

EIC “second option” solenoid modeling for the Yellow Report (and beyond)

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Motivation & goals of this meeting

- The EIC community is in favor of having *two* detectors ...
- ... therefore even that BaBar magnet is available, a second one will be needed anyway

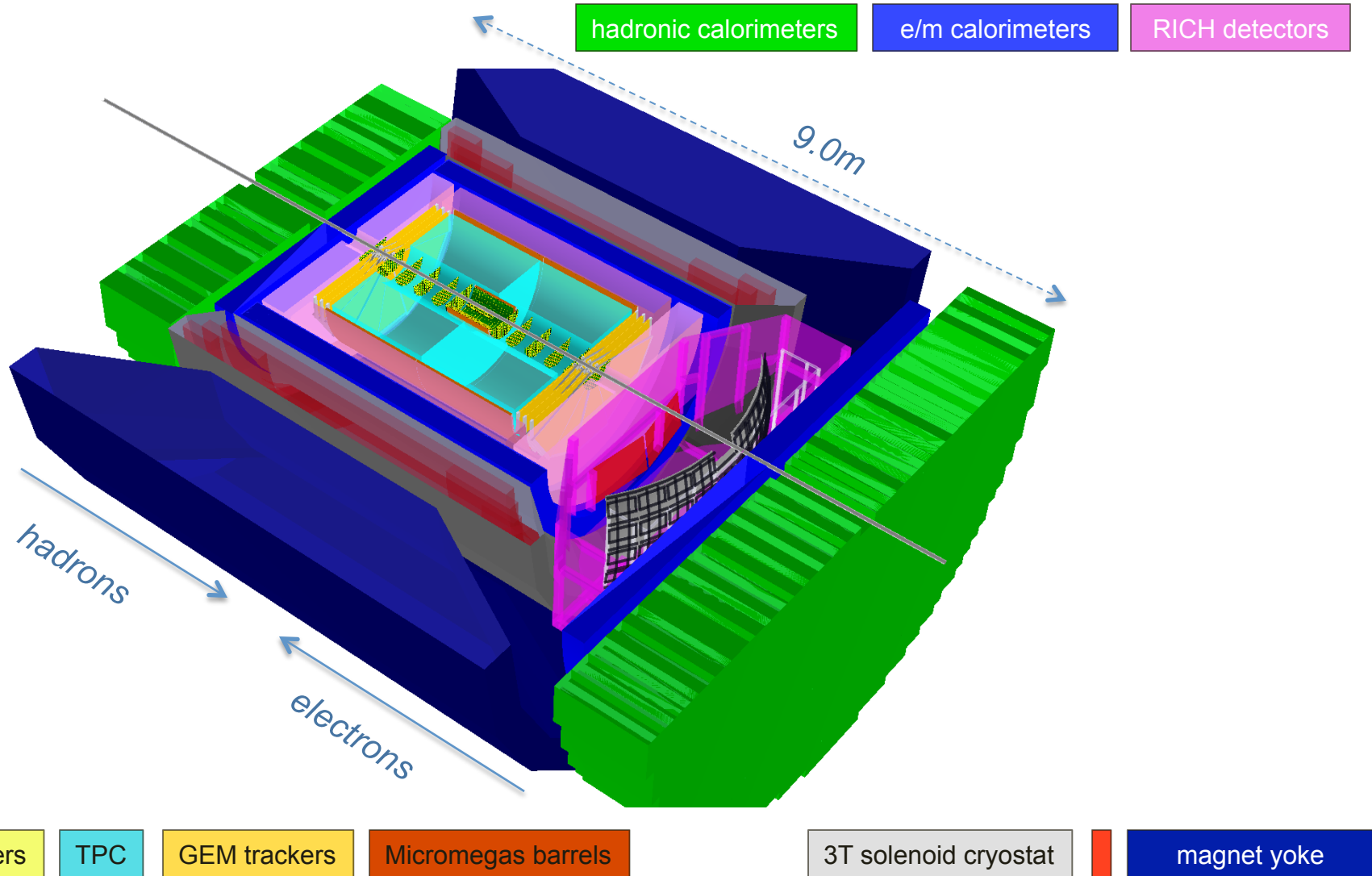
- Discuss the scope for the Yellow Report (and pCDR + CD-1)
- Think on the responsibilities and timelines

