

Connecting The Dots 2023



Contribution ID: 50

Type: **Plenary**

CEPC tracking performance with ACTS

Tuesday 10 October 2023 11:00 (25 minutes)

The Circular Electron Positron Collider (CEPC) is a physics program proposal with the goal of providing high-accuracy measurements of properties of the Higgs, W and Z bosons, and exploring new physics beyond the SM (BSM). The CEPC is also an excellent facility to perform precise tests of the theory of the strong interaction.

To deliver those physics programs, the CEPC detector concepts must meet the stringent performance requirements. The majority of the visible particles at CEPC are charged particles whose multiplicity can be as high as 100. An efficient separation of these particles provides a solid basis for the reconstruction and identification of physics objects, the high-level objects such as leptons, photons and jets that are input to physics analyses. Therefore, the CEPC detector should have excellent track finding efficiency and track momentum resolution. For example, for tracks within the detector acceptance and transverse momenta larger than 1 GeV, a track finding efficiency better than 99% is required.

A Common Tracking Software (ACTS) project aims to provide an open-source experiment-independent and framework-independent software designed for modern computing architectures based on the tracking experience at LHC. It provides a set of high-level performant track reconstruction tools which are agnostic to the details of the detection technologies and magnetic field configuration, and tested for strict thread-safety to support multi-threaded event processing. ACTS has been used as a tracking toolkit at experiments such as ATLAS, sPHENIX, ALICE, STCF etc. and has shown very promising tracking performance in terms of both physics performance and time performance. In particular, recently, implementation of ACTS for STCF, which is the first application of ACTS for a drift chamber, is made and promising performance is achieved.

In this talk, we will report on development of the CEPC track reconstruction software based on the detection information from Silicon Trackers and a Main Drift Chamber using the Kalman Filter based track finding and fitting algorithms of ACTS. The tracking performance for a tracking system with a drift chamber and a track multiplicity of 100 (which is much higher than that at STCF) will be presented.

Authors: LIU, Mengyao; AI, Xiaocong (Zhengzhou University); HUANG, Xingtao; Mr QIN, Zuyin

Presenter: AI, Xiaocong (Zhengzhou University)

Session Classification: Plenary