

FAST SIMULATION MEETING
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IFR fast simulation: Status

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General stuffs

- **G. Castelli** (Padova University and INFN) just joint the Fast simulation group
- **IFR fast simulation will not be used for the detector design/optimization**
 - Any input will be parameterized
 - Dedicated studies are ongoing with the BaBar full simulation
 - These studies will also be used to find parameterization or adjustments in the parameters/parameterizations

General stuffs

- **First step:** *parameterized output using the standard BPC ntuples*
 - *IFR geometry will be very similar to the SuperIFR: material before the IFR will be ~ the same*
 - *We will provide in a reasonable time scale a realistic output that can be used for physics*
 - *Advantages: output is -realistic-: hadronic (pions, Kaons) interactions within the IFR and before the IFR are parameterized with data*
 - *Disantvantages: parameterization needs to be changed according to the design optimization (full simulation)*

Muon selection

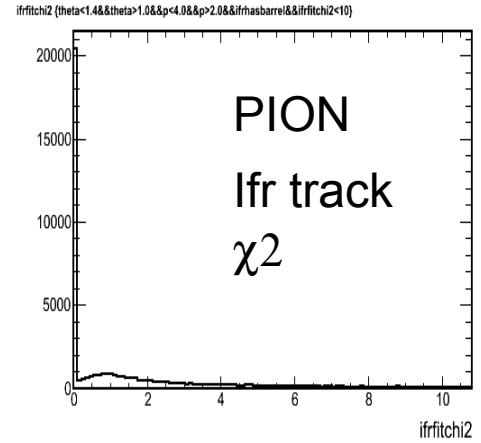
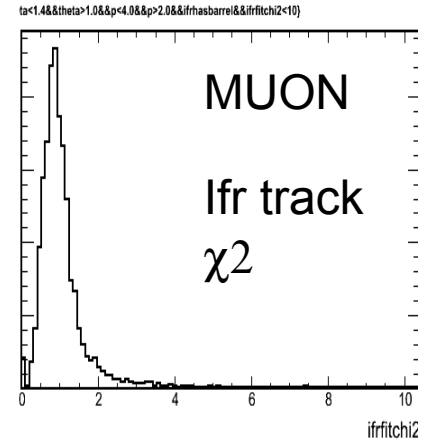
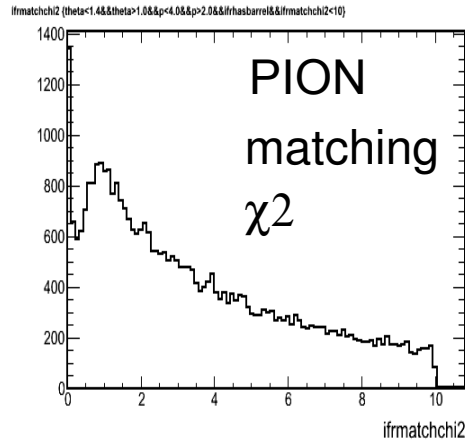
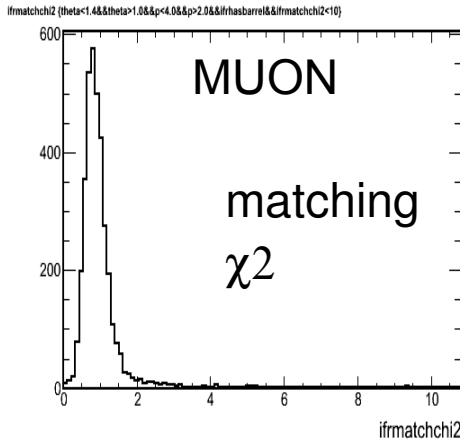
Selection Variables	Very Tight	Tight
E_{cal}	[0.4, 0.5]	[0.4, 0.5]
No. of Layers (N_L)	> 1	> 2
Meas. Lambda (λ_{meas})	> 2.2	> 2.2
Delta Lambda ($\Delta\lambda$)	< 0.8	< 1
Track Fit Chisq. (χ_{fit}^2)	< 3	< 3
Track Match Chisq. (χ_{mat}^2)	< 5	< 5
Track Continuity (T_C)	< 0.34	< 0.3
Average Strip Mult. (\bar{m})	< 8	< 8
Sigma Strip Mult. (σ_m)	< 4	< 4

