

FIFL-SF-509-100



509nm High power single frequency Laser

Core Parameters

Operating wavelength 509nm, Output optical power 100W, Spectral Linewidth 20.7 kHz

Overview

The 509 nm single-frequency continuous-wave (CW) laser represents a breakthrough in high-power, ultra-low noise laser technology. Utilizing an advanced injection-locked DFB seed laser combined with an external cavity Pound-Drever-Hall (PDH) resonant frequency doubling system, this laser breaks the record with an unprecedented 101.3 W output power and an ultra-narrow linewidth of 21 kHz.

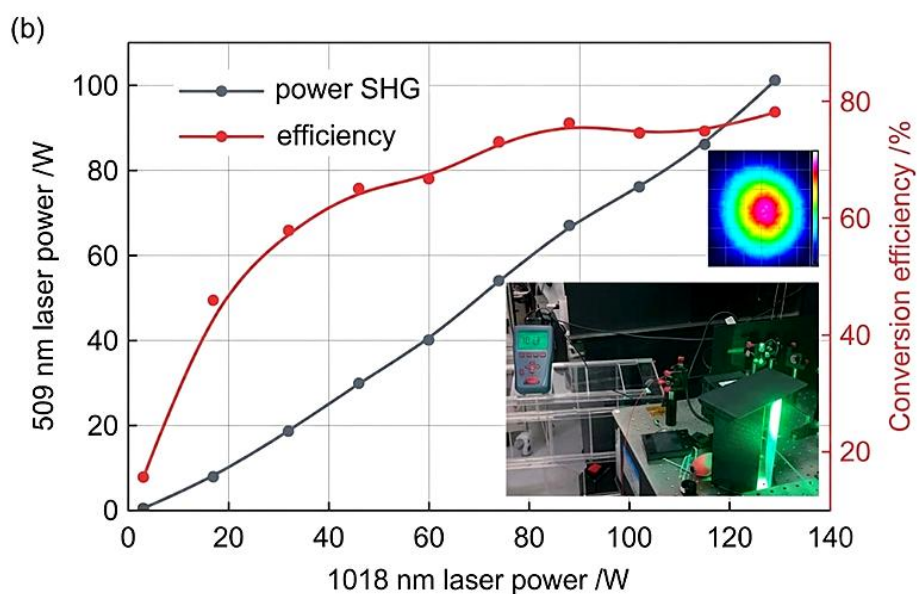
It serves as the ideal, high-performance pump and excitation source for cutting-edge quantum and precision engineering applications.

Features

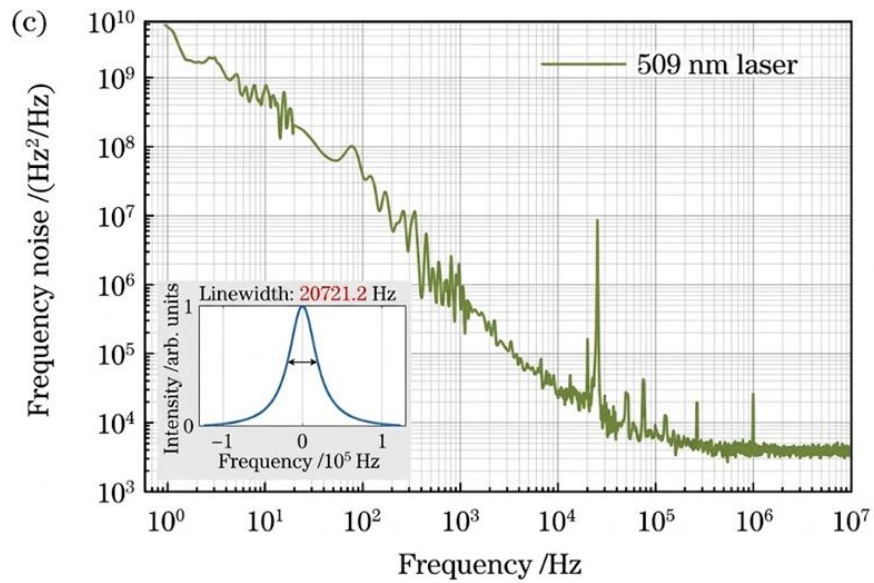
- Record-Breaking High Output Power
- Ultra-Narrow Linewidth
- High Efficiency Resonance Frequency Doubling
- Ultra-Low Intensity Noise
- Robust DFB Seed-Based Architecture
- Optimized Non-Critical Phase Matching (NCPM)
- Excellent Beam Quality

Technical Specifications

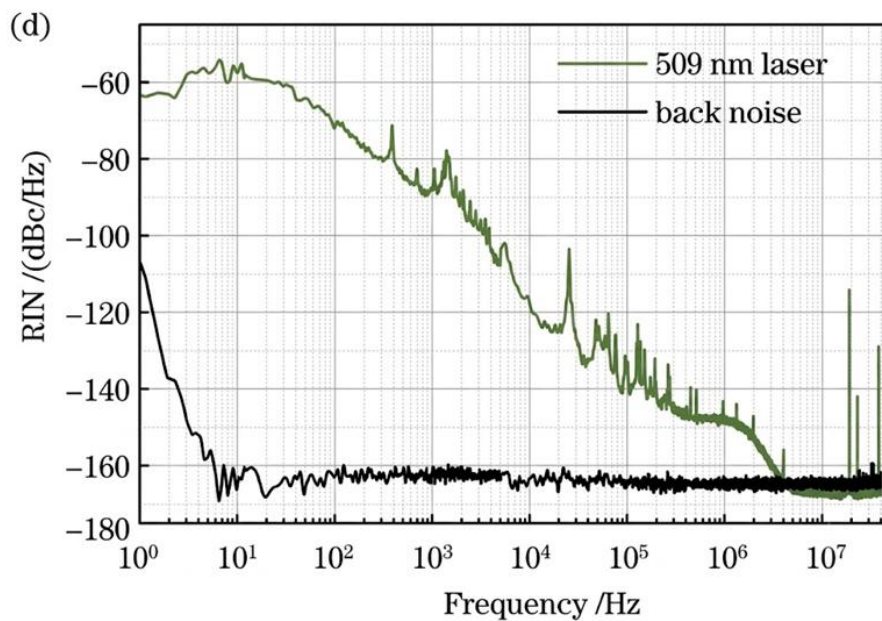
Parameter	Specification	Note / Condition
Center Wavelength	509 nm	Green-blue spectrum
Max. Output Power	101.3 W	Record-breaking CW single-frequency output
Spectral Linewidth	20.7 kHz (~21 kHz)	Ultra-narrow, evaluated via β -separation line
Conversion Efficiency	78.5%	High-efficiency external cavity resonant doubling
Relative Intensity Noise (RIN)	<-120dBc/Hz	For frequency bands above 10 kHz
Beam Profile	Single-mode, high-purity spot	Near-perfect mode matching (>90%)



509 nm laser output power and conversion efficiency versus injected fundamental laser power (Insets: laser beam profile and laser operating status at maximum power).



(c) Frequency noise and integrated linewidth of the 509 nm laser at maximum output power



(d) RIN for 509 nm laser at the maximum output power