

Korean Prospective for EIC

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EIC-ASIA workshop

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Institutes interested in ePIC

Calorimeter (barrel)

Yonsei U, SKK U, KNU, PNU
(Dual readout + Si teams)

Calorimeter (ZDC)

Sejong U, Korea U
*ALICE Focal + LAMPS**

Si pixel

Yonsei U, PNU
ALICE ITS3 group

μ RWELL

SNU, U of Seoul
Korean CMS group

LGAD

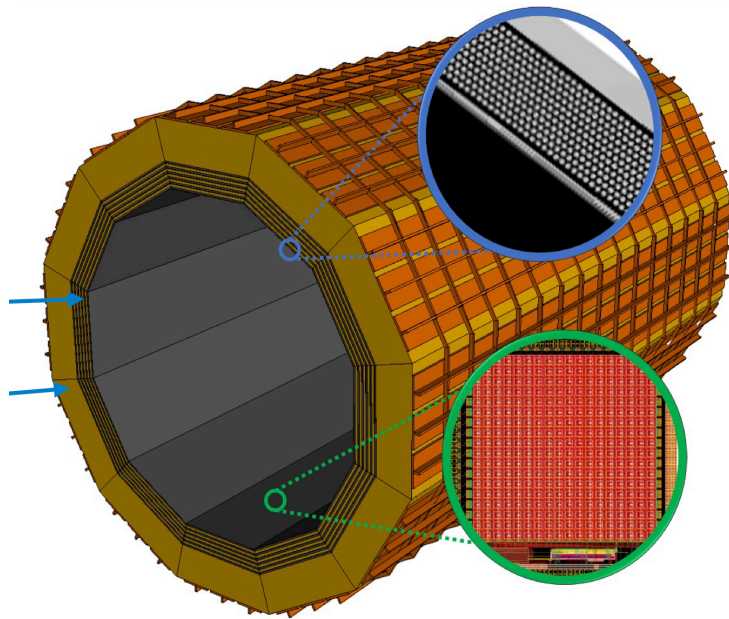
KNU, Korea U
Korean CMS group



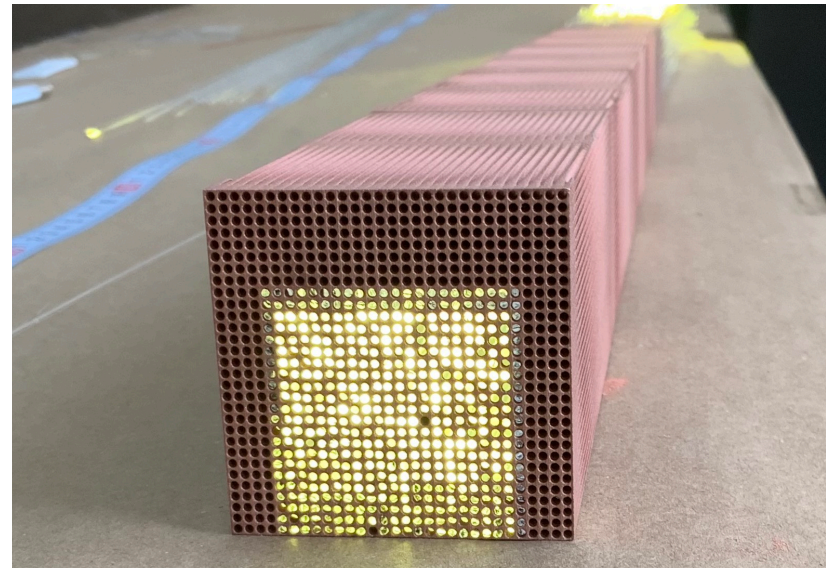
* LAMPS: A detector for rare isotope collision experiment in Korea

Calorimeter: Barrel imaging Ecal

- Yonsei U, SKK U, KNU, PNU
- Expertise in Sc/Fi calorimetry and test/manipulation of silicon sensor
- Had regular meeting with ANL for collaboration
- Plan reviewed by ePIC this week



