

RD-FCC/WP1
Physics & Software Meeting
News

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Management & organization News

- Very interesting collaboration meeting two weeks ago, lots of progress and new ideas. We need to keep the momentum.
- The work of this WP is expanding:
 - Detector Simulation (Full and Fast)
 - Algorithms development
 - Physics Analysis (Case Studies, Measurements opportunities)
- Find a « regular » bi-weekly meeting slot (of 2h max) to keep following up with the activities regularly. Will send around proposals.
- **Many many many thanks to Sylvie Braibant** for her work these past years organizing this group. We hope she will stay on to contribute to the physics and studies for IDEA
 - **Welcome to Paolo Azzurri**, FCC-ee EWK Group convener and CMS SMP Physics group convener. Expert in W physics & properties and more. Best wishes for this new challenge!

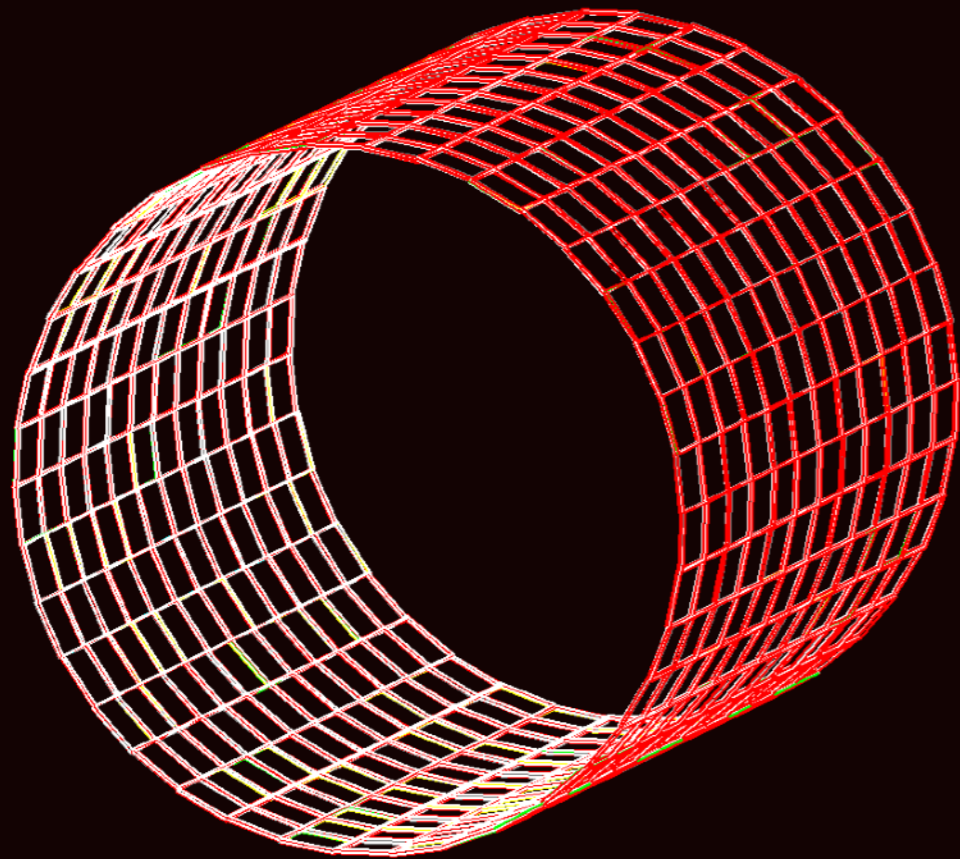
Latest news from the FCC-ee Phys Perf & Software group

- The Physics Performance activities (Azzi, Perez) are continuing well and the number of active case studies keeps increasing.
 - Next meeting on March 15th will be devoted to final states with photons, axions etc.
- More documentation and information is being added on the official pages:
 - <https://hep-fcc.github.io/FCCeePhysicsPerformance/>
 - If you scroll down here there are specific pages create for each case-study that will be maintained by the analysers with all the relevant information.
 - This is a good way to keep the information up-to-date and not duplicated or hard to reach.
 - in parallel the analysis code being developed will be hosted in a similar structure on the <https://github.com/HEP-FCC/FCCAnalyses> repository.
 - specific folders for the different case studies where code « in progress » can be added. Once code is finalized and maybe common things are useful for a larger audience they will be moved to the « general tools » structure
 - to profit of this it's important to learn to use the EDM4HEP event data model and the root/dataframe tools. Examples are being provided to unpack data and create a flat ntuple.
 - of course everyone is free to analyze the ntuple the way they want, but with the common tools things are much easier.
 - We'll use one of the next meeting as a tutorial to get people started.
- New MC production being setup: let us know if you need specific signals.

Summary & Plans for muon detector and pre-shower

Muon group

Current status of the detector description



- Pre-Shower
 - General description of a μ -RWELL detector element implemented in Geant4 (by Elisa Fontalesi – INFN BO)
 - Full barrel geometry implemented
 - Preliminary studies to define the endcap geometry
 - No implementation of sensitive volumes
 - Everything in a standalone code <https://github.com/elfontan/IDEA>
- Muon detector
 - totally missing

Aim & Strategy

- Provide a description of the geometry of muon detector and pre-shower
 - Simplified geometry → only the big volumes, to avoid chasing any modifications to the detection modules
 - Fine details (e.g., dead spaces, modularity) will be handled at reconstruction level
- The description will include a simple implementation of the return yoke of the solenoid
- The description will be done within the standalone IDEA concept:
 - First with Geant4 directly (by July) using EDM4HEP as output
 - Later ported to DD4HEP
- The Pre-Shower description must be also ported inside the official framework (later)

Very useful topical meeting with the relevant stakeholders last week
Resources identified within the muon and pre-shower group

Conversion from GEANT4 hits into EDM hits

G. Tassielli – L. Lavezzi

STARTING POINT

DCH + SVX + PSHW + (CALO) standalone code

- Simulation: GEANT4
- Analysis: ROME

Dependencies:

- GCC 6.3.0
- ROOT 6.14.06
- GEANT4-10.4.3 with GDML
- CLHEP 2.4.0.0

KEY4HEP STACK

`/cvmfs/sw.hsf.org/key4hep/setup.sh`

- Simulation: GEANT4
- Analysis: ~~ROME~~

Dependencies:

- GCC 8.3.0
- ROOT 6.22.06
- GEANT4-10.4.7
- CLHEP 2.4.4.0

WHAT HAPPENED

- At the beginning there were attempts to find a match between the two setups
- It was decided to adopt to setup everything to depend **only on kay4hep stack**
- The compilation was moved **from Makefile to Cmake** → automatic find(packages)
- Now **the simulation of the standalone compiles under key4hep stack**
- Everything is on git: <https://github.com/lialavezzi/IDEA/tree/master/DriftChamberPLUSVertex>

•NEXT TO DO

- Actual conversion of the data model

- THANKS** to Iacopo Vivarelli for the help!

Next steps

- Priorities very clear: for the Summer we need to have the FullSim of IDEA in GEANT working and providing EDM4HEP output.
 - Place in the official repository available. Let's move the code asap (even if it runs standalone)
 - Muon/preshower: a preliminary geometry should be added as well to have a complete detector
- Important to start with case studies and create the knowledge to use easily the new framework. This framework (edm4hep, key4hep) will be common to *any* future ee that will be built (and also LHC).
 - more physics studies will also allow to involve theorists and newcomers that might not be familiar with ee physics
 - they allow also to give thesis topic at the Magistrale or as additional studies for a PhD student working on some read data (LHC, BES, Belle2 etc..)
- Next meeting in ~2weeks!