

LHCb Starterkit 2024 - Practice Session

February 16, 2024

1 Part 1 - Producing your nTuple

1.1 Goals of the session

Starting from a DST files with simulated events that passed HLT2 selections, we want to tuple the information using DaVinci.

- Decay of interest : $D^0 \rightarrow K^- \pi^+$
- Simulation sample used:
/MC/Upgrade/Beam7000GeV-Upgrade-MagDown-Nu7.6-25ns-Pythia8/Sim10aU1/27163003/XDIGI
- You can find the dst files (2 files with different statistics) and the tck.json files in this directory:
/afs/cern.ch/work/f/femiguel/public/Starterkit24/
- **Please copy the files to your working area.**

1.2 Setting the configuration

Working from lxplus.

1. Create a file python tupling.py, that will contain the algorithm used to config DaVinci.
2. Create a function that will be called when executing DaVinci (typically alg config()), taking options as argument.
3. This function return make config(options, algs). (This function needs to be imported from DaVinci).

4. To make things easier here are the list of imports we will be using.

```
from PyConf.components import force_location
from DaVinci.algorithms import add_filter
from DaVinci import make_config
from FunTuple import FunTuple.Particles as Funtuple
from FunTuple import FunctorCollection
import Functors as F
```

```

from FunTuple.functorcollections import (
    MCHierarchy,
    Kinematics,
    SelectionInfo,
    MCVertexInfo,
    MCKinematics,
    EventInfo,
)
from Functors.math import log
from DaVinci.truth_matching import (
    configured_MCTruthAndBkgCatAlg,
)
from DaVinci.reco_objects import make_pvs_v2
from DaVinci.algorithms import add_filter, get_odin, get_decreport

```

5. This is the HLT2 line: `Hlt2Charm_D0ToKmPip_XSec_Line`
6. Hint: `add_filter` in this DaVinci version is the equivalent of the `create_line_filter` we saw in the DaVinci Run 3 lesson this year. This is due to these DST files being created with a previous DV version.

1.3 Setting the options

Create the `yaml` file and fill with the following (ignore the unintended indentation):

```

input_files: ... # the dst file
annsvc_config: PATH/hlt2.tck.json
input_type: ...
input_raw_format: ...
data_type: Upgrade
simulation: true
dddb_tag: ...
conddb_tag: ...
ntuple_file: ...
process: ...

```

1.4 Execution

To run the tupling:

```
lb-run DaVinci/v62r0p1 lbexec CONFIG OPTION
```