

High-power 3 μm fiber lasers and amplifiers

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Fiber laser technology has considerably improved in the last 20 years thanks to advances in low-loss optical fibers and high-power laser diodes [1]. Fluoride fiber lasers, one of the noteworthy tools for generating coherent mid-infrared signal between 2 to 5 μm , have made outstanding progress in terms of compactness, reliability, high beam quality, and output power [2]. In particular, laser emission near 3 μm is crucial for many applications such as spectroscopy, countermeasures and medicine. High power version of such laser emission is crucial to open new doors for potential applications, thus there is always an increasing demand for achieving higher output power parameters.

Recent advances in 3 μm fluoride fiber lasers have led to slope efficiencies exceeding the Stokes limit by 15%, pulse energies of more than 100 μJ and an average output power of more than 42 W [3-5]. In this talk, we will review the results obtained with different fluoride fiber laser systems and discuss the critical fiber-based components for achieving high slope efficiency, output power and pulse energy near 3 μm . Novel strategies to reach higher output power levels will also be presented.

Keywords: fiber lasers, erbium, high-power lasers, fiber optics, fluoride fiber

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