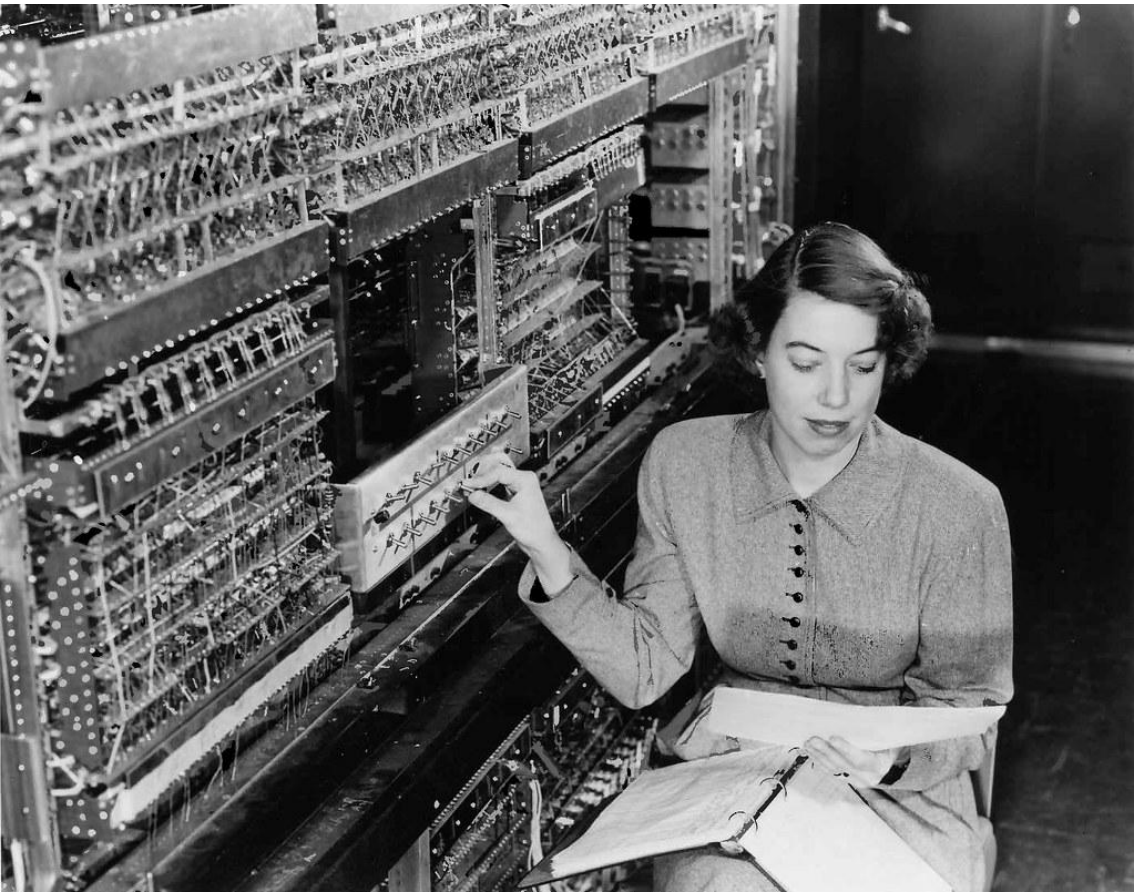
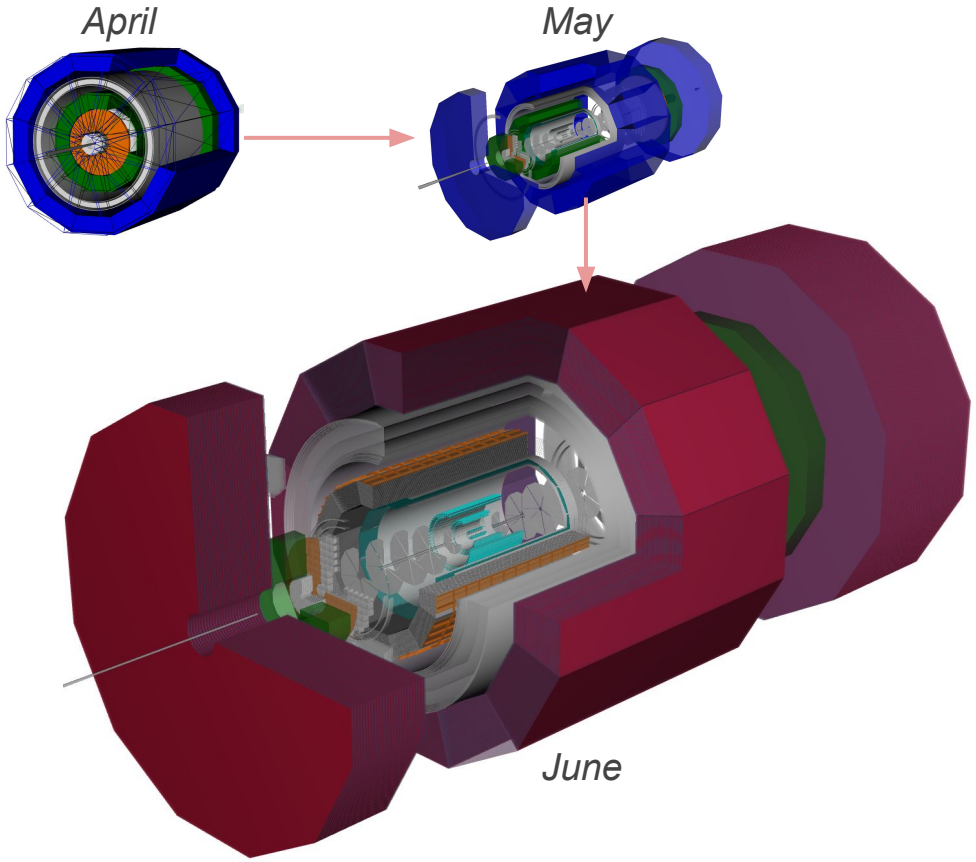


