

Low-phase-noise, single-frequency, single-mode 608 W thulium fiber amplifier

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Abstract

A chain of four Tm-doped fibers amplified a single-frequency, 2040 nm diode laser to 608 W with $M^2 = 1.05 \pm 0.03$, limited by available pump power. Stimulated Brillouin scattering limits were investigated by splicing different lengths of passive fiber to the output of the final amplifier stage. Integrated rms phase noise above 1 kHz was less than $\lambda/30$, suggesting the possibility of further scaling via coherent beam combining. To our knowledge, this is the highest power obtained from any single-frequency, single-mode fiber laser.

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* Single-frequency YAM and YAR CW fiber amplifiers are also available up to 2.1 kW. Single-mode YLS-SM laser systems up to 10 kW and multi-mode YLS laser systems up to 120 kW are available. NEW FEATURE! QCW Option on High Power Lasers 2x Peak Power Boost in Pulsed Mode. * TLM thulium laser modules and TLR rack mountable units are also available in the Low Power fiber laser family, 1 to 120 Watt output power range. Kilowatt-class multi-mode thulium fiber lasers packaged in industrial cabinets can be provided upon request. * Linearly polarized TLR-LP thulium fiber lasers are available up to 100 W output power in Low Power fiber laser family. Please contact IPG Representative with your requirements. CONTACT US. CYFL-KILO: continuous Ytterbium fiber laser provides single frequency beam with low phase noise and low RIN. It can deliver up to 20W output power. Therefore, they integrate an ultra low noise and narrow linewidth seed (<70kHz) laser which is amplified through several stages of a highly stable ytterbium-doped fiber amplifier. Also, these lasers can be thermally tuned in wavelength over 200MHz, and their central emission line can be modulated for locking purposes. The narrow linewidth fiber laser provides an output power up to 20W with an excellent power stability. The laser can be monitored by pump diode current or with the output power value (APC option) thanks to an embedded large dynamic photodiode. Thulium-doped fluoride fibers (TDFA = thulium-doped amplifier) pumped around 1047 or 1400 nm can be used for amplification in the telecom S band around 1460-1530 nm, or even around 1.65 μm . G. D. Goodno et al., "Low-phase-noise, single-frequency, single-mode 608 W thulium fiber amplifier", Opt. Lett. 34

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