Simulation Status of IFR

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Outline

- Ifr Group Simulation
- Geant4 Simulation
- Ifr optimization

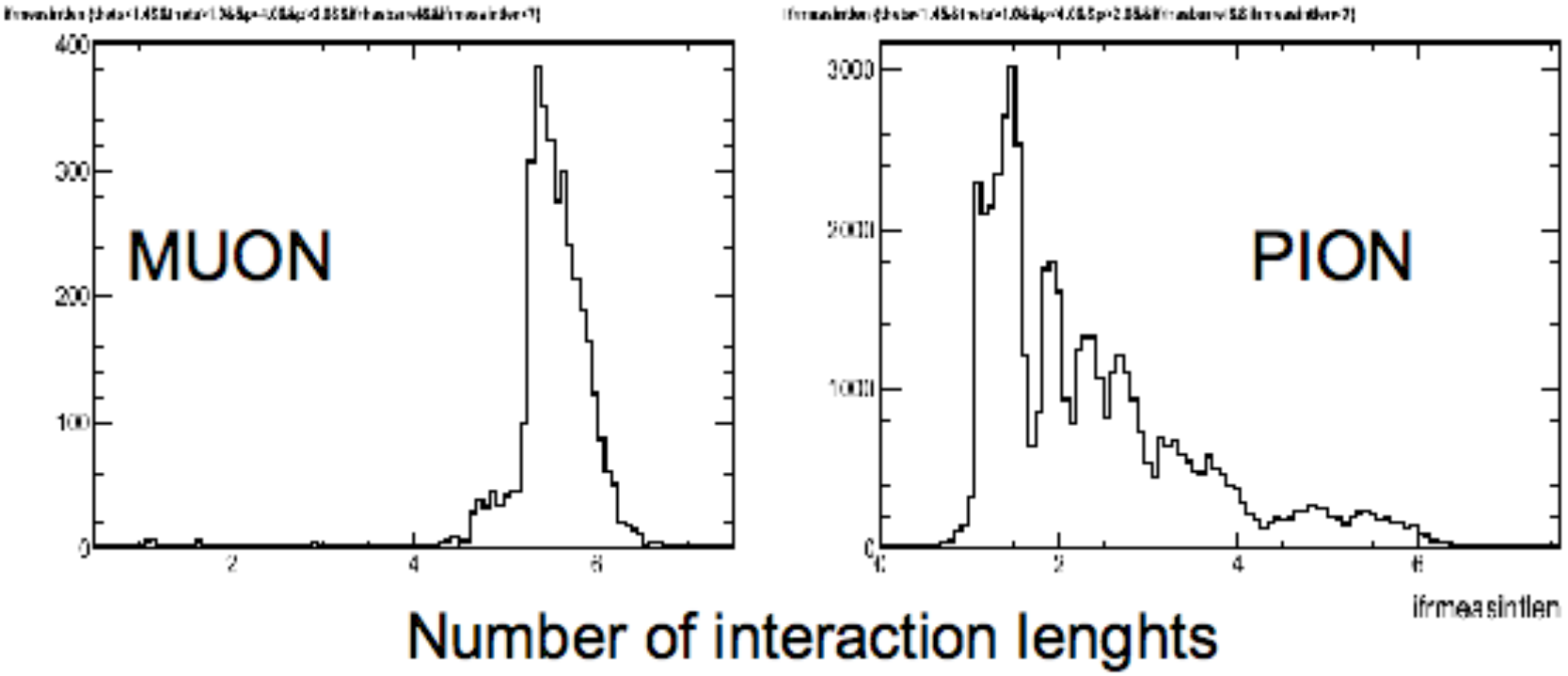
IFR Simulation Group

- Fast Simulation: G. Castelli (Padova), M. Rotondo (Padova)
- Geant4: M. Andreotti (Ferrara), G. Cibinetto (Ferrara), M. Rotondo (Padova)
- Detector optimization: M. Andreotti (Ferrara), M. Munerato (Ferrara)

Fast Simulation status

- Many changes in PravdaMC:
  - →TRACKERR is going to be changed with PacTrk (main developer David N. Brown)
- IFR output will be parameterized:
  - →Parameters/distributions from the n-tuple produced by the BaBar PID group
  - →Generate the relevant variables for each particle type: p, theta and phi;

