PID selectors in FastSim

Warwick Workshop, April 16th 2009

Nicolas Arnaud (LAL-Orsay)

- Code organization in FastSim
- Existing (preliminary!) selectors
- Documentation
- Missing pieces

PID code organization in FastSim

- Several packages involved
  - **`PacDirc`**: DIRC-like PID barrel simulation
  - **`PacForwardPid`**: Forward PID-related code (detector descriptions, simulation, reconstruction)
  - **`PacPid`**: Core code imported from BaBar; definitions of PID selectors and sequences

    → Complete & consistent framework available for developers
  - **`PacPidCalib`**: Adapted from BaBar software; provides tools to test selectors using clean samples

    → Various developments still needed in this area
  - **`BetaMicroAdapter`**: Coming from BaBar as well; defines containers with basic detector & PID (barrel + forward) information

Existing selectors in PacPid

- A few preliminary selectors already exist

→ Some examples not complete/optimized which **shouldn't be** used as such in analysis: the 'First' selectors

```
PacPidFirstElectronSelector
PacPidFirstKaonSelector
PacPidFirstPionSelector
```

either improve them or get inspired for your own powerful selectors

→ `PacPidTruthBasedSelector` is based on MC-truth and the 5 (mis-)id probabilities are set by the user in a tcl file

```
(…)
acceptProbaIfElectron set 0.01
acceptProbaIfMuon     set 0.01
acceptProbaIfPion     set 0.05
acceptProbaIfKaon     set 0.95
acceptProbaIfProton   set 0.01
(…)
```

Example settings for a K selector

PID sequences in PacPid

- One sequence for each type of charged particle
  → So far:

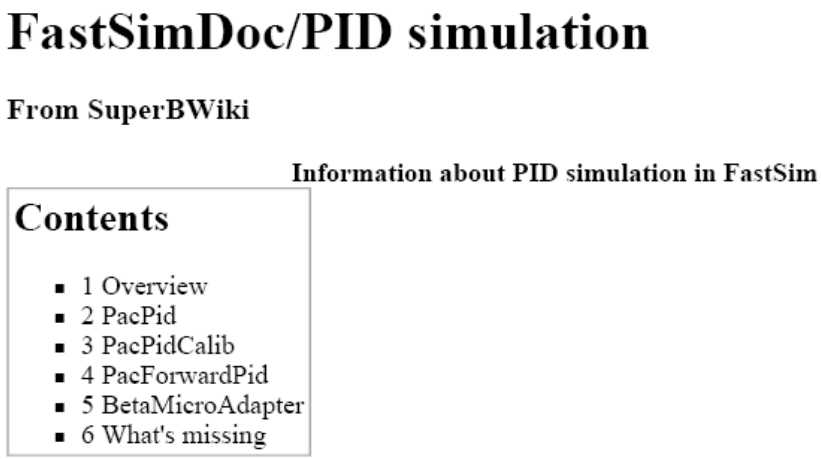
  `PacPidElectronSequence`
  `PacPidKaonSequence`
  `PacPidPionSequence`

- Top-level sequence calling all the other ones: **`PacPidSequence`**

- Very straightforward code
  → Easy to add your own selector sequence
  → Follow existing coding conventions

Documentation

- In the SuperB wiki:
  http://mailman.fe.infn.it/superbwiki/index.php/FastSimDoc/PID_simulation#PacPid
- This is part of a more general documentation about PID in FastSim which has just been released:
  http://mailman.fe.infn.it/superbwiki/index.php/FastSimDoc/PID_simulation



FastSimDoc/PID simulation

From SuperBWiki

Information about PID simulation in FastSim

Contents

- 1 Overview
- 2 PacPid
- 3 PacPidCalib
- 4 PacForwardPid
- 5 BetaMicroAdapter
- 6 What's missing

- Anyone contributing to the FastSim PID effort is welcome to update it
- It contains additional information w.r.t. this presentation

What's missing

- A lot of things!

- Realistic selectors for all charged particles
  → Inputs from dE/dx, calorimeter and muon detector
  → Performances to be tuned on pure samples

- Area not much manpowered so far
  → All contributions welcome
  → Works with limited time duration can have big impact