ATHENA Proposal Committee: Integration & Global design Subgroup NEWS

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Bi-weekly Meeting, July 22nd 2021

Proposal Committee: Integration & Global design

Activity summary

meetings

- 18 June, attendance: only the subgroup members
- 25 June, the Tracking, PID and Calorimeter WG conveners invited
- 2 July, the Tracking, PID and Calorimeter WG conveners invited
- 7 July, the Tracking, PID, Calorimeter, far-forward and far-backward WG conveners invited
- 14 July, the Tracking, PID, Calorimeter, far-forward and far-backward WG conveners invited
- 21 July, all the WG conveners, Elke, Coordination committee invited:
  - 3 T magnet session with Valero Calvelli and Renuka Rajput-Ghoshal
  - Slides available at : https://indico.bnl.gov/event/12530/

- **NEXT meeting**: 29 July, no meeting in the following week (EICUG annual meeting)
  - Our meeting time: **Wednesday at 11.00 (EDT)**
- INDICO page: https://indico.bnl.gov/category/378/

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REMINDER

Activity strategy

- define a limited number of global detector configurations
  - Configuration defined with the help of the DWG conveners
- have the configurations implemented in the simulation in the DD4hep frame
  - Activity shared between the Software working group and the DWs
- configurations used by the WGs with the following goals:
  - DWGs check the detector performance using complete and realistic (= material and services) configurations
  - PWGs check if and at which extent the configurations match the requirements for physics
- this validation activity requires coordination and a reference colleague who keeps track of the validation exercises and the relative outcome:

- B. Mohanty has kindly agreed to serve as VALIDATION COORDINATOR

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REMINDER

About detector configurations

New Configuration Labels: B, P, N

- Need unambiguous ID of specific configuration.
- Label according to their coverage (using existing letters from software group)
  - B = Barrel
  - P = forward, Positive endcap
  - N = backward, Negative endcap
- Followed by a two-digit version number M.N
  - M defines specific subsystem composition (change if subsystem add or remove)
  - N labels the geometry(e.g. pixel size, thickness, service material etc) are changed within a given overall configuration M.
- If needed the software group can add a 3rd number (M.N.V) for software version or the like - up to them

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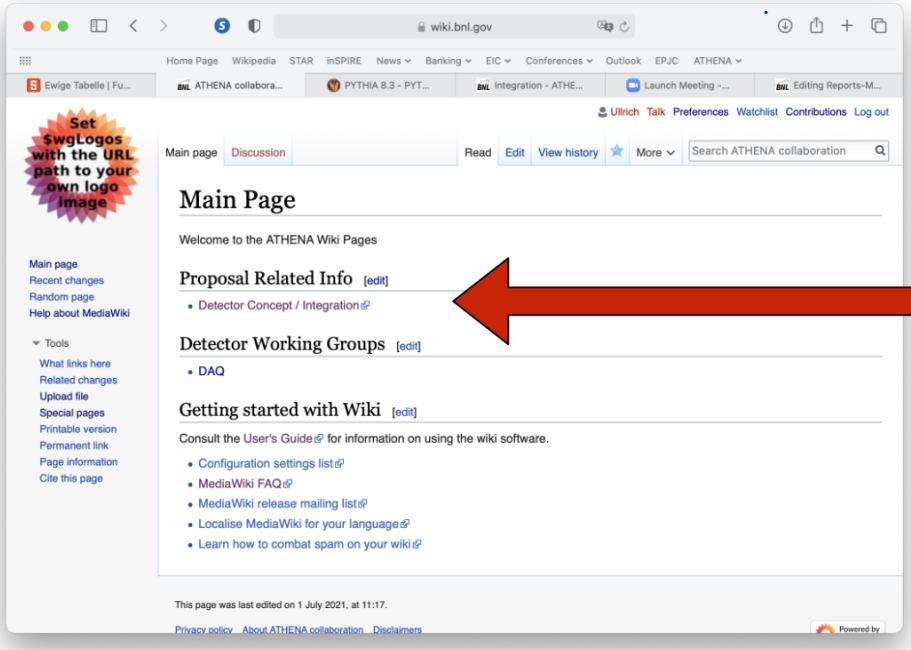
REMINDER

