

150 mW unsaturated output power at 3 μm from a single-mode-fiber erbium cascade laser

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We report on an erbium cascade laser in a fluorozirconate fiber. Lasing on the transition $^4I_{11/2} \rightarrow ^4I_{13/2}$ at 2.71 μm is supported by colasing on the transition $^4S_{3/2} \rightarrow ^4I_{9/2}$ at 1.72 μm . This recycles the excitation that is lost via excited-state absorption and avoids the saturation of the output power. Threshold at 2.71 μm is 33 mW launched pump power at 791 nm. The measured slope efficiency of 22.6% is relatively close to the 29.1% stokes-efficiency limit. An output power of 158 mW is obtained, limited only by the 1.43 W power available from the Ti: sapphire pump laser. Output power is 15 and slope efficiency 2.5 times higher than reported in previous publications. © 1995 American Institute of Physics.