

ACTS: from ATLAS software towards a common track reconstruction software

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The reconstruction of charged particles trajectories is a crucial task for most particle physics experiments. The high instantaneous luminosity achieved at the LHC leads to a high number of proton-proton collisions per bunch crossing, which has put the track reconstruction software of the LHC experiments through a thorough test. Preserving track reconstruction performance under increasingly difficult experimental conditions, while keeping the usage of computational resources at a reasonable level, is an inherent problem for many HEP experiments. Exploiting concurrent algorithms and using multivariate techniques for track identification are the primary strategies to achieve that goal.

Starting from current ATLAS software, the ACTS project aims to encapsulate track reconstruction into a generic package, which can be built against the Gaudi(Hive) framework. It provides a set of high-level algorithms and data structures for performing track reconstruction tasks as well as fast track simulation. The software is developed with special emphasis on thread-safety to support parallel execution of the code and data structures are optimized for vectorization to speed up linear algebra operations. The implementation is agnostic to the details of the detection technologies and magnetic field configuration which makes it applicable to many different experiments.

Primary Keyword (Mandatory)

Reconstruction

Secondary Keyword (Optional)

Algorithms

Tertiary Keyword (Optional)

Parallelization

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