Fast simulation

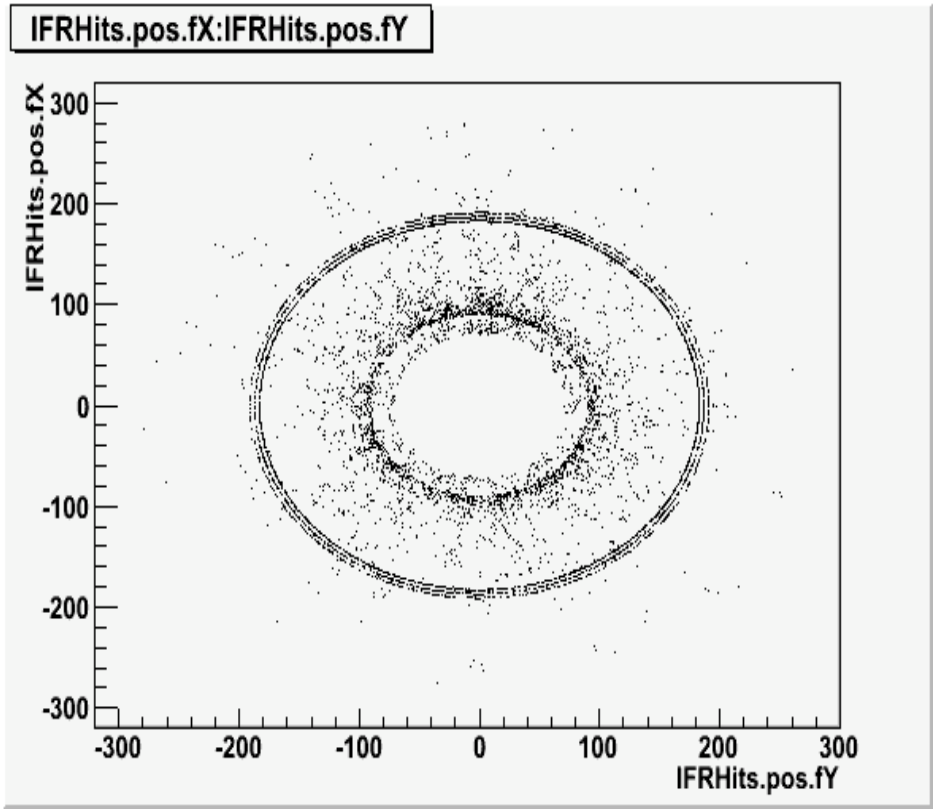


- Release a preliminar version useful for physics by the end of June

- Than improve the parameterizations according to the detector/optimization design