Questions & specs

- Can we come up with a better (non-Babar) model for the YR?
- Specifications:
 - Up to 3T central field
 - Specially tuned fringe field configuration in the forward RICH volume
 - Bore diameter ~3m, length ~3m (coils), etc
 - Acceptable stray field in the hall, ...
- Options:
 - Field clamps, flux return through HCal?
 - Active compensation coils between EmCal & HCal?
- Compensation for beam optics (new task force led by Vasiliy)

Example: BeAST detector

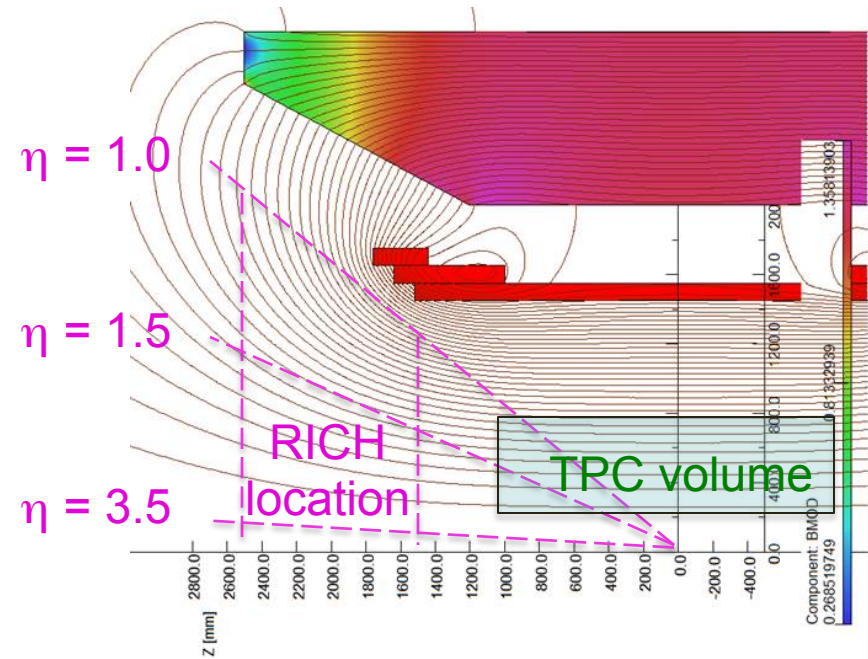
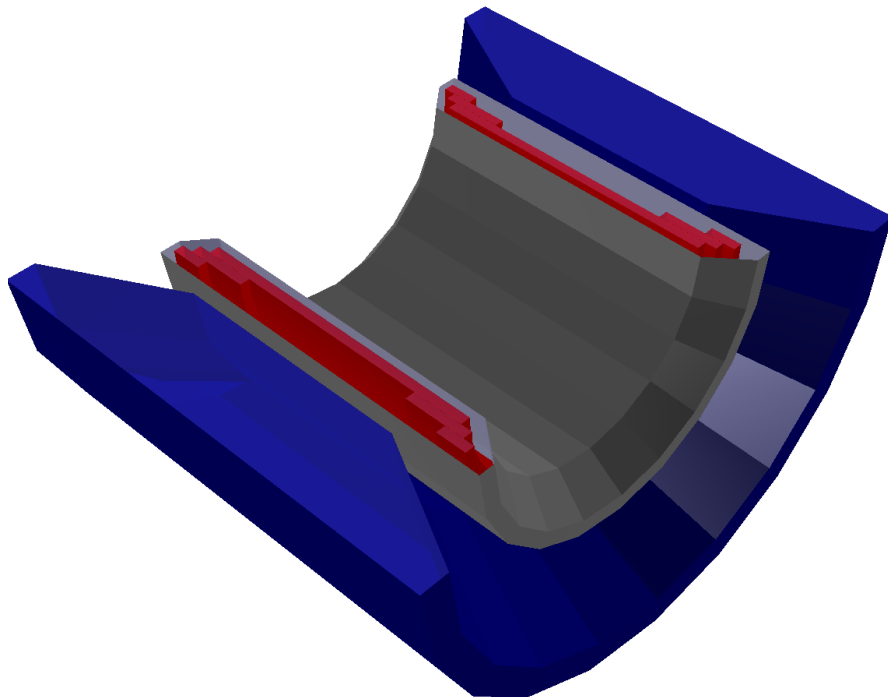
$-3.5 < \eta < 3.5$: Tracking & e/m Calorimetry (hermetic coverage)