Bi-weekly Meeting S&C WG Update

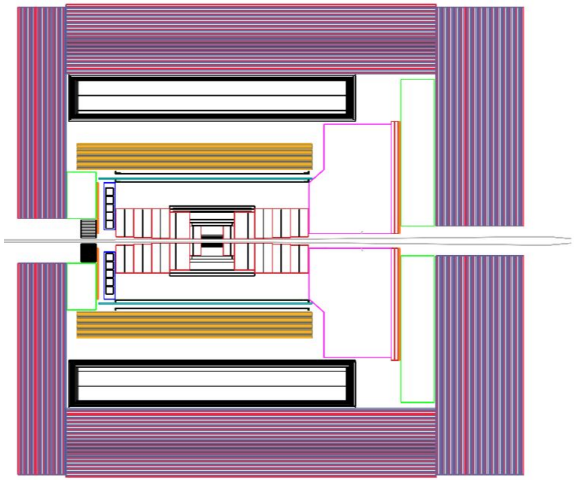
Friday 2021-06-09

The Software and Computing WG Conveners:
Andrea Bressan (University of Trieste and INFN) ,
Dmitry Romanov (Jefferson lab) ,
Sylvester Joosten (Argonne National Laboratory) ,
Whitney Armstrong (Argonne National Laboratory) ,
Wouter Deconinck (The University of Manitoba)

ATHENA detector implementation seeing great progress!

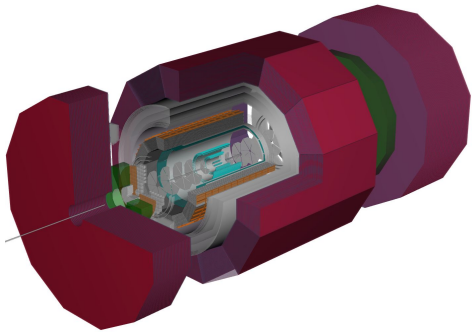


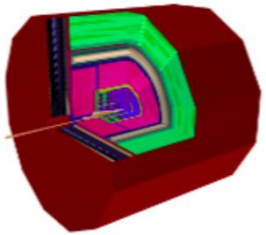
- Increasing amount of realism in services and infrastructure (support frames, and solenoid designs from CAD)
- Increasing amount of realism in detector subsystems
- Interactive in-browser geometry viewers:
  - Central detector
  - Full detector with beamline



