Contribution ID: **88** Type: **Poster (Session A)**

A proposal for position monitoring and alignment of pixel detector at LHC using FBG sensors

The use of fiber optic sensors for performing structural health monitoring by measuring strains is becoming more and more frequent. In fact those sensors offer several advantages over conventional sensors. One of those is the immunity from electromagnetic interferences. This aspect is particularly attractive in the environmental conditions of contemporary High Energy Physics experiments, where detectors are immersed in magnetic fields. The Fiber Bragg Grating (FBG) which is one particular fiber optic sensor give an additional advantage since FBGs can be easily multiplexed within the same fiber. FBGs are optical strain gauges and the possibility of having more sensors in the same fiber will significantly reduce the harness required when strain measurements are needed. In this paper we propose the use of FBGs for a different purpose with respect to structural health monitor and in particular to monitor the position of particle detectors at a few micron level. In fact mechanical and thermal deformations can induce unwanted displacements on the detector and consequently errors in particle trajectory reconstruction. Another aspect that will be investigated is the possibility of using FBG sensors for monitoring accurately the re-positioning of the pixel detector about the beam pipe. We have proposed and used FBG sensors as position monitors in HEP experiments at high-intensity colliders such as FINUDA at Frascati and BTeV at Fermilab (Chicago). In this paper we report on results on a proposed use of FBG sensors for position monitoring, re-positioning and alignment of the pixel detector for experiment CMS at LHC (CERN, Switzerland).

Author: PAOLOZZI, Antonio (INFN Frascati + Uni Sapienza Roma)

Co-author: COLONNA, Danilo (INFN Frascati)

Presenter: PAOLOZZI, Antonio (INFN Frascati + Uni Sapienza Roma)