Diode-pumped 1.7-W erbium 3-μm fiber laser

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We report what is to our knowledge the first 3-μm fiber laser of the 1-W class. 1.7 W of output power and 17.3% slope efficiency (with respect to the launched pump power) at a wavelength of 2.71 μm are demonstrated from a double-clad erbium-doped ZBLAN fiber diode pumped at 790 nm. Energy transfer from the Er^{3+} lower laser level to a Pr^{3+} codopant decreases ground-state bleaching and excited-state absorption, thus avoiding output-power saturation. This result represents more than an order-of-magnitude improvement over previous work of which we are aware. Advantages over current crystal-laser designs include nearly transverse-fundamental-mode operation, reduced thermal effects, and ease of use, e.g., in medical endoscopy.

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