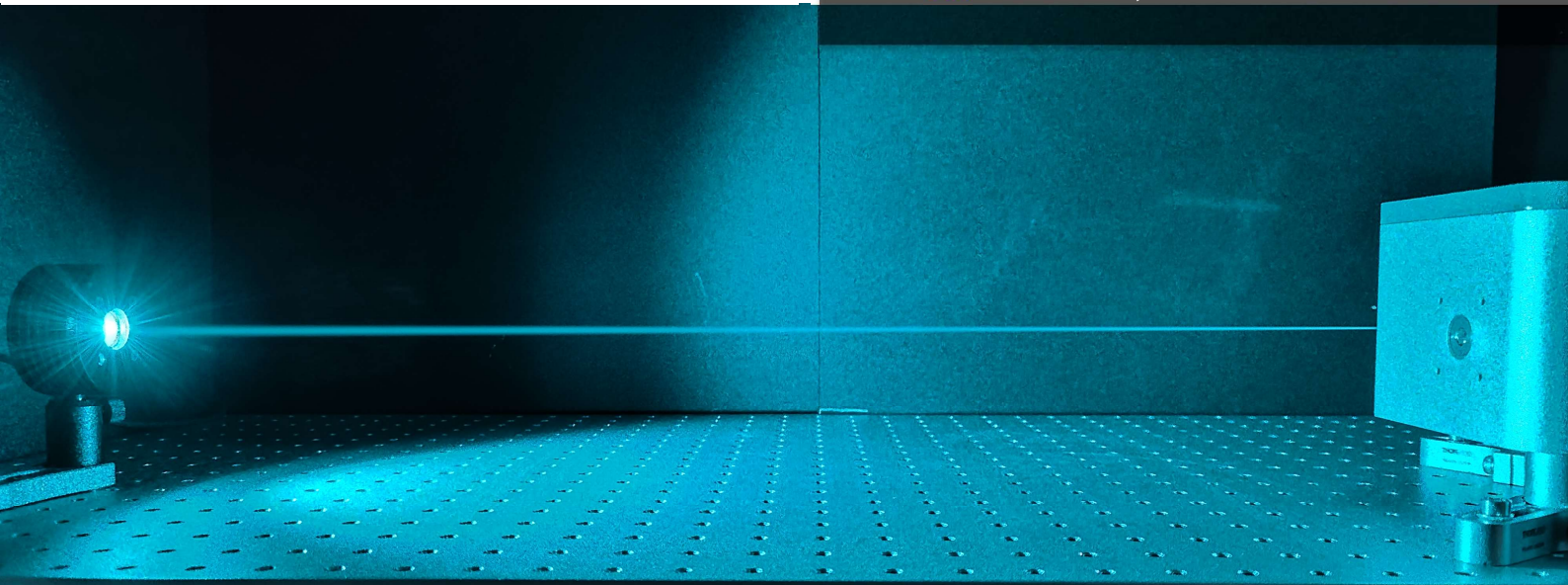




HIGH-POWER / LOW-NOISE / SINGLE-MODE LASERS FOR RESEARCH AND INDUSTRY

Vertical-external-cavity surface-emitting lasers (VECSELs)

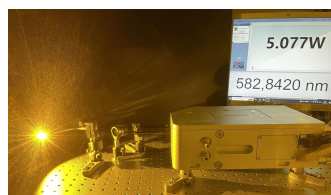
VECSELs combine the benefits of semiconductor quantum-well gain together with the external cavity architecture of disk lasers, resulting in wavelength-versatile high-brightness laser operation. These lasers are also commonly known as optically pumped semiconductor lasers.

