

Multi-wavelength Brillouin-Raman fiber laser utilizing enhanced nonlinear amplifying loop mirror design

ABSTRACT

We demonstrate a single-spacing, multi-wavelength Brillouin-Raman fiber laser utilizing an enhanced cavity of nonlinear amplifying loop mirror. In this structure, the optimization of multi-wavelength lasing is done with proper adjustments of coupling ratio and Brillouin pump power. When setting the Raman pump power to 300 mW, up to 28 channels with an average 17 dB optical signal-to-noise ratio are achieved. In this case, the Brillouin pump power is maintained at -2.6 dBm when the splitting ratio and Brillouin pump wavelength are fixed at 99/1 and 1555 nm, correspondingly. Our achievements present high numbers of Stokes channels with an acceptable optical signal-to-noise ratio at low pump power operation.

Keyword: Fiber laser; Multiwavelength; Brillouin scattering; Nonlinear amplifying loop mirrors; Optical signal to noise ratio; Splitting ratio.