

# Status of Forward PID in FastSim

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- Simulation far from being as mature as the 'DIRC' barrel  
⇒ much less to say than Brian
- Basic framework existing  
⇒ code developers needed
- Various inputs required to move forward quickly

# Simulation Status

- `PacForwardPid` package
- The `PacForwardPidReco` class loops over the `PacSimHits` and triggers the creation of a `PacForwardResponse` object each time a hit in the Forward PID detector is found
- So far no simulation of detector response
  - ⇒ Information stored is ‘measurement’ + ‘error’ & hit coordinates
  - ⇒ Propagated to the `BtaPidQual` object whose creation is now triggered by hits in either the barrel or the forward PID region [see package `BetaMicroAdapter`]
- Detector configurations set via xml files; so far:

<code>ForwardPid_SuperB.xml</code>	⇐ symlink steering the simulation
<code>ForwardPid_TOF.xml</code>	change it to change detector
<code>ForwardPid_aerogel.xml</code>	[files have meaningful names]
<code>ForwardPid_noForwardPid.xml</code>	

# Work in progress

- **Simulation of the TOF detector**  
→ Orsay (**Leonid Burmistrov** *et al.*)
- **Simulation of the aerogel detector**  
→ Novossibirsk (**Alexey Berdyugin** *et al.*)  
work expected to take place during a visit to  
Padova scheduled for the first half of May
- **Detector geometry & response studies** needed
- **Investigations to understand what is going on in forward region**  
→ Preliminary studies in Orsay seem to show that the fraction of reco.  
tracks in the forward PID region is (much) lower than expected  
→ More work needed to find whether the effect is true or the  
signature of a problem (FastSim implementation and/or reco.)

More manpower  
wouldn't hurt...

# Documentation

- In the **SuperB wiki**:

[http://mailman.fe.infn.it/superbwiki/index.php/FastSimDoc/PID\\_simulation#PacForwardPid](http://mailman.fe.infn.it/superbwiki/index.php/FastSimDoc/PID_simulation#PacForwardPid)

[actually **part of a more general PID documentation just released**]

## PacForwardPid

This package contains all the code specific to the Forward PID detector: simulation setups, measurements and reconstructed data.

- The different detector configurations are described in **xml** files and the one actually used by the simulation is defined via a symbolic link:

```
ForwardPid_SuperB.xml -> ForwardPid_aerogel.xml
```

Please follow carefully the existing conventions when modifying or committing any of these setup files; ask Nicolas ARNAUD if you have any doubt or question.

- The **PacForwardPidResponse** class aims at describing the response of the detector when a charged particle interacts with it. So far its contents are trivial or commented out.
- The **PacForwardPidMeasurement** class fills an object of type *PacForwardPidResponse* each time a *PacSimHit* located in the forward PID detector is recorded. For now the interaction with the actual detector is not simulated: only raw information from the input *PacSimHit* is used by the *PacForwardPidResponse*:

```
{...}
PacForwardPidHit* forwardpidhit = new PacForwardPidHit( hit );
{...}
res->setMeasurement( hit.time() ); // time measurement for now
res->setError( 20.0E-12 ); // assuming timing error of 20 ps
{...}
res->setX( hit.position().x() );
res->setY( hit.position().y() );
res->setZ( hit.position().z() );
{...}
```

- The **PacForwardPidReco** class loops over the *PacSimHits* and looks for those which are in the Forward PID detector.

Contrary to the mature barrel PID simulation which has benefited from years of operation of the BaBar DIRC, the Forward PID simulation is still very much work in progress. **Your help is needed to improve it!** Among the critical things currently missing are realistic simulations (detector position, materials, interaction with tracks, etc.) of the TOF and Aerogel potential solutions for the forward PID detector.

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→ In progress: all contributions welcome