Products & Services

Overview
Standard AFB®
Specialized AFB®
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Lasers

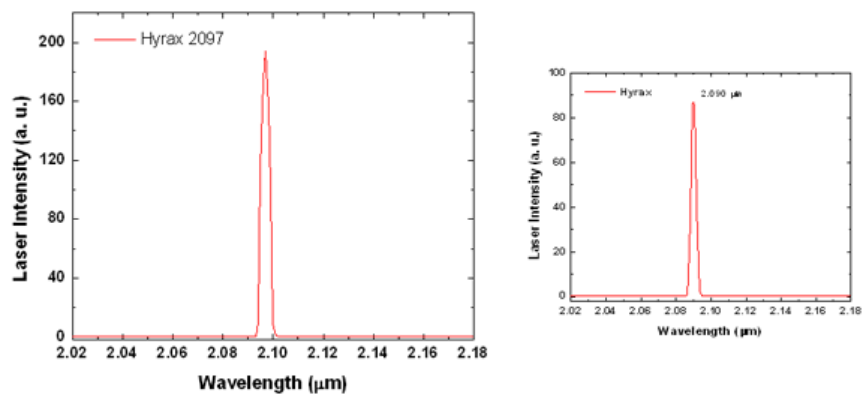
Hyrax

Onyx Optics announces the Hyrax, a Ho:YAG laser system that utilizes Onyx's patented Adhesive-Free Bond® technology and operates with the highest efficiency at 2.1-µm. With pump powers of 23.7 W from a CW-mode Tm:Fiber laser, the system delivers an average output power of 18.6 W with beam quality of M^2<1.2 at a repetition rate of 10 KHz and a pulse width of 35 ns. The system can also be operated at other repetition rates or in CW-mode without any significant alterations to power levels.

2.1-µm Ho:YAG lasers can be used for pumping Mid-IR ZGP OPO and are also important laser sources for laser remote sensing and medical surgery. To date, a majority of the reported Tm: laser pumped Ho:YAG laser systems have slope efficiencies of approximately 60%, while some can achieve over 70%. With an AFB® Ho:YAG laser composite and a 4-pass end-pump design, Onyx Optics has successfully improved the laser slope efficiency to a record high of 81% (optical-to-optical efficiency of 78%). Considering about 9% quantum defect and unavoidable cavity loss, we believe that the 81% slope efficiency has approached the theoretical limitation of Tm: laser pumped Ho:YAG lasers.

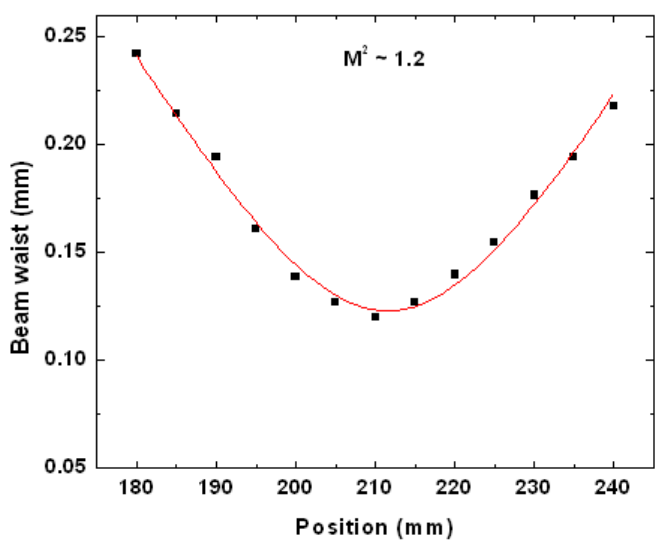
Laser Spectrum

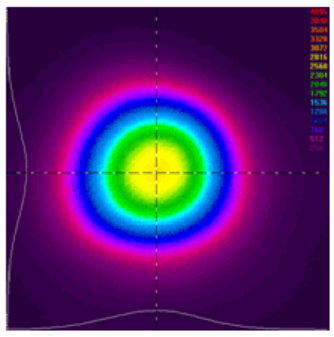
- Laser Wavelength: 2097nm
- Line width (FWHM): <4 nm (typical ~ 3.5 nm)
- 2090nm upon request

