrt(Hz)
Current Modulation	DC-10 MHz
Current RF Modulation	Up to 100 MHz (AC)
PZT	0-125 V
PZT Noise	< 500 nV / Sqrt (Hz)
PZT Modulation	DC-10 kHz
Input	+5 V DC
Power Consumption	5 W Typ



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AOSense is hiring!

(Check the website for open positions / contact me)