DD4Hep community

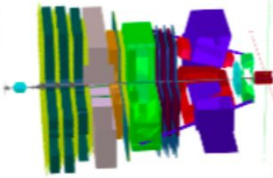
ATHENA



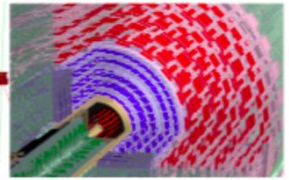


Production

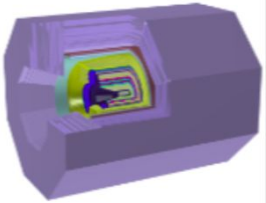
Production



Production
Run 3



Under
investigation
Run 3

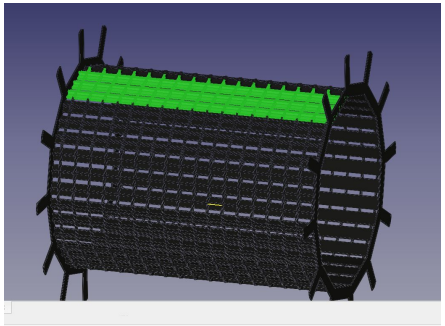


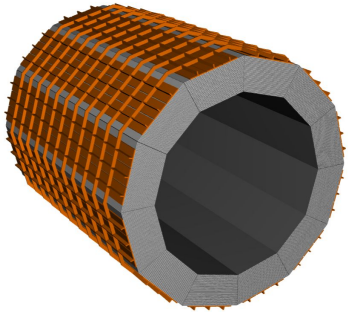
Production

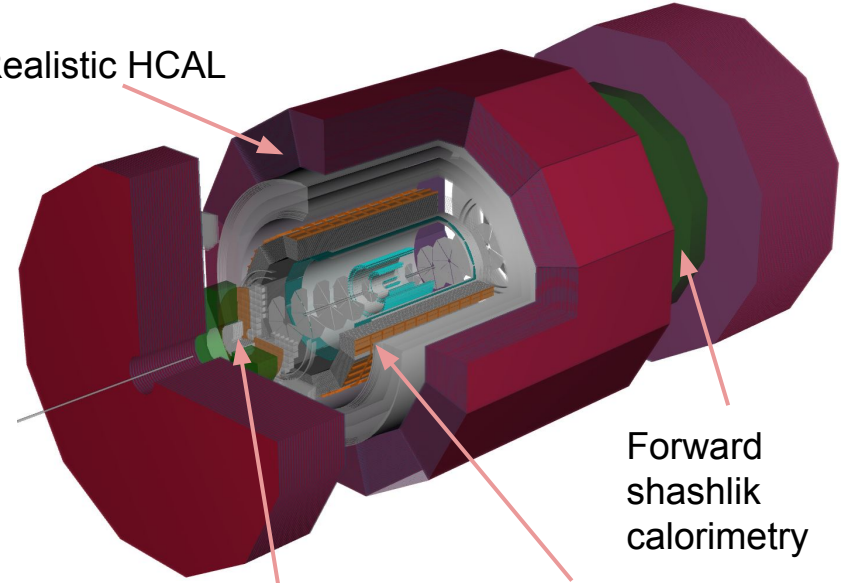
Super Charm
Tau Factories

Calorimetry status

From CAD → To DD4hep



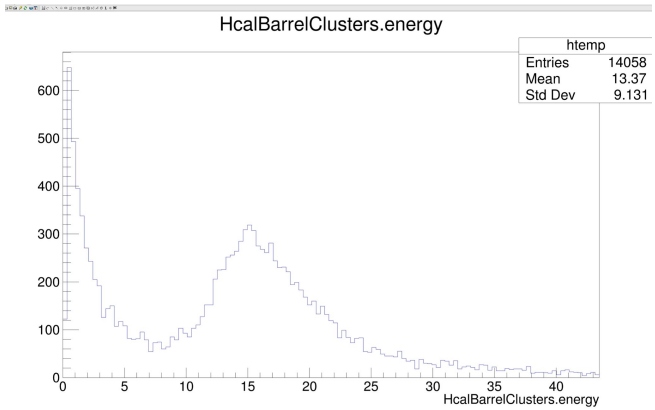




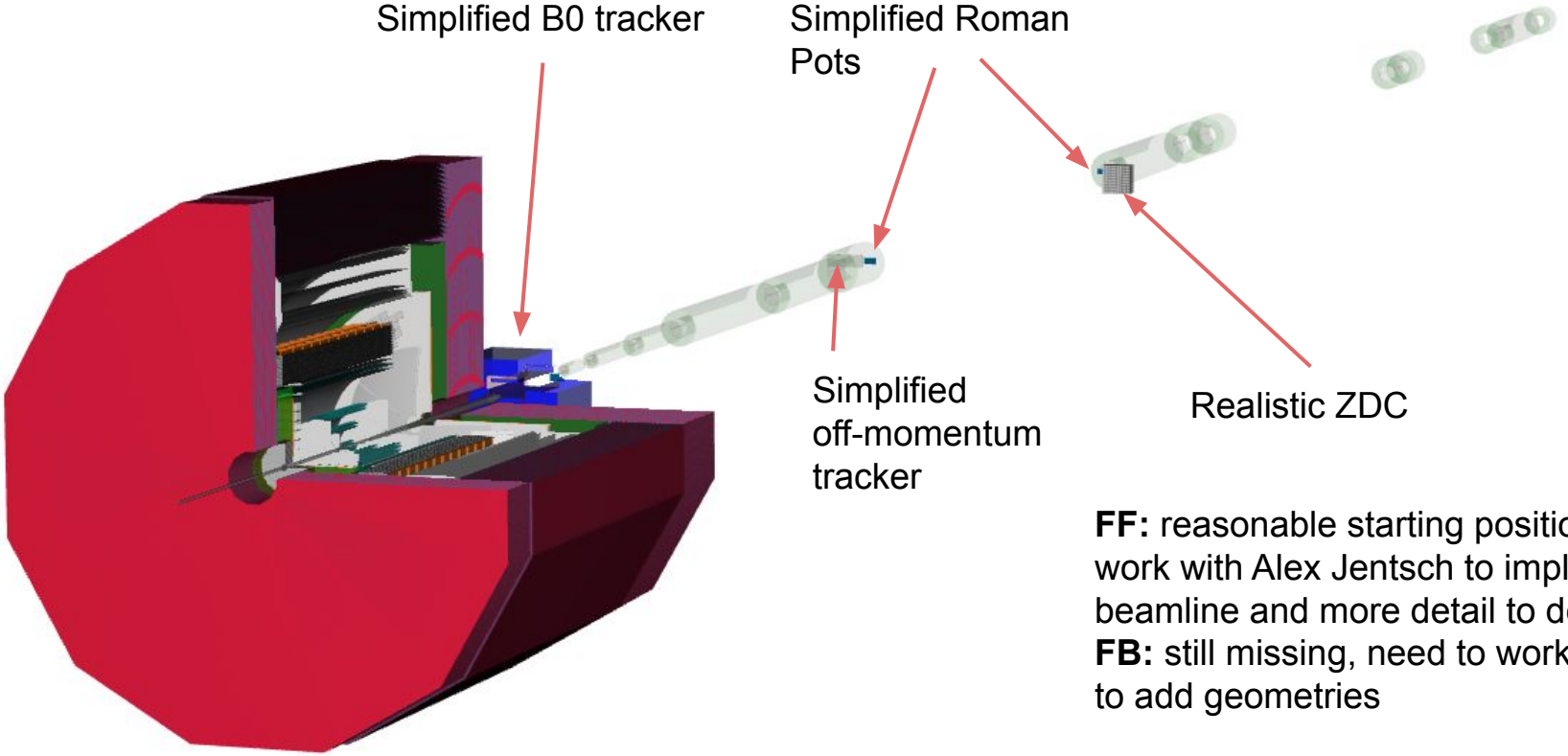
Reconstruction:

ECAL: 2D, 2+1D and 3D clustering (Chao)

HCAL (new!): 3D topological clustering (Miguel)



Far-forward & Far-backward status

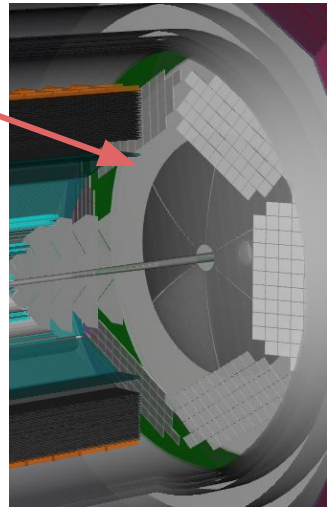


FF: reasonable starting position. Will work with Alex Jentsch to implement beamline and more detail to detectors.
FB: still missing, need to work with WG to add geometries

PID status

- Last PID meeting dedicated to software last Monday
- Decent baseline geometries implemented, functioning RICH reconstruction algorithm
- Increasing collaboration with PID experts

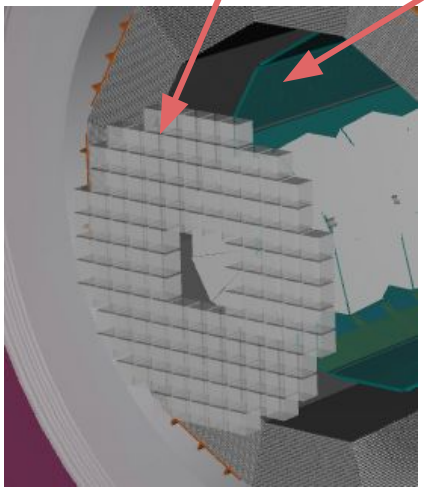
gas-RICH starting point for dRICH implementation

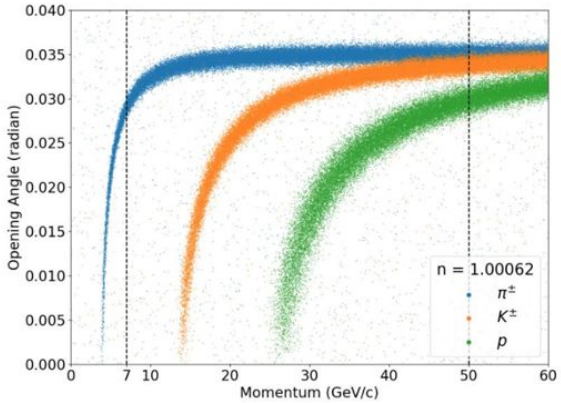


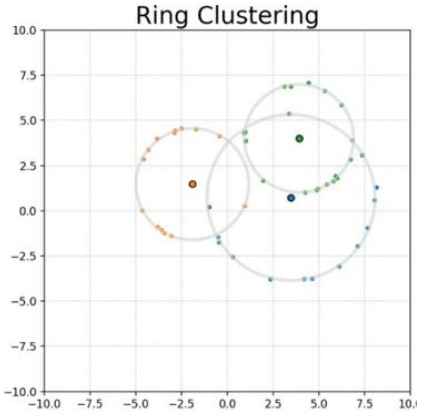
LGAD implementation ongoing (Zhenyu)

