

Hands-on: b2bii

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Belle II Summer Workshop
12 – 16 July 2021



Introduction

- ▶ B2BII converts Belle dataobjects into Belle II dataobjects ([Comput. Softw. Big Sci. 2 \(2018\)](#))
 - ▶ `convertBelleMdstToBelleIIMdst`
- ▶ special particle lists for neutrals
 - ▶ `gamma:mdst`, `pi0:mdst`, `K_S0:mdst`, `Lambda0:mdst`, `gamma:v0mdst` (converted photons), `K_L0:mdst`
- ▶ dedicated PID variables
 - ▶ `atcPIDBelle()`, `eIDBelle`, `muIDBelle`, `muIDBelleQuality`
- ▶ “standard cuts” for K_S^0 and Λ : `goodBelleKshort` and `goodBelleLambda`
- ▶ in previous releases switches were necessary in many functions (`buildRestOfEvent`, `flavorTagger`) but in latest releases this is handled automatically behind the scenes
- ▶ latest FEI training (`FEI_B2BII_light-2012-minos`) and B2BII flavor tagging payloads only available in analysis global tag
 - ▶ only if those are needed, disable kekcc-based B2BII database by setting `enableLocalDB=False` in `convertBelleMdstToBelleIIMdst`

Hands-on I: Generate Belle MC

- ▶ log into kekcc
- ▶ create a new directory or go to your directory of the basf2 hands-on session from Monday
- ▶ copy Belle MC generation helper scripts: `cp -r ~fmeier/BelleIISummerSchool2021/BelleMC .`
- ▶ load Belle software settings: `source /sw/belle/local/etc/bashrc_general`
- ▶ change into evtgen directory: `cd BelleMC/evtgen`
- ▶ copy decfile for $B^\pm \rightarrow DK^\pm$: `cp ~fmeier/BelleIISummerSchool2021/Bu2DK_D2KSpi0.dec .`
- ▶ generate 10 000 events for experiment 65 split into 20 jobs of 500 events
 - ▶ nBB-limited is prepared to have only experiment 65
 - ▶ Y4S.conf is evtgen config file for $\Upsilon(4S)$ productions
- ▶ check that .gen files are produced in gen/ directory and inspect one event using `bbsview filename.gen` (load three times, then print GEN_HEPEVT)
- ▶ simulate detector response:
`./runGsimReco.csh <your-directory>/BelleMC/evtgen/gen/Bu2DK_D2KSpi0/` from gsim/ directory

Hands-on II: Conversion of steering file

- ▶ start from script created on Monday or copy my latest version

```
cp ~/fmeier/BelleIISummerSchool2021/improvedBu2DKReconstruction.py .
```

- ▶ remember to start a new kekcc session with the Belle II tools loaded and light-2106-rhea set up
- ▶ load merged K_S^0 and all π^0 particle lists (stdV0s and stdPi0s)
- ▶ replace D^0 daughters K^+ and π^- with K_S0:merged and pi0:all
- ▶ update decay string in variable alias creation functions
- ▶ add mass constraints for K_S^0 and π^0 to vertex fit

You should have a working **Belle II** steering file for the reconstruction of $B^\pm \rightarrow DK^\pm$ with $D^0 \rightarrow K_S^0 \pi^0$ now.

- ▶ replace K_S^0 and π^0 particle lists with pre-defined B2BII versions (label :mdst)
- ▶ load generated Belle MC files with convertBelleMdstToBelleIIMdst

You should have a working **B2BII** steering file for the reconstruction of $B^\pm \rightarrow DK^\pm$ with $D^0 \rightarrow K_S^0 \pi^0$ now.