

OSNR variation of multiple laser lines in Brillouin-Raman fiber laser

ABSTRACT

We report experimental results demonstrating the variation of optical signal-to-noise ratio (OSNR) of laser lines in Brillouin-Raman fiber laser against Raman pump power (RPP) variation. The reduction of OSNR is attributed to the spectral broadening of laser lines depending on the RPP. The spectral broadening is owing to the effect of the interaction between laser lines and turbulent waves (nonlinear interaction between longitudinal cavity modes). In our experiment, the worst OSNR is obtained at 650 mW RPP as a result of maximum spectral broadening when the Brillouin pump wavelength is fixed at 1555 nm. On the other hand, the OSNR improvement is obtained for RPP beyond 650 mW due to the effect of red-shift, the Raman peak gain is shifted away from the laser lines generated around 1555 nm thus reduces the spectral broadening effect.

Keyword: Lasers; Fiber; Stimulated Brillouin; Raman fiber lasers.