mRICH geometry

DIRC needs the most work





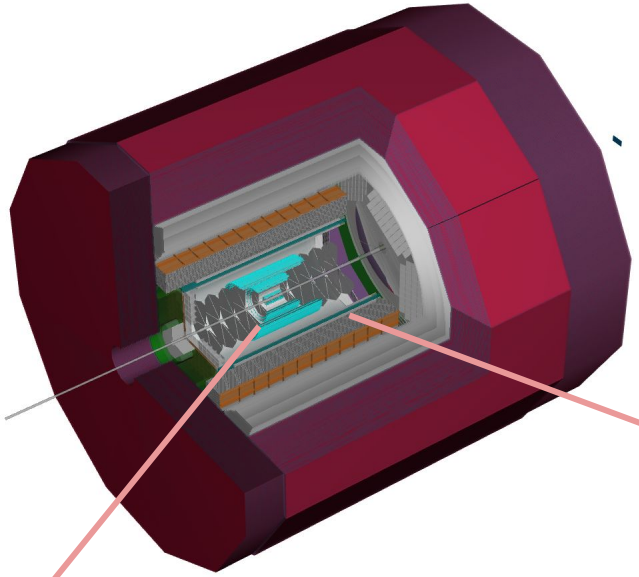


Reconstruction

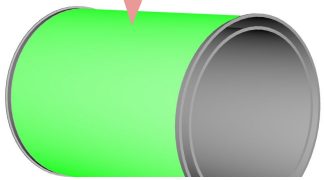
RICH: Working fuzzy-K clustering, tested on gas RICH (Chao)

Tracking status

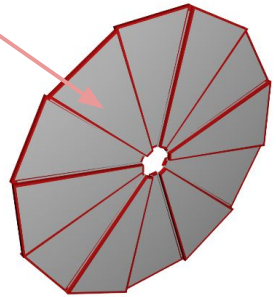
- Detector geometries in full simulation in good shape!
- Reconstruction: geometries fully functional with ACTS, tracking benchmarks ongoing

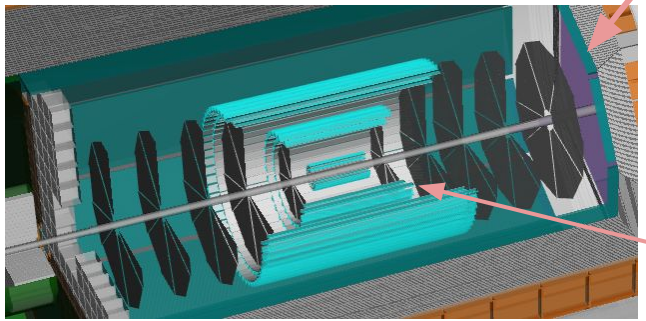


Realistic μRWELL tracker with support



Realistic GEM implementation with frame (Matt)





Realistic silicon tracker (using all-silicon geometry) with services in current baseline geometry

First large-scale data production

- Input: 4 x 1M Pythia8 DIS events with beam angle/divergence/crabbing
  - 5x41 GeV, 18x275 GeV; # tracks about 30% higher in 18x275 GeV, i.e. looks like logo:
  - 25 mrad, 35 mrad crossing angle
  - HepMC files on S3 under ATHENA/EVGEN/JETS/crossDivNrgCrab/
    - Note: 25 mrad, 18x275 GeV still incomplete
- Full simulation with current detector model, all bells and whistles:
  - Typical: 0.25 to 1.5 s/event, <500MB RAM RSS, 30 kB to 200 kB output size/event
  - ROOT files on S3 under ATHENA/FULL/JETS/crossDivNrgCrab/2021-06-09/
- Reconstruction (in progress)
  - Focus on tracking and calorimetry (including new HCal clustering)
  - ROOT files will be on S3 under ATHENA/RECO/JETS/crossDivNrgCrab/2021-06-10/
- Full simulation: ~biweekly repetition; reconstruction: every few days
- Written to work on any slurm batch system; performed at Compute Canada

Requests

1. Fill out the computing resource request spreadsheet: https://docs.google.com/spreadsheets/d/1FpzI20WqMaIhbOqeGEiJMsXRwAvzisWRjCMfOHasUz0/edit#gid=0
2. Please identify WG contact person to the Software & Computing WG and let us know ASAP.

Notes:

- Purchase of new nodes/disks to arrive August must be justified now.
- Synergies will be coordinated by Software & Computing WG.
- Particle gun = single particle / event

ATHENA Computing Resource Needs Estimates

The goal of this spreadsheet is to build a justified computing and storage request.

