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## Switchable Q-switched and mode-locked erbium-doped fiber laser operating in the L-band region

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### Abstract

We demonstrate a switchable Q-switched and mode-locked erbium-doped fiber laser (EDFL) operating in the L-band region using the nonlinear polarization rotation effect. The switching operation is achieved by controlling intensity-dependent loss using a polarization controller. In Q-switching mode, the EDFL produces a pulse train with a repetition rate of 21.1 kHz, pulse width of 7.7  $\mu$ s, and pulse energy of 13.6 nJ. The EDFL also generates a multi-wavelength comb with a very narrow and constant wavelength spacing of 0.045 nm and optical signal-to-noise ratio of at least 10 dB. During mode locking, the EDFL produces stretched pulses with 3-dB bandwidth of 26.2 nm, pulse width of 350 fs, repetition rate of 2.38 MHz, and pulse energy of 48.56 pJ.

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