We will parameterize the distributions of these quantity

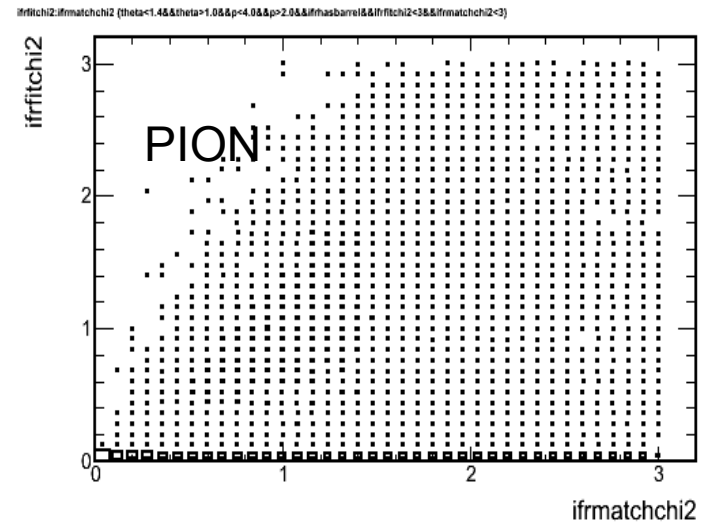
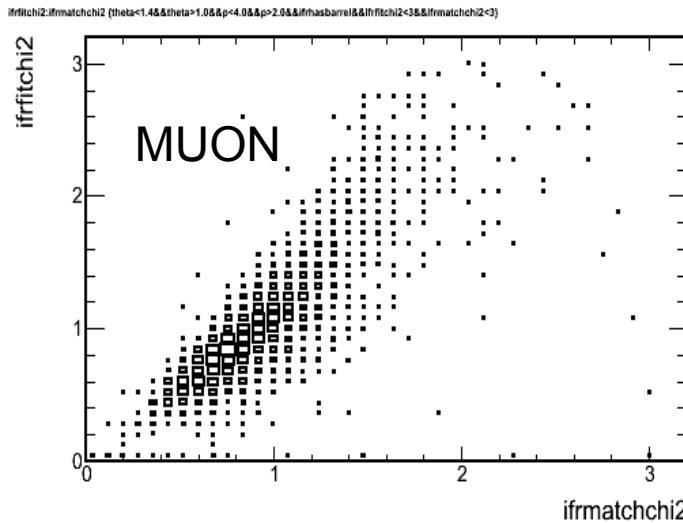
Future: we will generate Hits in the IFR (strips multiplicity, etc etc) and compute the relevant quantities from the basic detector inputs - a reconstruction layer will be needed: reuse the BaBar code

Some examples

- Use clean samples of muons ($\mu\mu\gamma$) and pions ($\tau\tau$): select a particular bin, for ex. (barrel): $\theta(57^\circ-80^\circ)$, $p(2.0-4.0$ GeV)



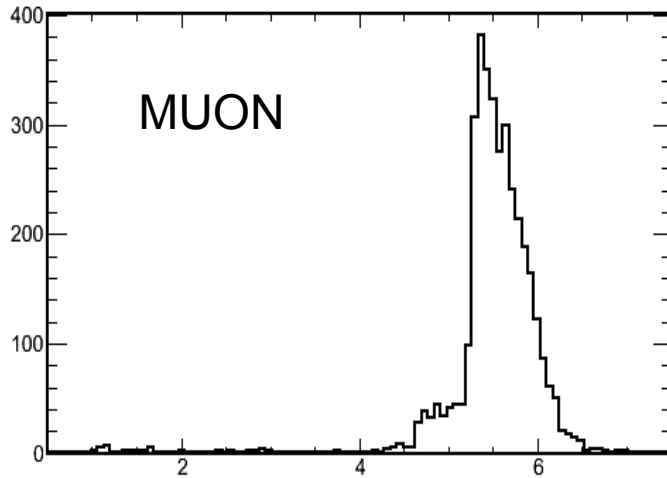
Take into account the correlations...