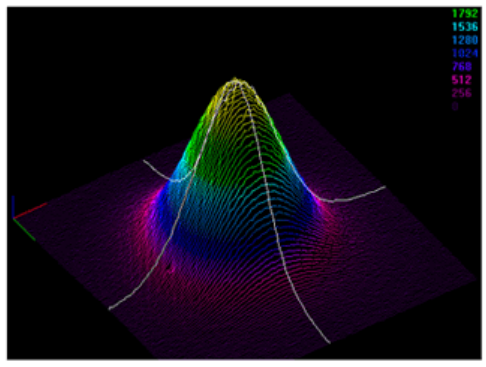


Beam Quality

- TEM00 mode
- M^2 ~ 1.2





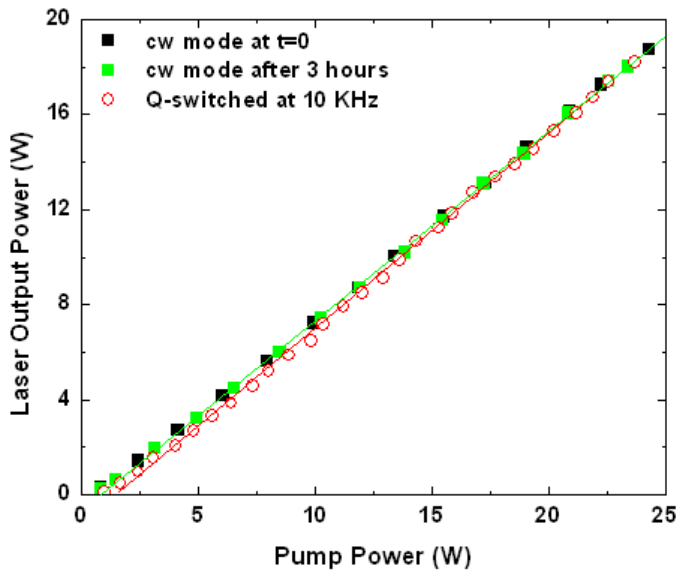


High Efficiency, High Energy

• Slope efficiency: >80%

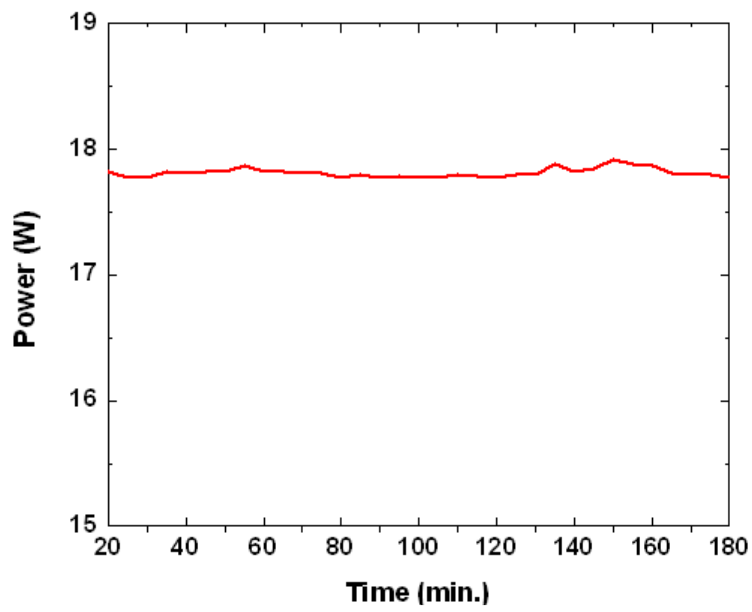
• Average Power: >15 W (maximum 18.6 W @ pump power of 23.7 W)

