
21st International Conference on Computing in High Energy and Nuclear Physics **CHEP2015** Okinawa Japan: April 13 - 17, 2015

Contribution ID: **267** Type: **oral presentation**

# Optimization of the LHCb track reconstruction

*Monday, 13 April 2015 14:45 (15 minutes)*

The LHCb track reconstruction uses sophisticated pattern recognition algorithms to reconstruct trajectories of charged particles. Their main feature is the use of a Hough-transform like approach to connect track segments from different subdetectors, allowing for having no tracking stations in the magnet of LHCb. While yielding a high efficiency, the track reconstruction is a major contributor to the overall timing budget of the software trigger of LHCb, and will continue to be so in the light of the higher track multiplicity expected from Run II of the LHC.
In view of this fact, key parts of the pattern recognition have been revised and redesigned. We will present the main features which were studied. A staged approach strategy for the track reconstruction in the software trigger was investigated: it allows unifying complementary sets of tracks coming from the different stages of the high level trigger, resulting in a more flexible trigger strategy and a better overlap between online and offline reconstructed tracks. Furthermore the use of parallelism was investigated, using SIMD instructions for time-critical parts of the software or - in a later stage - using GPU-driven track reconstruction.
In addition a new approach to monitoring was implemented, where quantities important for track reconstruction are monitored on a regular basis, using an automated framework for comparing different figures of merit.

**Primary authors:** STORACI, Barbara (Universitaet Zuerich (CH)); DE CIAN, Michel (Ruprecht-Karls-Universitaet Heidelberg (DE))

**Presenter:** STORACI, Barbara (Universitaet Zuerich (CH))

**Session Classification:** Track 2 Session

**Track Classification:** Track2: Offline software