3-28-2008

Distributed Fiber-Bragg Grating Temperature Sensors for Real-Time MultiplePoint Temperature Monitoring

Corneliu Rablau

Simon Murphy

Distributed Fiber-Bragg Grating Temperature Sensors for Real-Time Multiple-Point Temperature Monitoring

Rablau, Corneliu; **Murphy, Simon**

Distributed fiber-optic temperature sensors (DFOTS) are being increasingly deployed in applications requiring 2D or 3D temperature profiling. Fiber Bragg Gratings (FBG's), through the shift of their Bragg wavelength, are well suited for such applications due to their immunity to electromagnetic interference and small physical size and thermal inertia of the sensing element. These characteristics are complemented by the easiness of combining individual gratings in series or parallel arrays that can monitor systems with characteristic dimensions from as small as a few millimeters to as large as several kilometers. To highlight this versatility, we report on the study of two FBG arrays for temperature monitoring. A series array obtained by inserting several discrete FBG's operating at different Bragg wavelengths on a 5-km long fiber strand is used to monitor the temperature at predetermined points along the fiber link. A second, parallel array of FBG's is used to monitor the temperature in a cross-section of a 3 ml vial containing a ferrofluid in magnetic field. The temperature resolution in both cases is better than 1 C. The longitudinal spatial resolution is 5 mm, and the lateral spatial resolution for the parallel array is better than 1 mm.

Publication:
American Physical Society, 2008 Spring Meeting of the Ohio-Region Section of APS, March 28-29, 2008, abstract id. C3.008

Pub Date:
March 2008

Bibcode:
2008APS..OSS.C3008R