



Contribution ID : 545

Type : **Oral presentation**

The Software Library of the Belle II Experiment

Friday, 4 July 2014 17:00 (15)

The rich physics of heavy quark decays provides creative and precise ways to look into nature. Experimentally, B factories have been producing quite prominent discoveries and new insights: The CP violation in B meson decays, charm neutral meson oscillations, discovery of new particles such as X(3872), and various other significant physics results. Based on these successes, a next generation B factory and the detector counterpart, SuperKEKB and Belle II, are being built in Japan, as the upgrades of KEKB and Belle, respectively. The new factory will start its physics run in the year 2016. This is an ambitious project. The luminosity of the e^+e^- collider will be upgraded by the factor of 40, which will create a 50 times larger data set compared to the Belle sample. Both the background and the triggered event rates will be increased by a factor of at least 10. The Belle II software system is designed to accommodate these challenges and to run on grid, cloud, and local resources around the world. Various external software packages are employed to enhance the user interface. The software system, BASF2, is structured as a framework built with dynamic module loading and the ability of parallel processing. The system is written in C++ with Python steering scripts, compatible with common linux operating systems. A full detector simulation library is created based on Geant4. The parallel processing utility is based on a fork-based method, where full events are distributed to the spawned processes. In this talk, we will explain the design of the Belle II software structure with the emphasis on the parallel processing.

Summary

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Session Classification : Computing and Data Handling

Track Classification : Computing and Data Handling