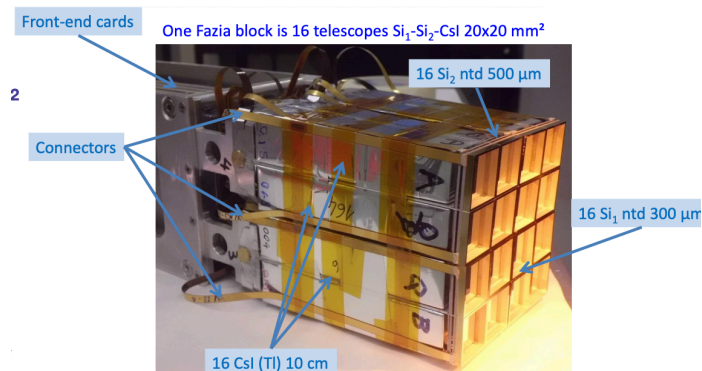
Argonne lab's proposal



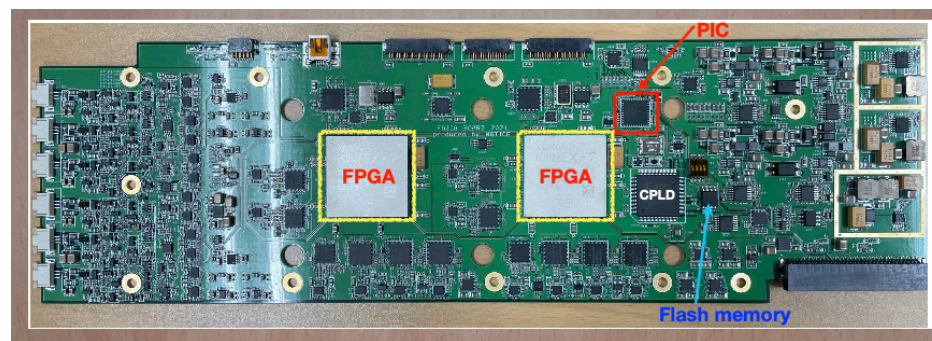
dual readout prototype (Yonsei U)

Calorimeter: ZDC (hadronic)

- Collaboration with RIKEN
- Two operational types are considered
 - **Sc/fi with MCPPMT** (robust against radiation?)
 - Similar to ALICE Focal-h
 - Same technology with imaging calorimeter
 - **Sampling w/ PIN sensor** (larger version of focal-e?)
 - Expertise in sensor fabrication (ETRI) and FEE board (NOTICE co.)
 - System for silicon sensor test is already setup
 - HGCROC v4?



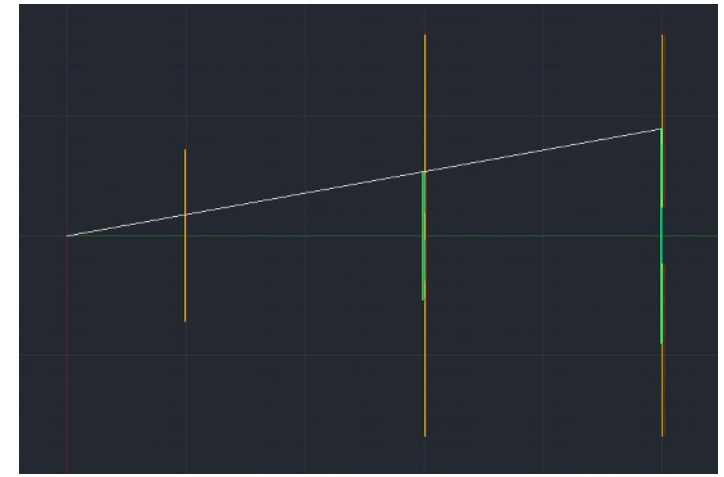
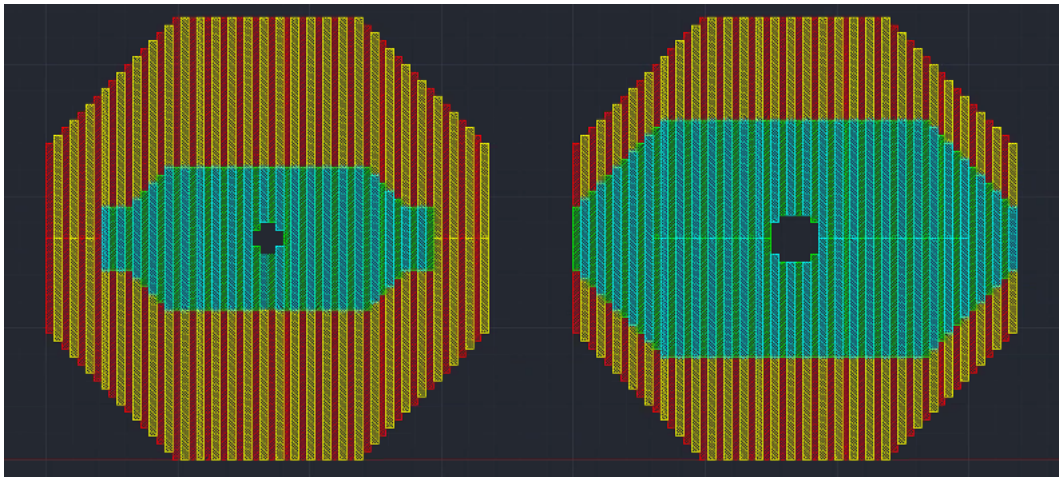
FAZIA-type telescope
(Inha U & Korea U)