Please use one line for each type of study, e.g. "5 beam energy combos of pythia8 full detector simulations, 100M events to reach 5% uncertainties in 10 Q^2 and 10 x bins."

It is OK if you have to be vague at this point; we are going to refine this as we get more info.

	Contact email	# events **generator-level**	# events **fast** simulati
Example Working Group			
5 beam energy combos of pythia8 full detector simulations, with 100M events each to reach 5% uncertainties in 10 Q^2 and 10 x bins	wouter.deconinck@umanitoba.ca	500M with pythia8	none
50 standalone simulations of geant4 example N02 and 30 barrel HCAL simulations over central rapidity region	wouter.deconinck@umanitoba.ca	0	
Software & Computing Working Group			
Inclusive Working Group			
Semi-Inclusive Working Group			
Jets/HF/EW-BSM Working Group			
Exclusive/Tagging Working Group			
Tracking Working Group	mposik1983@gmail.com		
PID Working Group			
Calorimetry Working Group			
Far-Forward Working Group			
Far-Backward Working Group			
DAQ/Readout Working Group			
Polarimetry Working Group (with EICUG)			

Software & Computing WG

Bi-weekly software meeting: Thursday 12:00pm EDT

Software & Computing Conveners:

Whitney Armstrong, Andrea Bressan(*), Wouter Deconinck, Sylvester Joosten, Dmitry Romanov (*)- liaison to EICUG software group

Day 0 WG support:

Kolja Kauder, Miguel Arratia, Stephen Sekula, Dmitry Romanov, Yulia Furletova, Andrea Bressan

Full simulation/reconstruction team

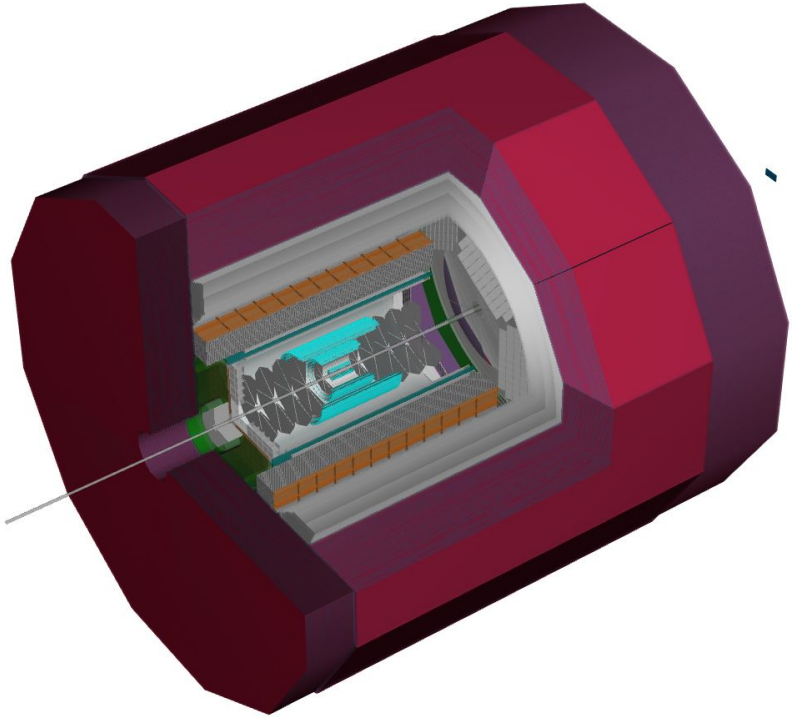
Whitney Armstrong, Miguel Arratia, Wouter Deconinck, Sylvester Joosten, Jihee Kim, Chao Peng, Tomas Polakovic, Dmitry Romanov, Marshall Scott, Zhenyu Ye, Ziyue Zhang, Maria Żurek

...and a rapidly growing amount ATHENA collaborators!

Documentation portal:
doc.athena-eic.org

Full simulation tutorials

eic-ip6-software-l@lists.bnl.gov
#software-helpdesk on Slack



ATHENA central detector