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All dielectric disposable micrometric temperature sensors for biomedical applications

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Abstract

Measurement of temperature is necessary in many biomedical applications. This task may be particularly difficult in the cases where the electromagnetic interference is an issue. For such applications, all-dielectric (neither metal nor semiconductor are involved) temperature sensors have been developed based on optical fibers. However, those are rather expansive sensors.

We describe an alternative approach that is based on the evanescent field of light. This is a sensor that uses only dielectric materials so it may be used without electromagnetic interference issues. It has good temperature and spatial resolution. Most importantly, this may be a disposable sensor. The operation principle of the sensing head as well as the interrogation system will be described and some experimental characterization results will be provided. We shall show how a simple intensity detection algorithm may be used for such a sensor to identify the temperature in a localized point (at the order of 10 micrometers) using without spectral or interferential equipment. Future trends will be outlined shortly.

Biography

Dr. Tigran V. Galstian (or Galstyan) completed his Ph.D. in 1990 from Moscow Engineering Physics Institute, Moscow, Russia. Then he worked at the Institute of Applied Problems in Physics in 1990 and at the Yerevan State University in 1991 (Armenia), then at the Orsay's Institut d'Optique (IOTA) in 1992-1993 and at the Rennes I University in1994 (France). He joined the Center for Optics, Photonics and Lasers at Laval University in 1995 as Professor of the Physics Department. He has up to 500 scientific communications. He is Editor of EPJ and is member of the OIQ, SID and Société Française d'Optique.

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