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Linear-cavity fiber lasers investigation and application

Shien-Kuei Liaw¹ and Chow-Shing Shin²

¹National Taiwan University of Science and Technology, Taiwan

²National Taiwan University, Taiwan

Recently, much more attention has been directed to diode-pumped single-longitudinal-mode (SLM) fiber lasers because of their high reliability, compactness, and capability of shot-noise-limited operation in the megahertz frequency range. In this paper, a SLM linear-cavity fiber laser at C-band wavelength is proposed and demonstrated by using only two subring cavities, either in serial or parallel connection. The employed saturable absorber filter and two subring cavities successfully suppress the multi-longitudinal-mode oscillation caused by spatial hole burning in a linear cavity. Tunable laser sources have seen various applications in recent years such as optical switching, network protection or digital communication. Among various tunable lasers, fiber lasers now compete directly in several domains with semiconductor lasers because they present the advantages of high brightness, low intensity noise, thermal stability, excellent coupling into a single mode fiber and better compatibility with fiber components. In this paper we develop an L band tunable erbium-doped fiber laser (TEDFL) using a broadband fiber mirror (BFM) and a tunable fiber Bragg grating (TFBG) as cavity ends. Several characteristics such as the gain fiber length, threshold pumping power, pumping efficiency and side-mode suppression ratio (SMSR) are studied. The wavelength tuning function is also demonstrated.

Biography

Shien-Kuei Liaw received the PhD degree from National Chiao-Tung University, Taiwan, in 1999. In 1993, he joined the Telecommunication Laboratories, Ministry of Transportation and Communications, Taiwan. In 1996, he was a visiting researcher at Bellcore (now Telcordia), Red Bank, NJ, USA in 1996 and a visiting Professor at University of Oxford, UK in Autumn 2011. He is now a distinguished Professor and the Director of Optoelectronics Research Center of National Taiwan University of Science and Technology, Taiwan. He has authored and co-authored over 200 international journal articles and conference presentations. His research interests include optical communication, fiber devices and fiber sensing.

skliaw@mail.ntust.edu.tw

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