Simulation Status

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On behalf of CompSW & SimQA

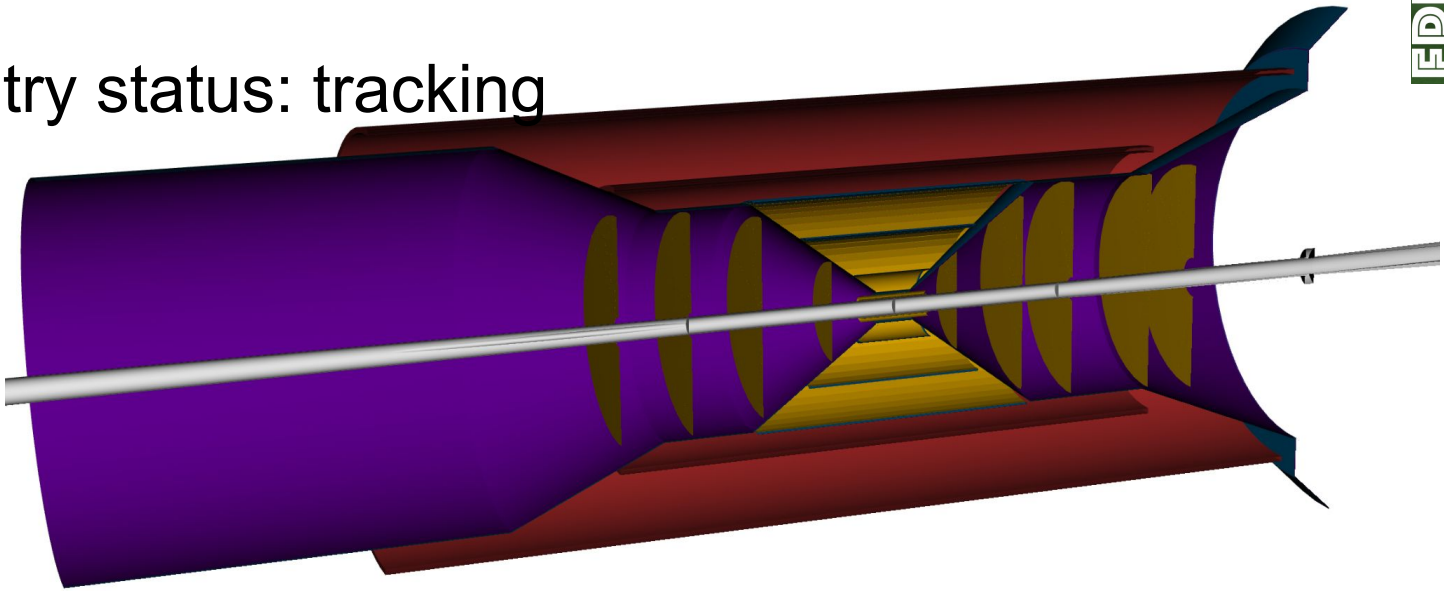
Convener Meeting
Friday 09/15/2022

Tentative development/production timeline

- **09/16/2022 (today)** Convener meeting, discuss simulation campaign goals and requirements
  … Implementation
- **10/03/2022** Feature freeze for simulation and reconstruction software
  … Test production chain, fix & patch software where needed
- **10/17/2022** Official start of production
  … Production

