

Actively Q-switched dual-wavelength laser with double-cladding Er/Yb-doped fiber using a Hi-Bi Sagnac interferometer

M. Duran-Sanchez, R. I. Álvarez-Tamayo, O. Pottiez, B. Ibarra-Escamilla, J. C. Hernandez-Garcia, G. Beltran-Perez, E. A. Kuzin.

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Abstract

An actively Q-switched double-wavelength Er/Yb fiber laser is experimentally demonstrated. The linear cavity is formed by a pair of fiber Bragg gratings on one side and a Sagnac interferometer (SI) with high birefringence fiber in the loop on the opposite side. A 3 m of double-cladding Er/Yb-doped fiber used as a gain medium is pumped by a 978 nm laser diode. The SI is used to adjust the internal cavity losses for simultaneous dual-wavelength laser generation. The adjustment is performed by temperature variations of the high birefringence fiber in the SI loop. The maximum average output power for the Q-switched laser operation in dual-wavelength mode was around 68 mW with a repetition rate of 40 kHz for 2 W of pump power. The minimum pulse duration was around 280 ns. The maximum pulse energy was 1.75 μ J.