FEE board (NOTICE)

Silicon pixel

- Proposal for endcap (electron-going) disks
- Actively involved in designing of ALICE ITS3 and will extend the current R&D for ePIC
- Expertise in thinning, dicing, wire-bonding and mass production test
- Potential collaboration with the US Si consortium
- Simulation study is ongoing

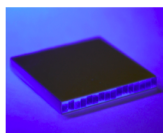


Youngil's simulation, 3 layers at $z_1 = 25 \text{ cm}$, $z_2 = 75 \text{ cm}$, $z_3 = 125 \text{ cm}$

LGADs at the HL-LHC (2028)

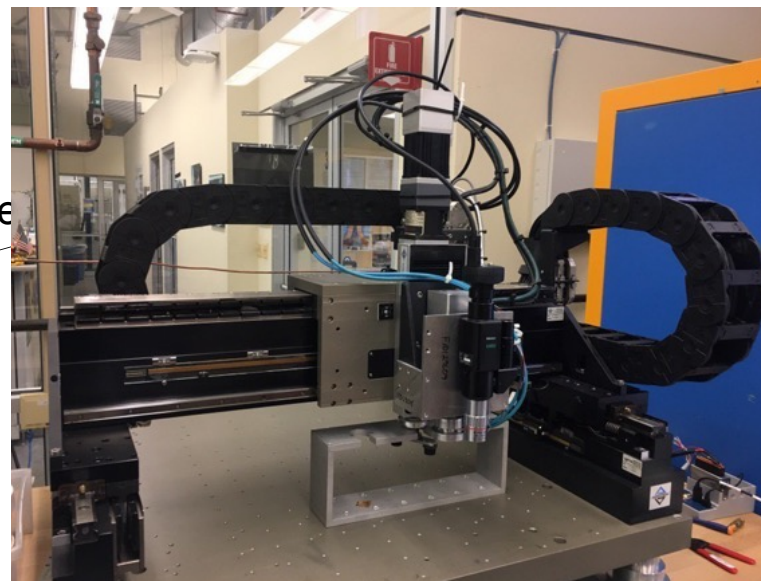
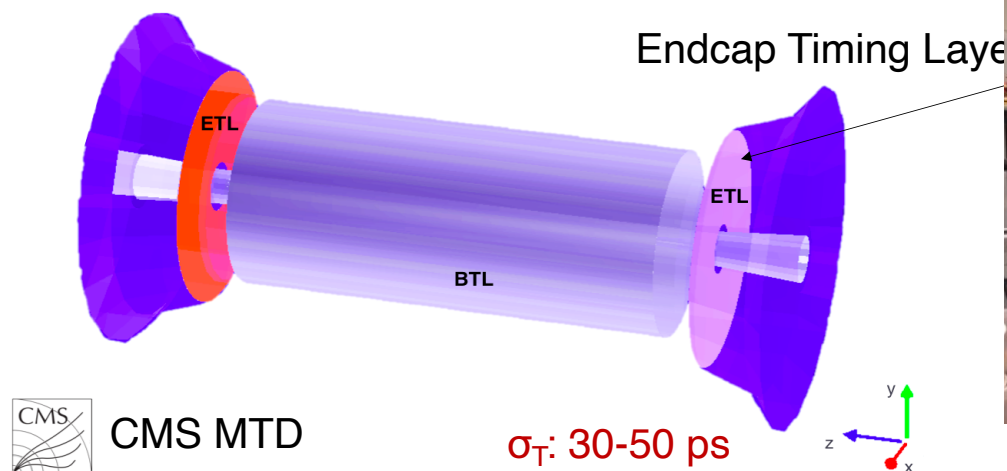
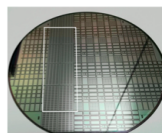
BTL: LYSO bars + SiPM readout:

- TK / ECAL interface: $|\eta| < 1.45$
- Inner radius: 1148 mm (40 mm thick)
- Length: ± 2.6 m along z
- Surface ~ 38 m²; 332k channels
- Fluence at 4 ab⁻¹: 2×10^{14} n_{eq}/cm²

