

## **Brillouin-Erbium fiber laser with enhanced feedback coupling using common Erbium gain section.**

### **ABSTRACT**

We demonstrate an enhanced architecture of Brillouin-Erbium fiber laser utilizing the reverse-S-shaped fiber section as the coupling mechanism. The enhancement is made by locating a common section of Erbium-doped fiber next to the single-mode fiber to amplify the Brillouin pumps and the oscillating Stokes lines. The requirement of having two Erbium gain sections to enhance the multiple Brillouin Stokes lines generation is neglected by the proposed fiber laser structure. The mode competitions arise from the self-lasing cavity modes of the fiber laser are efficiently suppressed by the stronger pre-amplified Brillouin pump power before entering the single mode fiber section. The maximum output power of 20 mW is obtained from the proposed fiber laser with 10 laser lines that equally separated by 0.089 nm spacing.

**Keyword:** Lasers; Fiber; Scattering; Stimulated Brillouin; Nonlinear optics; Fibers.