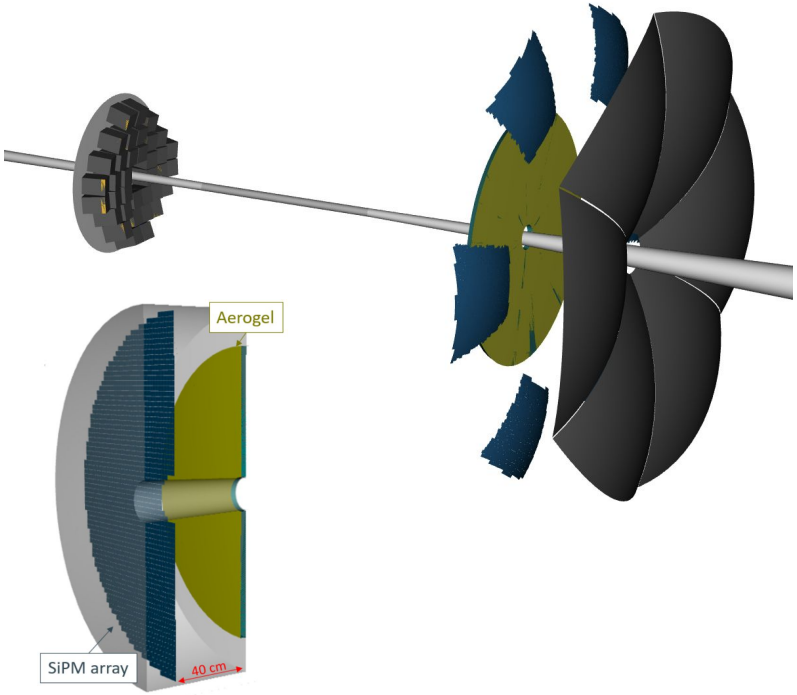
Nominally (TBD): expect 2 major configurations of the entire detector that see all physics events + targeted variations that see a more restricted set of simulations

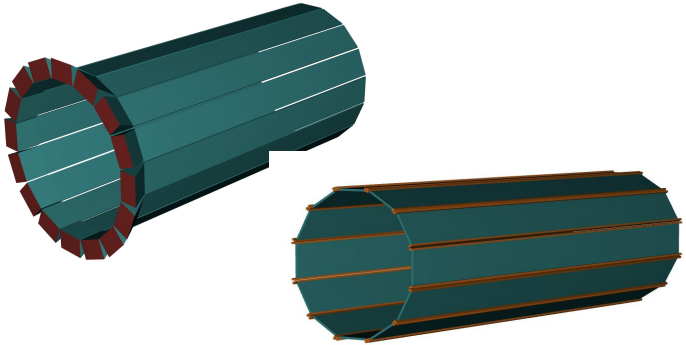
Geometry status: tracking



- ✅ Silicon barrel elements according the the latest tracking WG numbers
- ✅ Tracker support based on ECCE proposal, fully parameterized
- ✅ Silicon disks based on ECCE proposal, position needs validation
- ✅ MPGD geometry based on ECCE proposal
  - ❌ Readout with faux pixels, TODO: Proper implementation of strips (with associated digitization)
- 🚧 Silicon disk and MPGD geometry needs validation (Shujie Li and Matt Posik)
- 🚧/✅ Tracker material map for ACTS (Shujie will do once previous tasks complete)
- ✅ Background merging after simulation stage → not for main production but can run targeted
- ❌ Need new field map and updated magnet design for 1.7T magnet!

