DESCRIPTION FOR THE GENERAL PUBLIC

Position sensitive detectors based on semiconductor technologies provides the best single hit spatial resolution and allow for the most precise charged particles reconstruction for high energy physics applications. Detectors equipped with the silicon sensors (with micro-strip or pixel segmentation) can perform topological reconstruction of short-lived particles with time of live around 10^{-12} s. This, in turn, allows to perform precise measurement of such subtle phenomena as CP violation (charge-parity violation) which among other is responsible for the matter - antimatter asymmetry observed in the Universe. High sensitivity of the silicon based detection devices is also exploited in searching of the signals of New Physics beyond the Standard Model of the elementary particles.

The tendered project is a specific amalgamation of topics related to the High Energy Physics and detector physics. It includes the studies of the radiation damage of the planar micro-strip silicon sensors of the LHCb (Large Hadron Collider beauty) VELO (VErtex LOcator) detector induced by the hadronic particles produced in the proton-proton collisions at the LHC.

The LHCb VELO detector is a unique detection device. It is the most precise tracking device currently working at the LHC and is able to perform the standalone track reconstruction. Its sensors are placed in merely 8 mm from the proton beam, which means that they are subjected to the extreme fluences. The radiation damage of the bulk material of the VELO sensors results in a number of performance degrading effects that need to be carefully monitored and analyzed during the daily operation of the VELO. This task is regarded to be one of the most vital for maintaining the superb performance of the LHCb vertex locator achieved in Run I (2010 - 2012).

The main aim of the submitted project is application of a novel method of the leakage current measurement as a function of sensor temperature. In the course of execution of this project we intend to design and implement a dedicated software platform for processing and analyzing these data. Also, we plan to integrate this software with the official LHCb monitoring software used by the VELO group during the daily operation.