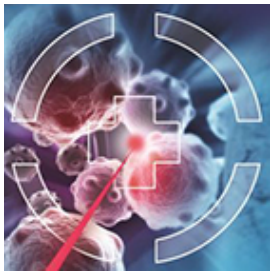

Contribution ID: **25** Type: **not specified**

Characterisation of the LHCb VELO detector modules as a non-invasive Proton Beam Monitor

Wednesday 4 September 2019 15:00 (20 minutes)

In proton beam therapy, knowledge of the detailed beam properties is essential to ensure effective dose delivery to the patient. In clinical practice, currently used interceptive ionisation chambers require daily calibration and suffer from slow response time. Therefore, novel silicon-based detector technologies are developed. This contribution presents a non-invasive method for dose online monitoring. It is based on the silicon multi-strip sensor LHCb VELO (VErtex LOcator), developed originally for the LHCb experiment at CERN. The semi-circular detector geometry offers the possibility to measure beam intensity through halo measurements without interfering with the beam core.
The technology has been recently tested at the MC40 proton beamline at the University of Birmingham, UK. Precise measurements of the proton beam halo were performed by synchronising the readout of the VELO detector with the RF cyclotron frequency and an in-beam ionisation chamber. Different beam sizes and beam current settings were recorded and are presented. The experimental results are compared to beam tracking simulation and summarised to characterise the VELO detector as a halo beam monitor.

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