



TECHNOLOGY

Bragg Waveguide Thermometer

OVERVIEW

Background:

Resistance thermometry is a time-tested method for temperature measurements. Though today's resistance thermometers can routinely measure temperatures with uncertainties of 10 mK, they are sensitive to environmental variables such as mechanical shock and humidity, which cause the sensor resistance to drift over time requiring expensive, time-consuming calibrations. The desire to reduce sensor ownership cost has produced considerable interest in the development of photonic temperature sensors as an alternative to resistance thermometers. It is believed that these innovative temperature sensors have the potential to leverage advances in frequency metrology to provide cost-effective measurement solutions.

Innovation:

Researchers at the University of Maryland and the National Institute of Standards and Technology (NIST) have developed a Bragg waveguide thermometer. The Bragg waveguide thermometer is fabricated using CMOS-compatible manufacturing technology and is a viable photonic temperature sensing solution. Our results demonstrate that these devices can be used to measure temperature at least over the range from 5 °C to 160 °C with a temperature sensitivity of 82 pm/°C, a factor of 8x improvement over the fiber optic Bragg sensors.

APPLICATIONS

Photonic temperature sensing

ADVANTAGES

Strong refractive index modulation

Continuous Measurement

CONTACT INFO

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Additional Information

INSTITUTION

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PATENT STATUS

Pending

EXTERNAL RESOURCES

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