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Primary Vertex Reconstruction in the ATLAS Experiment at the LHC

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In the harsh environment of the Large Hadron Collider at CERN (design luminosity of 10^34 cm-2s-1) efficient reconstruction of the signal primary vertex is crucial for many physics analyses. Described in this paper are primary vertex reconstruction strategies implemented in the ATLAS software framework Athena. The implementation of the algorithms follows a very modular design based on object oriented C++ and use of abstract interfaces. This guarantees the easy use and exchange of different vertex fitters and finders which are considered for a given analysis. This modular approach relies on a dedicated Event Data Model for vertex reconstruction. The data model has been developed alongside with the reconstruction algorithms. Its design is presented in detail. The performance of the implemented primary vertex reconstruction algorithms has been studied on a variety of Monte Carlo samples and results are presented.

Submitted on behalf of Collaboration (ex, BaBar, ATLAS)

ATLAS Offline Computing

Primary authors: Dr WILDAUER, Andreas (CERN); Mr PIACQUADIO, Giacinto (Albert-Ludwigs-Universität Freiburg); Dr PROKOFIEV, Kirill (University of Sheffield)

Presenter: Dr PROKOFIEV, Kirill (University of Sheffield)

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