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## Bragg Sensors in Engineering Education

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In the last decade, optical fiber sensors based on Bragg gratings technology have been proposed for many different engineering applications. They may be considered an added value to physical, electrical and biomedical engineering education, providing an important training on optics, optoelectronics and photonics.

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A research effort has also been put on the use of coatings to modify the response of optical fiber gratings. It can be expected that diamond coatings onto the sensors can significantly extend its capability, such as enhancing its mechanical strength, protecting it from chemical erosion, increasing its high temperature limit and prolonging its lifetime, especially for high temperature applications.

The design of optical platforms based on fiber sensing technology for monitoring the operating conditions and the wine evolution during the vinification process has also been under development. The specification of sensors is established according to chemical and physical parameters, sensitivity, working range and spatial distribution.

The potential applications of Bragg sensors for monitoring arterial pressure waveform will be analyzed and discussed. They are able of sensing displacements in the sub-nanometer scale, with bandwidths well within the range of cardiovascular dynamics.

The development of Bragg sensors for real-time monitoring of lithium batteries performance will also be presented. They have been extensively used in portable electronics and being pursued as power sources for hybrid electric vehicles and electric vehicles. The main objectives are the measurement of internal temperature and pressure during various charge and discharge conditions, such as high current densities, short circuit and overcharge. They are key issues for safety.

The design and development of these projects can be successfully explored within physical engineering master courses programmes. Its impact on autonomy and critical thinking skills may be extremely useful, towards a multidisciplinary engineering culture. ■

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