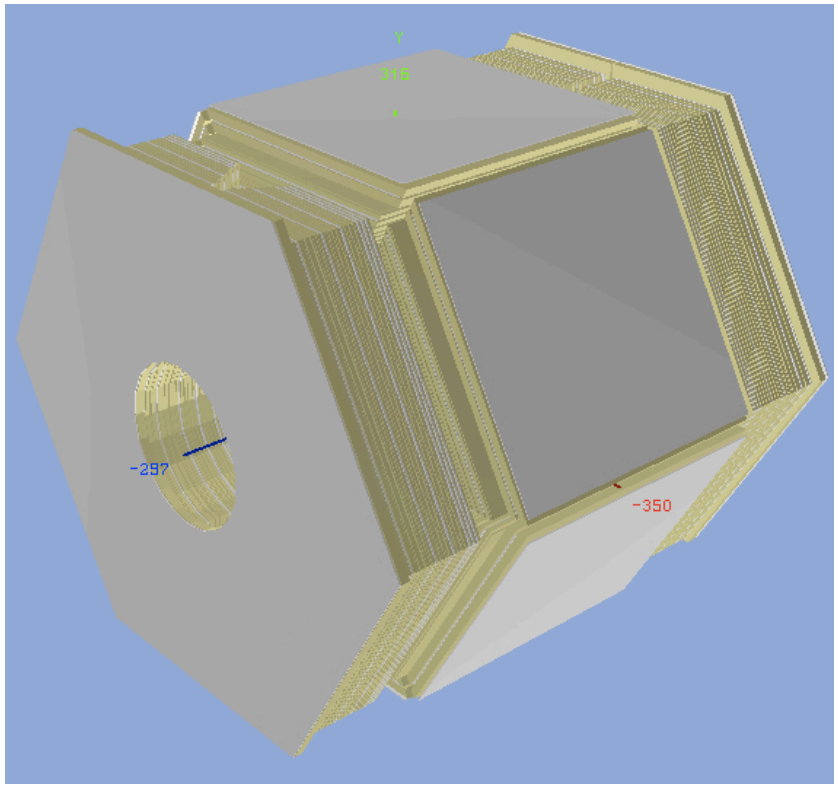
Geant4 simulation

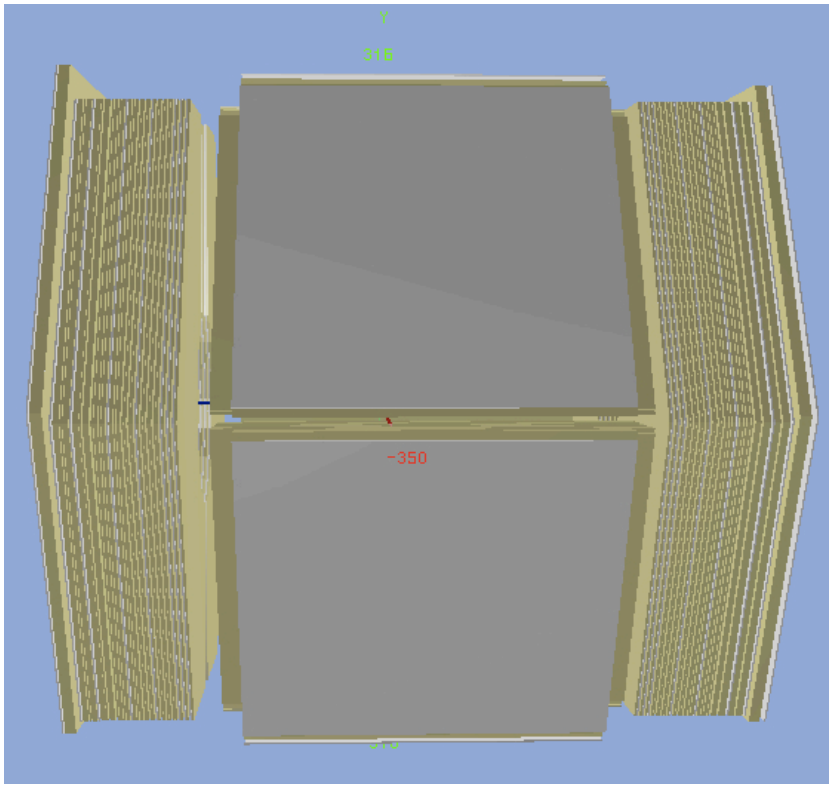
- A full IFR description is needed for background simulation, detector optimization and to extract the parameters for the fast simulation.
- In February the IFR appeared like this



Real IFR

- Now we have a preliminary version if the IFR description with the proper geometry





Features of IFR description

- The description file is generated by a script to allow the production of different configuration: number of active layers/ absorber.
- The SuperB IFR is designed starting from the BaBar IFR, using the same iron structure and adding active scintillator layers.
- No segmentation in the active layers (just one big scintillator slab) to allow offline reconstruction with different configurations.

To Dos

- Q.A. test on the IFR description will be done using $\mu\mu$ or $\mu\mu\gamma$ events produced by the simulation group.
- We need to finalize the merging with the other subdetectors and the machine simulation(some volumes are overlapping): right after the Elba meeting.
- Once simulated background events will be available we will use them in the BaBar framework for a fine detector optimization.

IFR optimization

IDEA

A first idea for these studies is to use the BaBar framework since we need a reconstruction information from other detectors

WHAT WE NEED?

Private version of DB

Background events from full simulation

Work Done

- The setup for doing study of IFR configuration has partly been done
- Understood how to change the IFR Geometry and how to upload changes in DB
- Some bugs found and fixed in package utilized for reconstruction
- Checking package dependencies for having an optimal configuration

To dos

- Fix some remaining issues with PID
- Add to simulated $\mu\mu$ events a background function→ this will be done using IfrNoise module
- Study different configurations of IFR geometry and then evaluate the efficiency of reconstruction
- Use optimal parameters in the full/fast simulation

Summary

- First description of IFR available
- Ready to analyze backgrounds
- Insert the background in $\mu\mu$ events
- Study different configurations of absorbers/scintillators
- Insert parameters obtained in full/fast simulation

Backup Slides

Setup

- Release 24.1.3
- Package used for making ntuples: BetaPidCaliNtuple
- Packages used for modify DB:
  - CdbRooConversionFwk, CdbRooConverters, CdbRooTools
- Packages for modify IFR geometry:
  - IfrGeom, IfrProxy, IfrSim