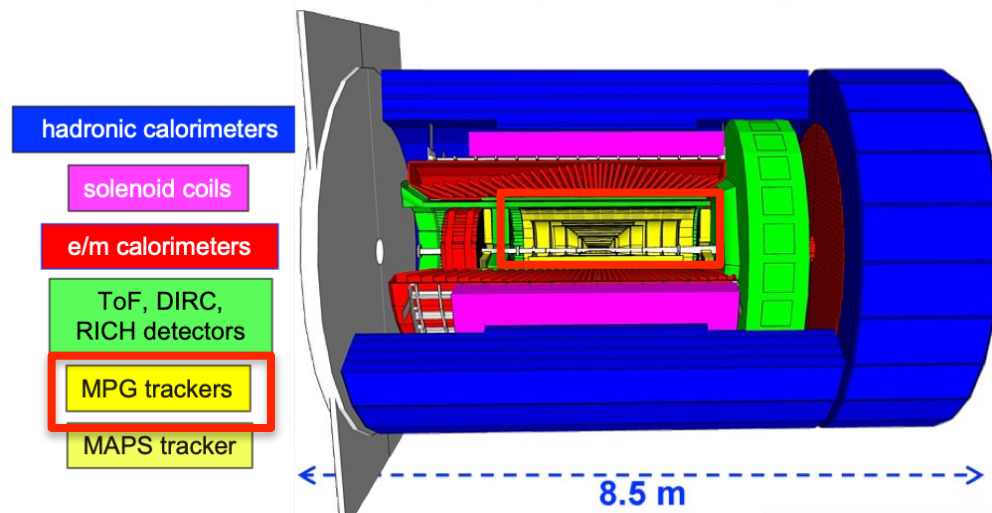
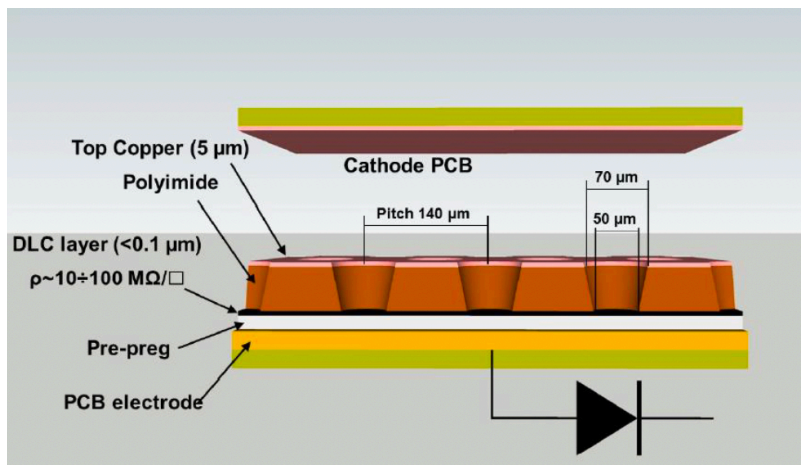


ETL: Si with internal gain (LGAD):

- On the CE nose: $1.6 < |\eta| < 3.0$
- Radius: $315 < R < 1200$ mm
- Position in z: ± 3.0 m (45 mm thick)
- Surface ~ 14 m²; ~ 8.5 M channels
- Fluence at 4 ab⁻¹: up to 2×10^{15} n_{eq}/cm²



- Endcap layers for CMS MIP Timing Detector (MTD) to be made of LGAD
- KCMS groups - KNU and KU - are actively involved
 - Prototype assembly, sensor tests with beams and lasers
- A huge synergy expected by collaborating with Asian countries



- The Korean GEM production facility for CMS can be great opportunity for mass production of MPGD
- Seoul Nat'l Univ., Univ. of Seoul
- Expect close collaboration with other groups having expertise in GEM
- Details to be reported tomorrow by Inseok

Funding situation

- **Budget for near future R&D and in-kind contribution**
 - Positive feedback from government offices
 - EIC-RRB meeting will be another useful input
 - Yongseok and I request ~2M\$/yr for the first 4 years
 - Expect expansion for mass production phase
 - We insisted significance of steady support, > 10 years
- **Timeline**
 - FY2023
 - Organization of EIC-Korea group (Th+Ex)
 - **CALO**: simulation studies
 - **μ RWELL, LGAD**: prototype development
 - **Si pixel**: Specification of collaboration with Si consortium
 - FY2024 - FY2027: R&D phase
 - FY2028 - FY203X: mass production phase



International Partnership Proposal

Korean leaders:
Yongsun Kim (Sejong U.)
Yongseok Oh (KNU)

