

Wide-uniform triple Brillouin frequency spacing multi-wavelength fiber laser assisted by a distributed Raman amplifier

ABSTRACT

In this paper, we demonstrate a wide-uniform and source with triple Brillouin-shift wavelength spacing. The hybrid gains include the combination of erbium-ytterbium-doped fiber and distributed Raman amplifiers. For optimum performances, the Brillouin pump wavelength is set at 1532 nm with power at -20 dBm, erbium-ytterbium-doped fiber amplifier at 950 mW and Raman pump power at 900 mW. The highest channel count is obtained in this kind of laser design, where around 164 Stokes lines are produced within 10 dB spectral flatness. The corresponding bandwidth is 40 nm, where the average optical signal-to-noise ratio is maintained at 36 dB estimation. The outstanding total power stability indicates 0.74 dB fluctuation over a 45-minute duration. This merits the practicality for various applications especially in optical communication system and sensing. Furthermore, a reasonable wide tuning range of 36 nm is realized, beginning from 1532 nm, which is only restricted by the accessible hybrid gain bandwidth.