

Promoting optical fibre sensor technology with educational experimental setup

Vinícius de Carvalho¹, Victor Hugo Martins¹,
Luís Victor Muller Fabris², Marcia Muller^{1,3}
and José Luís Fabris^{1,3}

¹ Department of Physics, Federal University of Technology—Paraná, Curitiba, Brazil

² Department of Physics, Federal University of Paraná, Curitiba, Brazil

³ Graduate Program in Electrical and Computer Engineering, Federal University of Technology—Paraná, Curitiba, Brazil



CrossMark

E-mail: mmuller@utfpr.edu.br

Abstract

This work shows the production steps of two optical fibre sensing setups which were specially designed for the activities of the 2018 Photonics Lab Open Day realized at the Federal University of Technology—Paraná in Brazil as a celebration of the first International Day of Light (16 May). The systems are based on the sensing properties of fibre Bragg gratings, a well-established photonic sensing technology but not covered in regular undergraduate Optics courses. The demonstrations of optical fibre sensing properties by means of funny scientific activities intended to stimulate high school and college students' interest in science, seeking greater engagement of these students in the research projects developed at the University. Fibre Bragg ability of detecting mechanical vibration and temperature changes was used to measure the temperature of the attendee's breath and vibrations produced during a short walk. Demonstrations were realized in a contest where students were challenged to walk smoothly over a flat surface instrumented with vibration sensors, as well as to blow into a tube containing the temperature sensor. Steps of the sensing systems implementation are provided in detail including aspects concerning to the choice of the apparatus design and the installation of the sensors.

1. Introduction

The newer generations have experienced overwhelming technological advances, being ordinarily surrounded by innumerable devices based on photonics. Despite the growing knowledge in this area of science and the fact that nowadays most people cannot imagine living without such technologies, they are usually faced as simple tools.

As an attempt to change this scenario, the United Nations General Assembly 68th Session proclaimed the year of 2015 as the International Year of Light and Light-based Technologies (IYL 2015) [1]. Shortly after, in 2017, the Executive Board of UNESCO, at its 39th Session, established the International Day of Light on 16 May as a world-wide opportunity to celebrate the role