

L-band multi-wavelength Brillouin-Raman fiber laser utilizing the reverse-S-shaped section

Abstract

In this paper, we experimentally demonstrated multi-wavelength Brillouin-Raman fiber laser that operates in the L-band wavelength region. The laser structure utilizes the reverse-S-shaped technique. 35 output Brillouin Stokes signals were generated at the injection of 6.3 mW of Brillouin pump power at wavelength of 1580 nm into the laser cavity together with a Raman pump power of 891.25 mW. The generated output Brillouin Stokes signals are rigidly separated by 0.08 nm (10 GHz). The structure also provides a high tuning range of 25 nm, from 1570 nm to 1595 nm at the injection of 6.3 mW of Brillouin pump signal power with a Raman pump signal power of 795.3 mW. The generated Brillouin Stokes signals also have an average peak power of 1.11 mW. Highest optical signal-to-noise ratio of 21 dB was obtained at Brillouin pump wavelength of 1595 nm.

Keywords

Brillouin-Raman fiber laser; multi-wavelength; Nonlinear; Raman amplification; stimulated Brillouin scattering