About detector configurations, documentation

ATHENA Wiki

- https://wiki.bnl.gov/athena
- Access rights: Ask Maxim for group (DWG convener) logins



This effort

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WHAT IS NEW:

- About detector documentation in the Wiki page
  - The documentation about the detectors is still incomplete and DWG conveners are urged to complete it

- About detector integration is DD4hep → see the dedicated talk

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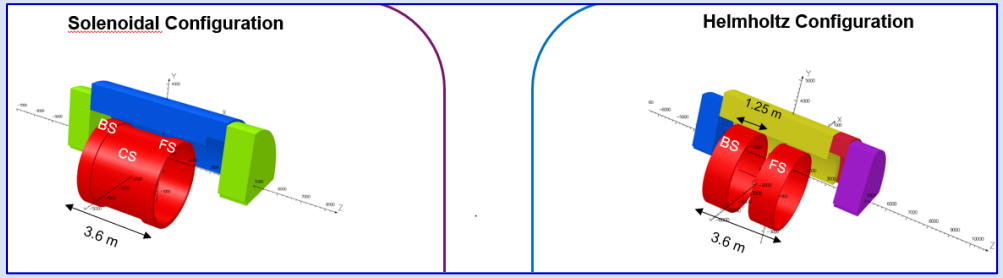
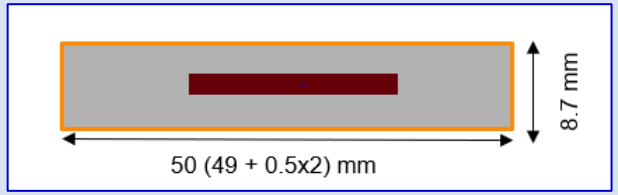
WHAT IS NEW:

- **About 3T Magnet (from yesterday meeting, all material from V. Calvelli)**
- **reminder (V. Calvelli's at at ATHENA bi-weekly on April 29th), two configurations proposed**



- **Intense current activity about:**
  - **Magnetism: issue of the forces pushing the coils towards the iron in the frd and bkd Hcals**
  - **Cryogenics**
  - **Conductor design and selection of the conductor stabilizer (Al/Cu)**



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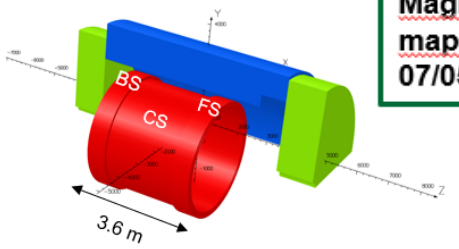
WHAT IS NEW:

- About 3T Magnet, *continuation*
- Comparison of the 2 configurations

TWO DIFFERENT MAGNET OPTIONS

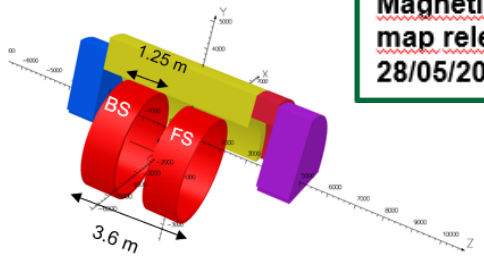
Solenoidal Configuration



Magnetic field map released 07/05/2021

Parameter	Values
B_{IP} (T)	3.15
B_{peak} (T)	4.35
Coil thickness (mm)	200
Energy (MJ)	183.9
H TCP 2 (%)	6.61
H FLAT 1 (%)	25.12
Projectivity (T/Amm²)	14.82

Helmholtz Configuration



Magnetic field map released 28/05/2021

Parameter	Goal
B_{IP} (T)	3.00
Bore diameter (mm)	1600
Coil length (mm)	3600
H TCP 2 (%)	5.0
H FLAT 1 (%)	10.0
Projectivity (T/Amm²)	min

