

## **OSNR enhancement utilizing large effective area fiber in a multiwavelength Brillouin-Raman fiber laser.**

### **Abstract**

We propose a simple Brillouin-Raman multichannel fiber laser with supportive Rayleigh scattering in a linear cavity without employing any feedback mirrors at the end of cavity. Brillouin and the consequences of Rayleigh scattering work as virtual mirrors. We employ a section of large effective area fiber in addition to a section of dispersion compensating fiber to enhance the optical signal-to-noise ratio of multi-channel Brillouin-Raman comb fiber laser. We able to produce a flat comb fiber laser with 37 nm bandwidth from 1539 to 1576 nm built-in 460 Stokes lines with 0.08 nm spacing. Furthermore, this Brillouin-Raman comb fiber laser has acceptable optical signal-to-noise ratio value of 16.8 dB for the entire bandwidth with excellent flatness and low discrepancies in power levels of about 2.3 dB between odd and even channels.

**Keyword:** Fiber lasers; Stimulated Raman scattering; Stimulated Brillouin scattering; Rayleigh scattering; Large effective area fiber.