

## Multiwavelength Brillouin-erbium fiber laser with double-Brillouin-frequency spacing

### ABSTRACT

We demonstrate a multiwavelength Brillouin-erbium fiber laser with double-Brillouin-frequency spacing. The wider channel spacing is realized by circulating the odd-order Stokes signals in the Brillouin gain medium through a four-port circulator. The circulated odd-order Stokes signals are amplified by the Brillouin gain and thus produce even-order Stokes signals at the output. These signals are then amplified by erbium gain block to form a ring-cavity laser. Ten channels with 0.174 nm spacing that are generated at 0.5 mW Brillouin pump power and 150 mW pump power at 1480 nm can be tuned from 1556 nm to 1564 nm. The minimum optical signal-to-noise ratio of the generated output channels is 30 dB with maximum power fluctuations of  $\pm 0.5$  dB.

**Keyword:** Brillouin scattering; Erbium; Lasers; Nonlinear optics; Fibers