Parameter	Values
B_{IP} (T)	2.97
B_{peak} (T)	4.84
Coil thickness (mm)	200
Energy (MJ)	235.7
H TCP 2 (%)	4.83
H FLAT 1 (%)	16.37
Projectivity (T/Amm²)	17.51

For TPC

Enough Bdl at small angles

For frd RICH

We expect a feedback on magnetic performances as soon as possible

EIC Integration Meeting – July, 21 2021

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Present assessment:

- No TPC in ATHENA
- No substantial degradation from tracking
- No substantial degradation for high p particle PID (hadrons)
- Some PID degradation at small p (e-π separation issue)

ATHENA must answer within 3 weeks

FEEDBACK NEEDS:

- What is the most performant configuration?
- What are the requirements on the calorimeters? →
- What is the impact of the structure & on the conductors on the calorimeters performances?

Project with its engineers

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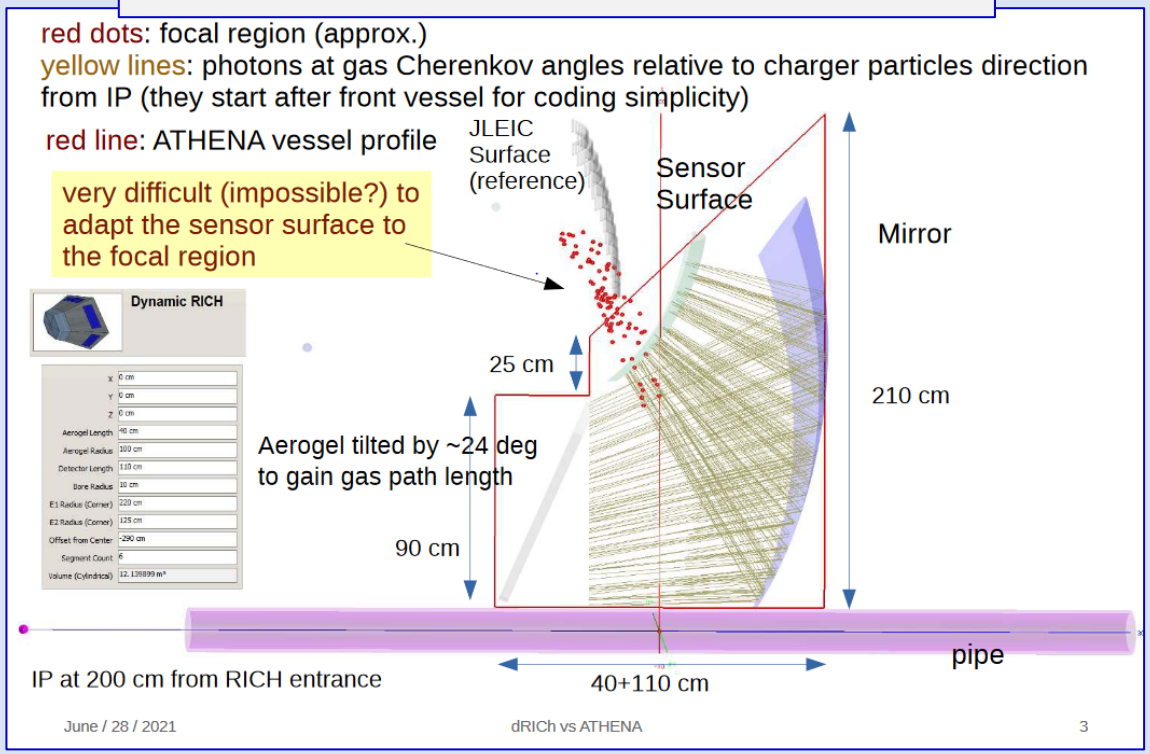
WHAT IS NEW:

- **About the increased space @ IP6 for the detector in the forward region (+ 0.5 m)**
  - **Even if not yet decided, the usage of the extra space for the forward RICH is considered**
  - **Here a hint about the motivation (part of this material is from PID meeting, part from Evaristo Cisbani's private communication)**

With frd RICH as in the reference detector



frd RICH making use of the extra space frd RICH (geometry not yet optimized)