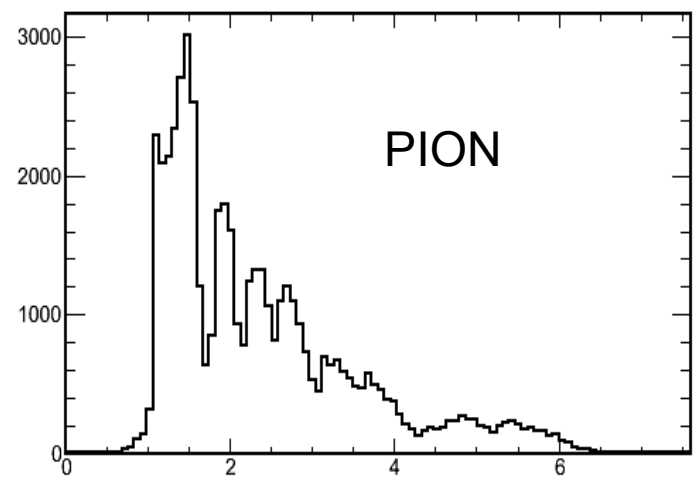
Other examples: measured IntLenght

bin: $\theta(57^\circ-80^\circ)$, $p(2.0-4.0 \text{ GeV})$

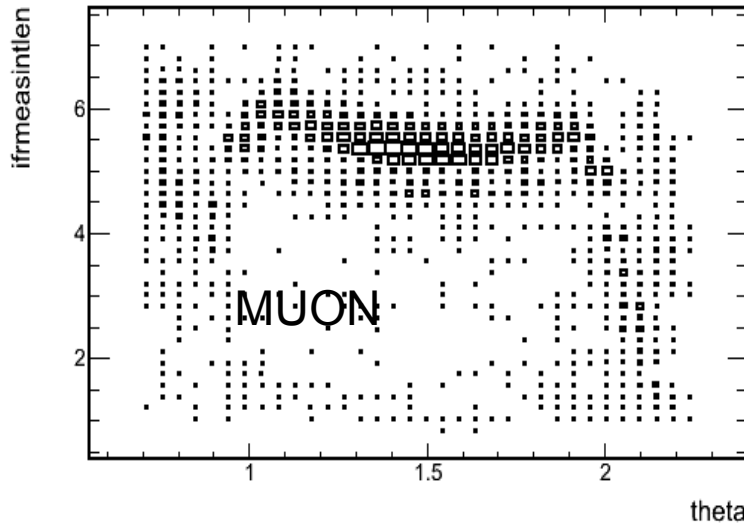
ifmeasintlen (theta<1.4&&theta>1.0&&p<4.0&&p>2.0&&ifrhasbarrel&&ifrmeasintlen<7)



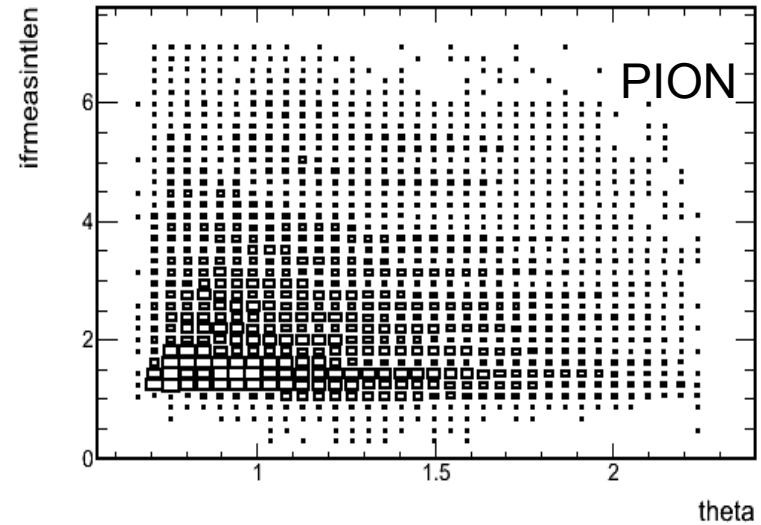
ifmeasintlen (theta<1.4&&theta>1.0&&p<4.0&&p>2.0&&ifrhasbarrel&&ifrmeasintlen<7)



