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Design and implementation of Er/Yb co-doped fiber lasers

In this talk, several types of single-longitudinal mode (SLM) linear cavity tunable fiber lasers will be reviewed and discussed. Integrating a partial reflectance fiber Bragg grating (FBG) as the front cavity end, the rear cavity end elements may be a loopback optical circulator (OC), a broadband fiber mirror, a Faraday rotator mirror or a 2x2 fiber coupler. For SLM selection, using multiple subring cavities based on the Vernier effect, a piece of gain fiber saturable absorber as modes filter or their hybrid type. For wide-tuning range fiber laser, the wavelength tuning mechanism may be tunable FBGs, a 3-point bending device or a four-lamina composite device to facilitate wavelength tuning of FBGs, a large tuning range cover C+L band with good resolution of 0.1 nm was achieved. Laser characteristics such as output power, optical signal-to-noise ratio, laser linewidth, threshold pump power and pumping slope efficiency are measured. An example characteristic of 1 MHz, 59 dB, 13% and 0.1 dB for linewidth, side-mode suppression ratio, quantum efficiency and power variation of whole tuning range, respectively, are obtained. The pumping power efficiency may be 10% improved by recycling the residual pump power to the gain medium and has the advantages of simple structure, large pump slope efficiency and short cavity. The proposed fiber lasers may find various potential applications.

Biography

Shien-Kuei Liaw received Double Doctorate from National Chiao-Tung University in Photonics Engineering and from National Taiwan University in Mechanical Engineering, respectively. He joined the Chunghua Telecommunication, Taiwan, in 1993. Since then, he has been working on Optical Communication and Fiber Based Technologies. He joined the Department of Electronic Engineering, National Taiwan University of Science and Technology (NTUST) in 2000. He has ever been Director of the Optoelectronics Research Center and the Technology Transfer Center, NTUST. He was a Visiting Researcher at Bellcore (now Telcordia), USA for six months in 1996 and a Visiting Professor at University of Oxford, UK for three months in 2011. He owned six US patents, and authored or coauthored for 250 journal articles and international conference presentations. He earned many domestic honors and international honors. He has been actively contributing for numerous conferences as a conference chair, technical program chair, organizing committee chair, steering committee and/or keynote speaker. He serves as an Associate Editor for *Fiber and Integrated Optics*. Currently, he is a Distinguished Professor of National Taiwan University of Science and Technology (NTUST), Vice President of the Optical Society (OSA) Taiwan Chapter and Secretary-General of Taiwan Photonic Society. His research interests are in Optical Sensing, Optical Communication and Reliability Testing.

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