

Enhanced sensitivity temperature sensing based on second order Brillouin slow light gaps

ABSTRACT

We demonstrate a temperature fiber sensor with enhanced sensitivity based on the second order Brillouin slow light. In this process, the modulated probe wave coincides with the second order Brillouin gain that was generated by circulating the first order Brillouin Stokes signal. Optical delay was induced on the modulated probe wave as it interacts with the second order Brillouin Stokes signal. As the temperature changes, the measured optical delay at the output also changes accordingly. The first order setup has a temperature slope coefficient of 1.126 ns/°C. Compared to the first order setup, the second order setup achieved a coefficient of 1.917 ns/°C, which is almost double the value obtained from the first order experiment.

Keyword: Brillouin; Slow light; Sensor