

## **Open cavity controllable dual-wavelength hybrid Raman-erbium random fiber laser**

### **ABSTRACT**

This investigation demonstrates a simple open-ended controllable dual-wavelength random fiber laser based on hybrid amplification of the Raman and erbium-doped fiber (EDF). Bidirectional pumping is employed to power a 80 km Truewave REACH fiber and a section of EDF as the gain medium. Without cavity selectors and reflectors, a single or dual wavelength operation is obtained by pump power variation. Interchangeable lasing peaks are obtained at wavelengths 1557 and 1567 nm, and both with peak power discrepancies of 16.2, 18.3, and 0.1 dB, respectively. The proposed scheme presents opportunities for long distance applications utilizing single laser, dual laser, or combination of both.

**Keyword:** Fiber lasers; Random fiber lasers; Stimulated Raman scattering; Erbium