Example: BeAST magnetic field

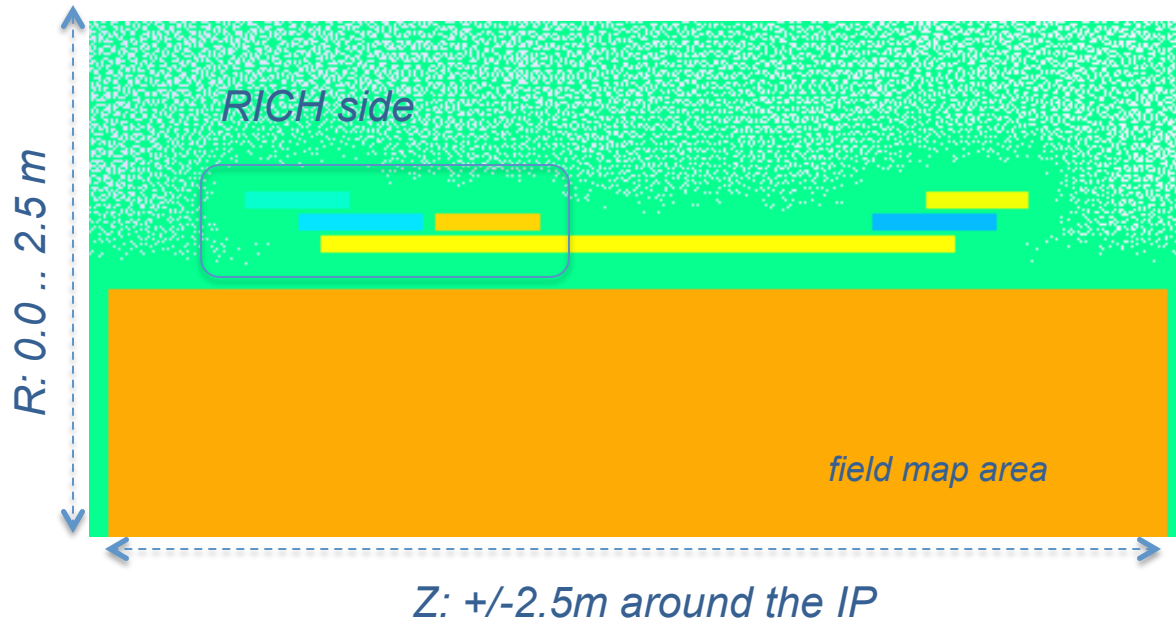
Goal:

- Implement in the same compact design:
 - homogeneous $\sim 3\text{T}$ field in the TPC
 - hadron-track-aligned field in the RICH
- Keep it simple (no dual solenoid configuration; no reversed current coils; no flux return through HCal; no warm coils between RICH and EmCal)



Central field	3T
Current density	23 A/mm ²
Full current	4.6 kA
Main coil radius	1500 mm
Coil pack length	3520 mm
Cryostat inner radius	1350 mm

Example: BeAST optimization for RICH



- RICH side (hadron-going direction) gets tuned
- The other side stays almost the same as required for the homogeneous field in the central area

R_{\min} , [mm]	R_{\max} , [mm]	Length, [mm]	Z-offset, [mm]	Current, [A/mm ²]
1610	1700	500	1600	-20
1510	1600	500	700	12
1510	1600	600	1300	40
1400	1500	3000	0	24
1510	1600	600	-1400	34
1610	1700	500	-1600	12

Deliverables

- A short list of milestones *this week* (as required by Elke)
- A tentative “best guess” field map *is needed early in the process* (and we have software means to make it public)
- A straw man solenoid design *by October*, according to the specs
- A ballpark cost estimate
- All the work should be “triple purpose” (YR, pCDR, CD-1) and serve as a start for the “actual” design work later