

Conversion of Belle's data to Belle II's data format

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The Belle II experiment is the upgrade of the highly successful Belle experiment located at the KEKB asymmetric-energy e^+e^- collider at KEK in Tsukuba, Japan. The Belle experiment collected e^+e^- collision data at or near the centre-of-mass energies corresponding to $\Upsilon(nS)$ ($n \leq 5$) resonances between 1999 and 2010 with the total integrated luminosity of 1 ab^{-1} . The data collected by the Belle experiment is still being actively analyzed and is producing more than twenty physics results per year.

Belle II is a next generation B factory experiment that will collect 50 times more data than its predecessor Belle. The higher luminosity at the SuperKEKB accelerator leads to higher background and requires a major upgrade of the detector. The simulation, reconstruction and the analysis software itself has also been upgraded substantially and most parts of the software were newly written taking into account the experience from Belle, other experiments, and advances in technology in order to be able to store, manage and analyse much larger data samples. Newly developed reconstruction algorithms and the need to keep the per-event disk-space requirements low resulted also in a new data format for the Belle II experiment.

The Belle II physics analysis software is organised in a modular way and integrated within the Belle II software framework (basf2). A set of physics analysis modules that perform simple and well-defined tasks and are common to almost all physics analyses are provided. The physics modules do not communicate with each other directly but only through the data access protocols that are part of the basf2. The physics modules are written in C++, Python or a combination of both. Typically, a user performing a physics analysis only needs to provide a job configuration file with the analysis's specific sequence of physics modules. This approach offers beginners and experts alike the ability to quickly and easily produce physics analysis specific data. Newly developed high-level-analysis tools for the Belle II experiment, such as for example full event tagging, show significantly better performance compared with the tools developed and used at the Belle experiment based on studies performed on simulated data.

This talk will present the Belle to Belle II data format converter that converts simulated and real data collected by the Belle experiment to the data format of the Belle II experiment. The Belle data conversion allows for the testing, validation and to some extent for the calibration of the Belle II physics analysis software and in particular of the high-level-analysis tools well before the first data are collected by the Belle II experiment ensuring faster physics output. On the other hand, the ability to run Belle II tools with better performance over Belle data enables significant improvements to be made on new or existing measurements performed using the existing Belle data.

Tertiary Keyword (Optional)

Secondary Keyword (Optional)

Preservation of analysis and data

Primary Keyword (Mandatory)

Data model

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