

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

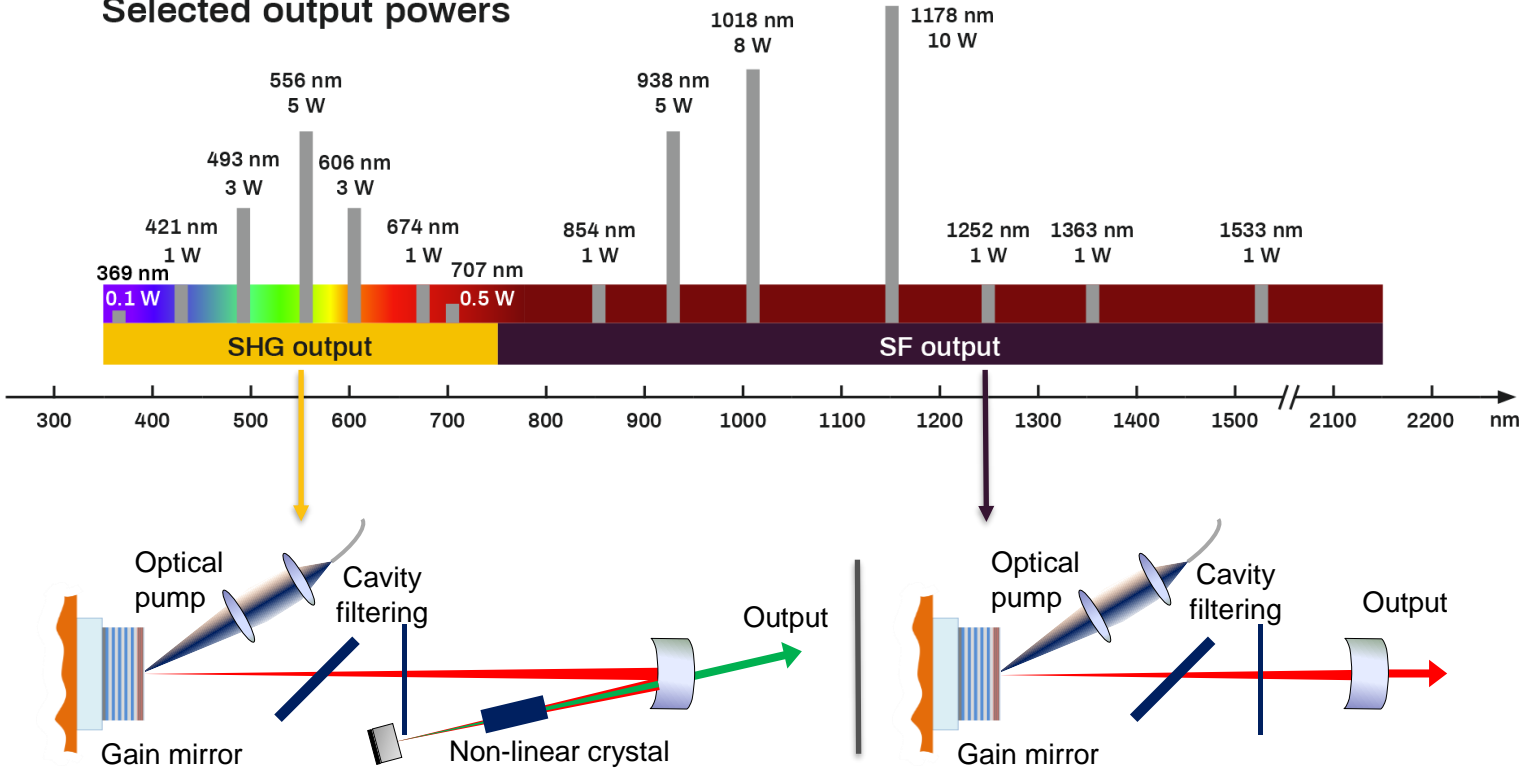
Broad wavelength range	High output power	Low noise	Excellent beam quality	Narrow linewidth operation
350 – 2150 nm	0.1 – 12 W	No amplified spontaneous emission	$M^2 < 1.1-1.2$	< 10 kHz (100 μ s)

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



Selected output powers



KEY ARCHITECTURAL FEATURES

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

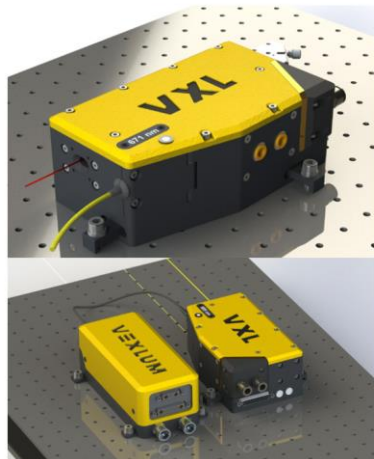
VALO system

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+
Cooling	461 nm > 1.5 W	399 nm > 500 mW	421.7 nm > 1 W
Ionization	N/A	N/A	461 nm > 1.5 W
Narrow cooling	689 nm > 300 mW	556 nm > 5 W	N/A
Repump	679 & 707 nm > 500 mW	1389 nm > 1 W	1033 nm > 8 W
Clock	698 nm > 250 mW	578 nm > 1 W	674 nm > 1 W
Trapping (magic λ)	813 nm > 1 W	759 nm > 500 mW	N/A