• Pulse energy: > 1.5 mJ @ 10 KHz; >3 mJ @ 5 KHz



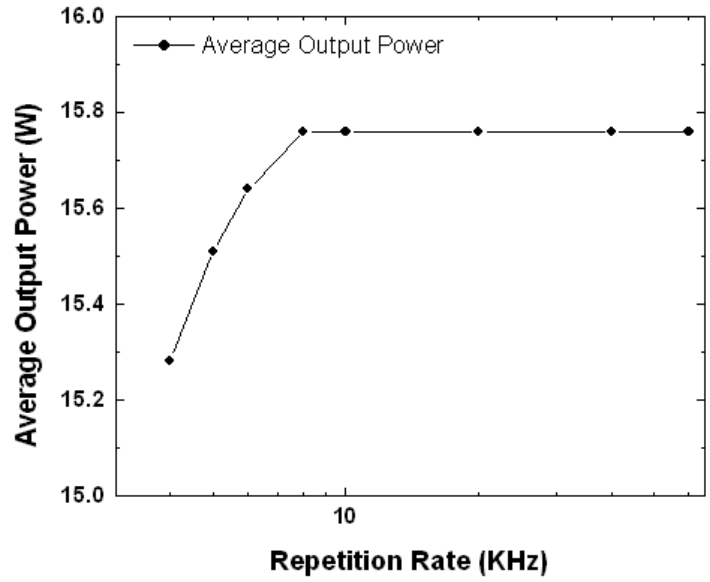
Power Stability

• Long-term power stability: ±<1% after 20 minutes warm-up (typical <0.5%)



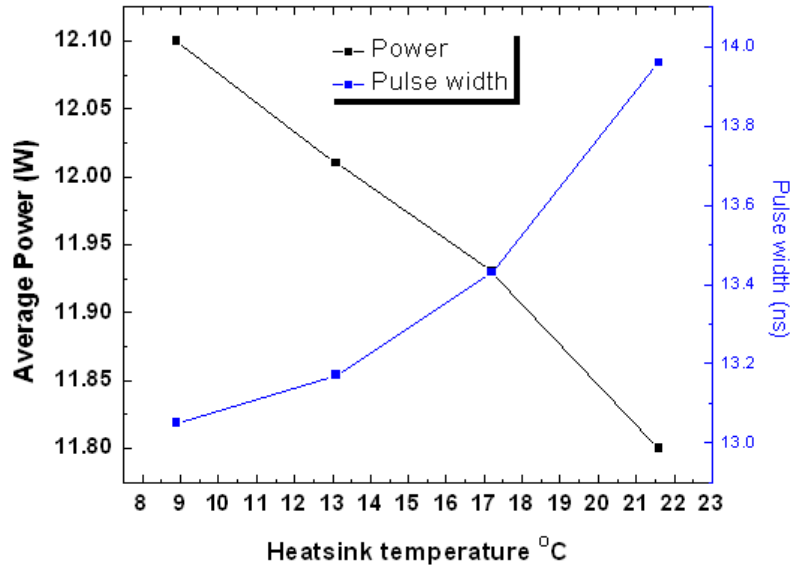
Power vs. Repetition Rate

• Constant output power beyond 8 KHz



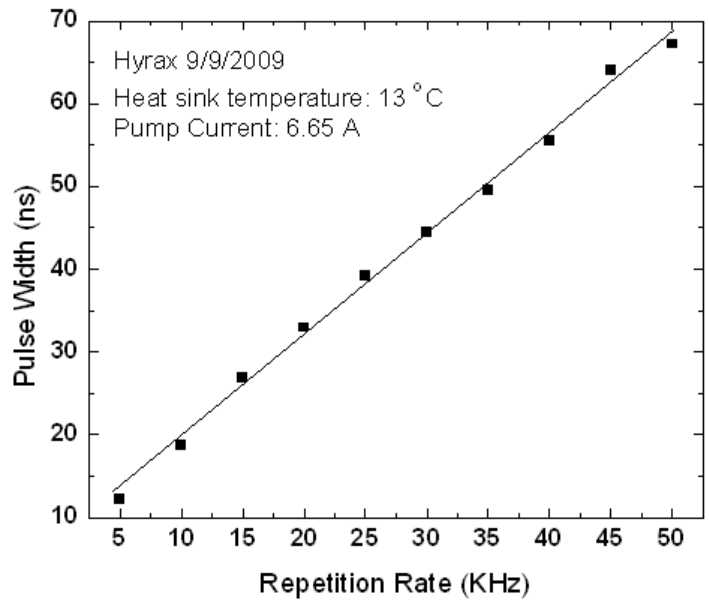
Pulse Width vs. Output Power

- Minimum pulse width: <13 ns @ 5 KHz; <20 ns @ 10 KHz
- Inversely dependent on the output power



Pulse Width vs. Repetition Rate

- Pulse width linearly increases with repetition rate
- 13 – 70 ns for repetition rate 5 – 50 KHz



Power & Pulse Width vs. Heat Sink Temperature

- Heat sink temperature decreases from 22 to 9, output power increases by 0.3 W, pulse width reduces by 0.9 ns