

## **150-channel four wave mixing based multiwavelength Brillouin-erbium doped fiber laser**

### **ABSTRACT**

A wide band tunable multiwavelength Brillouin-erbium fiber laser (BEFL) is developed. In this structure, the laser is formed between a double pass amplification box and a highly nonlinear fiber (HNLF), which acts as a virtual mirror, results in removing the reflective physical mirror from one side of the laser structure. A large number of Stokes and anti-Stokes lines are generated through cascading stimulated Brillouin scattering and inducing four wave mixing process inside the HNLF. Due to optimizing Brillouin and erbium doped fiber (EDF) pump powers, the Rayleigh back scattering is efficiently suppressed, and the generated BEFL wavelengths are free from self lasing cavity modes over a wide tuning range. At EDF pump power and Brillouin pump power of 100 mW and 3 dBm, respectively, up to 150 Stokes lines with wavelength spacing of 0.076 nm, and a tuning range of 40 nm were achieved.

**Keyword:** 140.3460 lasers; 140.3500 lasers; Erbium; 140.3510 lasers; Fiber; 140.3600 lasers; Tunable