

Results from the first LHC beam reconstructed tracks in the LHCb Vertex Locator

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LHCb is a dedicated experiment at the LHC to study CP violation and rare b decays. The vertex locator (VELO) is a silicon strip detector designed to measure precisely the production and decay vertices of B-mesons. The detector is positioned within 8 mm of the LHC beams and will operate in an extreme radiation environment. The VELO consists of two retractable detector halves with 21 silicon micro-strip tracking modules each. A module is composed of two n+-on-n 300 micron thick half disc sensors with R and Phi micro-strip geometry. The detectors are operated in vacuum and a bi-phase CO₂ cooling system used. The full system has been operated since June 2008.

During the LHC synchronization tests in 2008 and 2009 the LHCb detectors measured secondary particles produced by the interaction of the LHC beam on an absorber. Around 100,000 tracks were reconstructed in the VELO and they were used to derive the relative timing alignment between the sensors and for the first evaluation of the alignment. Using this track sample the VELO has been aligned to an accuracy of 5 microns. A single hit resolution of 10 micron was obtained at the smallest pitch for tracks of perpendicular incidence. Further results from initial LHC collisions will be added as available.

The design and the main components of the detector system are introduced. The commissioning of the detector is reported and the talk will focus on the performance results from the first LHC tracks.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

<http://parkes.web.cern.ch/parkes/LHCb%20VELO.pdf>

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