

Stable multiwavelength erbium-doped random fiber laser

ABSTRACT

A stable multiwavelength erbium-doped fiber laser (EDFL) based on random distributed feedback (RDFB) is presented. The random EDFL consists of a half-opened linear cavity in which a mirror forms one end, while the other end is connected to RDFB of a 25-km-long single mode fiber. In the laser cavity, the instability caused by the RDFB and cascaded stimulated Brillouin scattering is successfully mitigated by four wave mixing effect in a 2-km-long highly nonlinear fiber. Experimental results indicate the generation of 24 stable laser lines at the pump power of 350 mW. The recorded peak power fluctuation for the laser is less than 0.7 dB in a 60-min duration, illustrating the stability of the multiwavelength random fiber laser.

Keyword: Random fiber laser; Multiwavelength erbium-doped fiber laser; Four-wave mixing; Rayleigh scattering