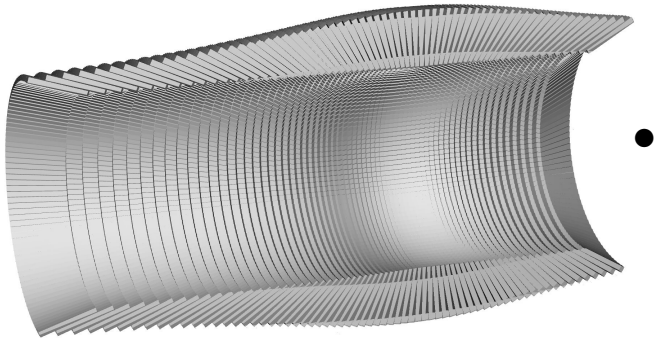
Geometry status: pid



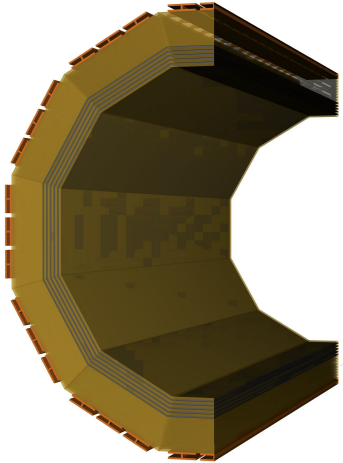


- ✅ dRICH design in very good shape (Chris Dilks)
- ✅ pfRICH also in good shape (Chris Dilks) - needs some integration work
- ✅ Currently running simulations with stand-in for DIRC
  - ❌ Have detailed implementation (without support) from August 2021, needs rescaling, fixing, and re-validation with experts (**no person assigned)**
- ✅ Basic implementation of mRICH (based on 2021 ATHENA implementation), implementation of pfRICH
  - ❌ Need validation, in particular orientation, and services and support

Geometry status: barrel calorimetry



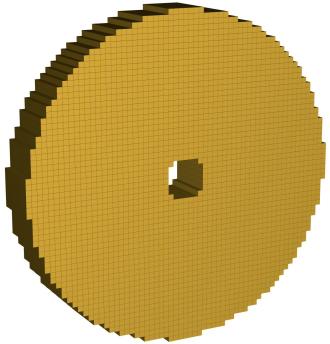
- 🚧 Work ongoing for SciGlass barrel (Dmitry Kalinkin)



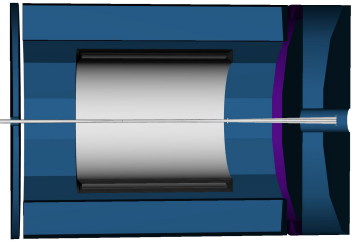
- ✅ Basic geometry for imaging ECal ready (Maria Zurek)
- 🚧 Finalize integration, change number of sectors to match the DIRC

- 🚧 Work starting on Barrel HCal (John Lajoie)

