

LAR CALO PROJECT FOR FCC-EE

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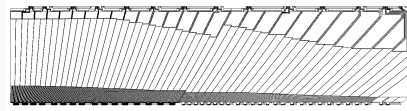
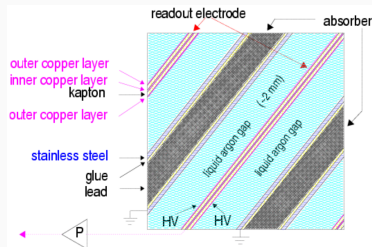
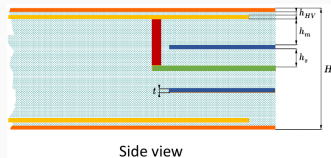


Reaching $10\times$ ATLAS granularity

- 200000 cells \rightarrow few million cells
- Readout in ATLAS uses simple copper/kapton electrodes
- Issue: traces to route signals to front or back of electrode take space !
- For $10\times$ more granular: go to multilayer PCB to route signals in a deep layer

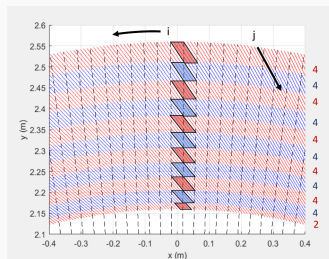
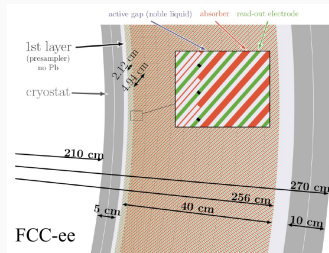
Basic design

- Cannot use accordion shape for PCBs
- \Rightarrow Straight planes inclined around the barrel
- Simulation in a specific IDEA-LAr setup



Design of ATLAS electrodes

- Enveloppe from IDEA tracker
- Aim for $20\text{--}22 X^0$
- Initial proposal: 1536 electrodes around ϕ
 - 2 mm Pb absorber, 1.2 mm PCB, 2×1.24 mm LAr. Sampling fraction $\sim 20\%$
 - Angle 50°
- Segmentation in θ : $\Delta\theta \sim 0.56^\circ$
- 11 segments in depth, first one without any Pb (presampler)
 - Projective cells in θ and ϕ
- All parameters still subject to optimisation



Parallelepipedic cells in $r - \phi$

Necessary R&D

Some items can be blockers to be able to build such a calorimeter

- Thin cryostats: R&D ongoing at CERN
- High density feedthrough: R&D ongoing at CERN
- Cold electronics
 - Basic estimations show very promising noise level achievable
- PCB electrodes (CERN and IJCLab)
 - Will define the maximum granularity achievable
- No thoughts put into mechanics yet
- Design of endcaps missing

Physics performance

- Simulation and integration into FCC software (CERN, Prague)
- Electroweak physics performance vs detector geometry, choice of absorber (Edinburgh)
- Tau physics studies and π^0/γ identification (Copenhagen)
- A lot of work to do on these simulation / performance aspects
 - In particular, interesting work to do on the reconstruction / clustering
 - See what we can achieve in terms of jet energy resolution, e/γ identification, in the full energy range, and in the context of a global PFlow reconstruction !

Very open to new contributions !