KEY BENEFITS OF VECSELs

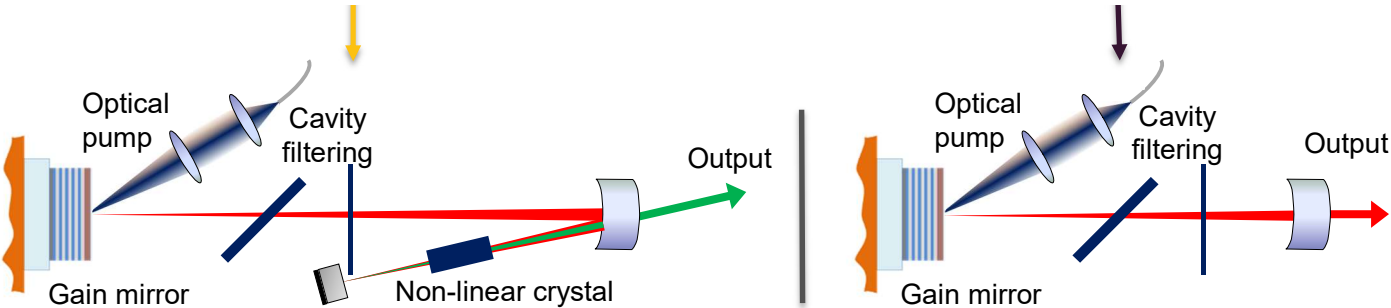
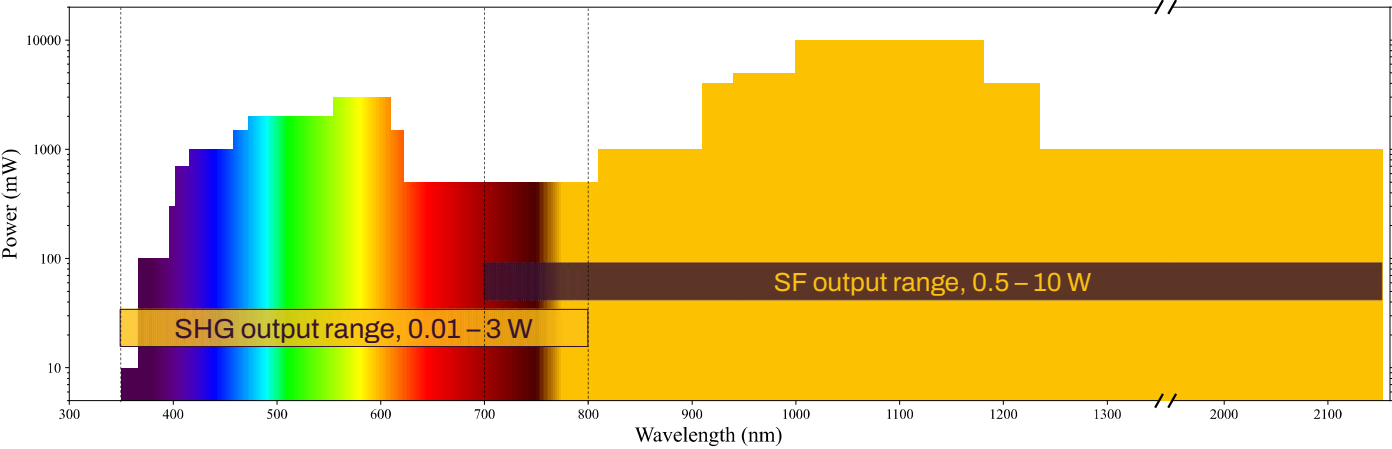
Broad wavelength range	High output power	Low noise	Excellent beam quality	Narrow linewidth operation
350 – 2150 nm	Up to 10 W	No amplified spontaneous emission	$M^2 < 1.1 - 1.2$	$< 10 \text{ kHz} (10 \mu\text{s})$

VEXLUM is a **semiconductor** laser company with **vertically integrated manufacturing**:

- Design and growth of gain structures
- Cleanroom processing of gain chips
- Optomechanical design and laser assembly
- Control systems development



Wavelengths and powers



KEY ARCHITECTURAL FEATURES

Optically pumped High output power High-quality spatial output Low carrier-induced noise	Semiconductor gain Wavelength flexibility High-gain saturation Tunable single frequency	Vertical external cavity High-Q cavity filtering Intracavity optical elements Inherently low noise	Intracavity SHG Efficient “3-in-1” configuration Unparalleled SWaP-C No “green problem”
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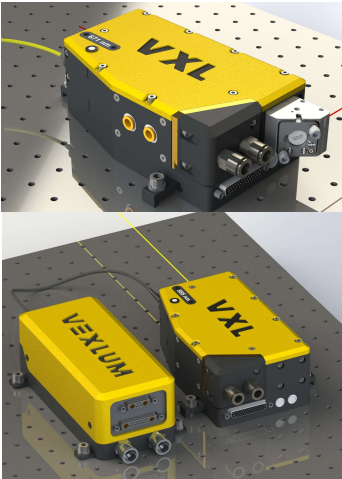
VALO system

VALO laser with control electronics and chiller unit



VXL™

Next-generation modular, rugged design



Wavelengths and powers

Laser powers for select atomic species

Transition	Sr	Yb	Sr ⁺	Ba ⁺
Cooling	461 nm > 1.5 W	399 nm > 0.3 W	421.7 nm > 1 W	493 nm > 2 W
Photoionization	N/A	N/A	461 nm > 1.5 W	791 nm > 0.5 W
Narrow cooling	689 nm > 0.3 W	556 nm > 3 W	N/A	N/A
Clock (quadrupole)	698 nm > 0.3 W	578 nm > 1.5 W	674 nm > 0.8 W	1762 nm > 1 W
Trapping (magic wavelength)	813 nm > 1 W	759 nm > 0.5 W	N/A	N/A