Geometry status: Endcap calorimetry

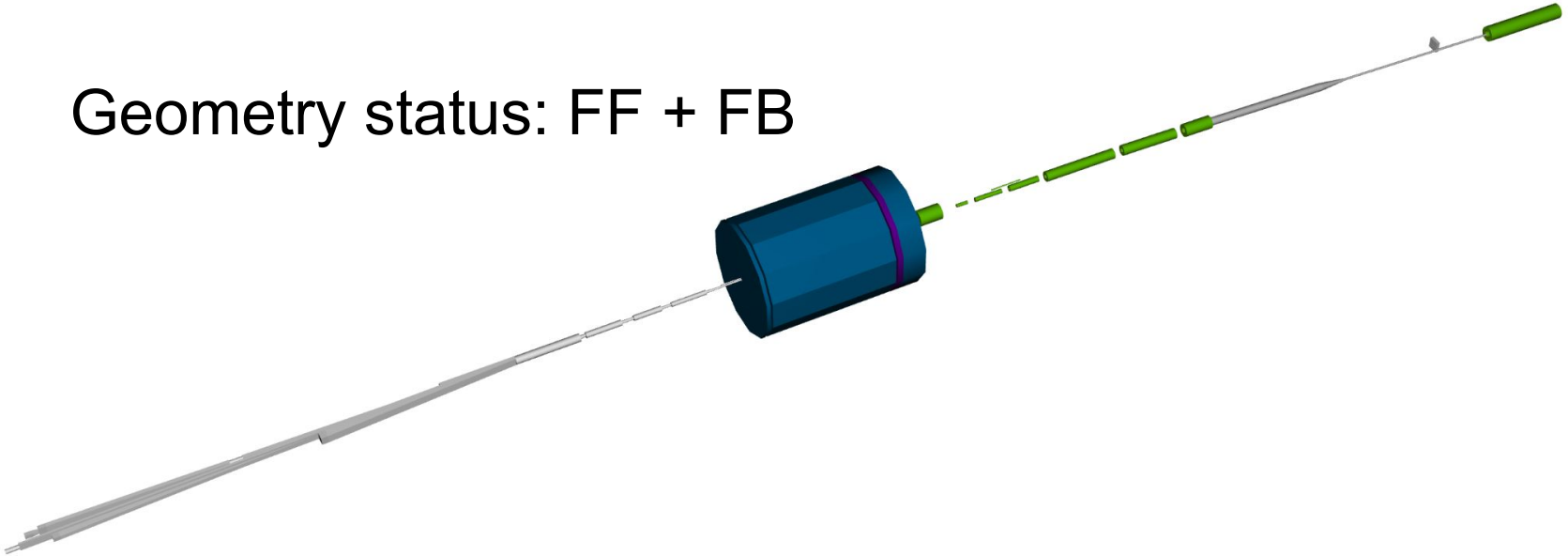


- ✅ Basic backward endcap ECal
  - ❌ Validate services, support, and gaps (what is needed for this production?
  - ❌ Liaison?



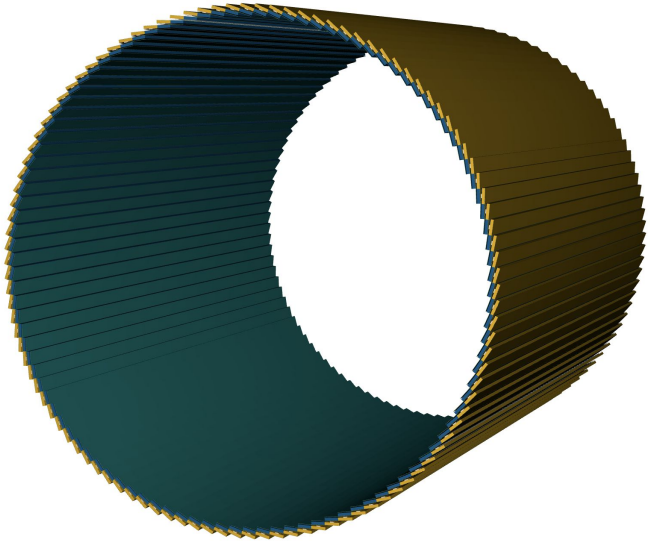
- ✅ Forward endcap ECal in two versions (2x detailed and homogenous effective) (Zhongling Ji)
  - ✅ Homogenous effective version for campaign
- ✅ Forward calorimeter insert (Ryan Milton)
- ✅ Simplified forward HCal (Ryan Milton)
  - 🚧 Detailed Forward HCal: work just starting (Friederike Bock)

Geometry status: FF + FB



- ✅ Main elements for FF + FB present
- ✅ FF liaison: Alex Jentsch
- ❌ **Need FB liaison**

Geometry status: TOF



- ❌ Barrel TOF in ATHENA version only
  - ❌ Needs updating to EPIC design
- ✅ Basic TOF disks available as starting points for forward/backward TOF system
  - ❌ EPIC forward/backward TOF needs to be fully implemented
- ✅ **Liaison: Zhenyu Ye**
- Unclear right now: any variations in TOF system between both major detector versions?

What could two versions look like?

Starting point for discussion

- **Version A “Arches”:**
  - Standard silicon tracker
  - **2 MPGD barrel planes** (second behind DIRC)
  - **No MPGD plane behind dRICH**
  - Standard dRICH & DIRC
  - **mRICH**
  - Standard forward/backward calorimetry and barrel HCal
  - **SciGlass bECal**
  - Standard FF and FB
  - Standard TOF?
  - Forward calorimeter insert?

- **Version B “BryceCanyon”:**
  - Standard silicon tracker
  - **1 MPGD barrel plane** (no plane behind DIRC)
  - + MPGD plane behind dRICH
  - Standard dRICH & DIRC
  - **pfRICH**
  - Standard forward/backward calorimetry and barrel HCal
  - **Imaging bECal**
  - Standard FF and FB
  - Standard TOF?
  - Forward calorimeter insert?


EPIC **Questions?**