ifmeasintlen:theta {p<4.0&&p>2.0&&ifrhasbarrel&&ifrmeasintlen<7}

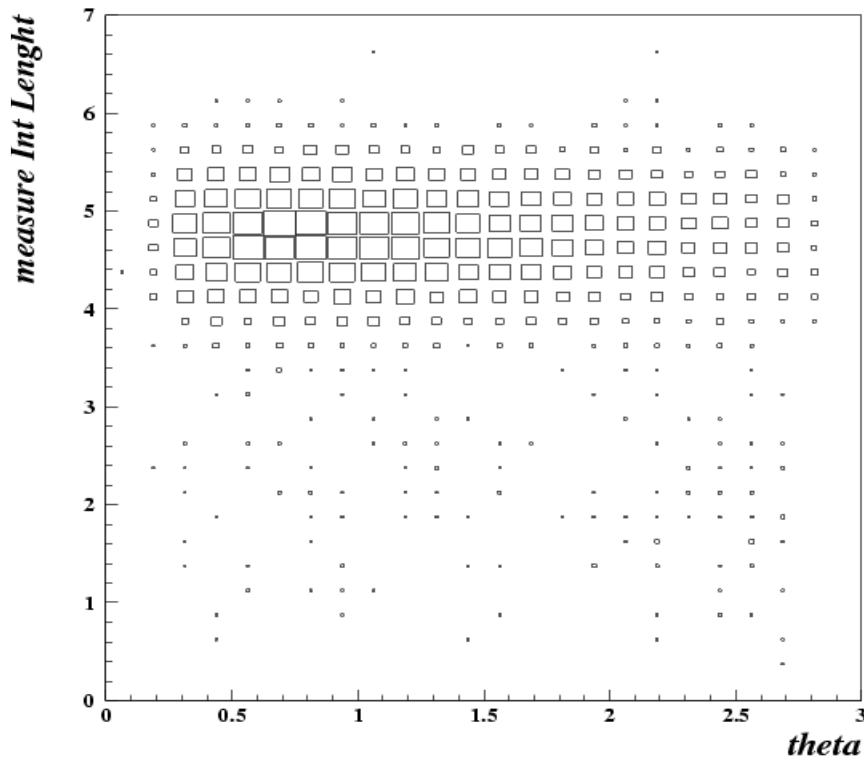


ifmeasintlen:theta {p<4.0&&p>2.0&&ifrhasbarrel&&ifrmeasintlen<7}



Example: first attempt

- Generate a sample of $B \rightarrow \mu\mu$ events
- Number of interaction lengths setted using
 - *PmcMicroAdapter::buildIfrQual* to compute the parameterized output and store the *BtalfrQul* quantities
 - *PmcMicroAdapter* use as Input a *BtaCandidate*



- We do not need a *BtaCandidate*
 - A *PacSimTrk* could be enough, a link to the detector responses should be provided
- Move/rewrite the *buildIfrQual* method in a dedicated package to simulate the response of the detector.

To Do

- **Move to the new PravdaMC ASAP**
- *Implement a simple cut based selector and create muonLists usable for physics*
- *Adjust the PDFs according to the CDR baseline (or other design)*
 - *for examples: changes in the #layers, or in the #interaction lengths*
- *Coordinate with the EMC:*
 - *Ecal is used by mu selectors*
 - *Take into account correlations between the energy release in the*
- *Question: how Klong fit with the PravdaMC/PacTrk design?*
 - *We need to generate a BtaCandidate from hits in the IFR*