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Multiple Parameters Optical Sensing Using Fiber Ring Laser Based on Fiber Bragg Gratings and 1064 nm Semiconductor Optical Amplifier*

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In this paper, a semiconductor optical amplifier (SOA) based on 1064 nm fiber ring laser with 63.56 dB optical signal-to-noise ratio (OSNR) is demonstrated. The stable performance is measured for 6 hours with lasing peak variation of $\leq \pm 0.115$ dB and wavelength variation of $\leq \pm 0.006$ nm. Combining the fiber ring laser with fiber Bragg gratings (FBGs), the SOA based fiber ring laser is applied to sense stretch, squeeze, and temperature variation. The results show high linearity, which is suitable for interpolation method's prediction and evaluation. A large dynamic range of up to 10 km is also demonstrated for remote sensing application.

Keywords: optical amplifier, fiber ring laser, fiber Bragg gratings.

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