

A wide flat triple Brillouin frequency spacing multiwavelength fiber laser assisted by four wave mixing

ABSTRACT

In order to improve the triple frequency spacing operation, we introduce a simplified arrangement of multiwavelength Brillouin-erbium-ytterbium fiber laser that incorporates only a single amplifier source. The strong responses amongst the interacting waves in the 500 m highly nonlinear fiber help in forming wider multiwavelength bandwidth and self-flattening of the output spectra. A total of 146 Stokes lines within 3-dB span are produced with a channel spacing of 0.246 nm. These are completed when the Brillouin pump (BP) wavelength is set at 1533 nm, BP power at -12 dBm and erbium-ytterbium doped fiber amplifier at 950 mW. A quality optical signal-to-noise ratio of 46.2 dB estimation is realized along the 36 nm lasing bandwidth that starts at 1533 nm wavelength. As a result of efficient suppression of self-lasing modes, the tunability covers the entire C-band which is associated to the lowest attenuation regime. For this particular area of fiber lasers, the results confirm dramatic advancements in spectral flatness and Stokes lines count combination especially with the additional benefit of high stability at only 1.22 dB fluctuation.

Keyword: Fiber laser; Four wave mixing; Stimulated Brillouin scattering