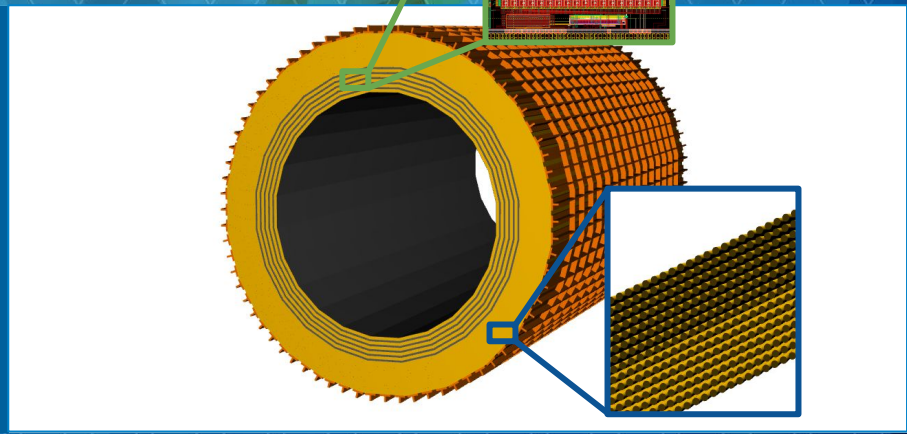
ePIC Collaboration Meeting

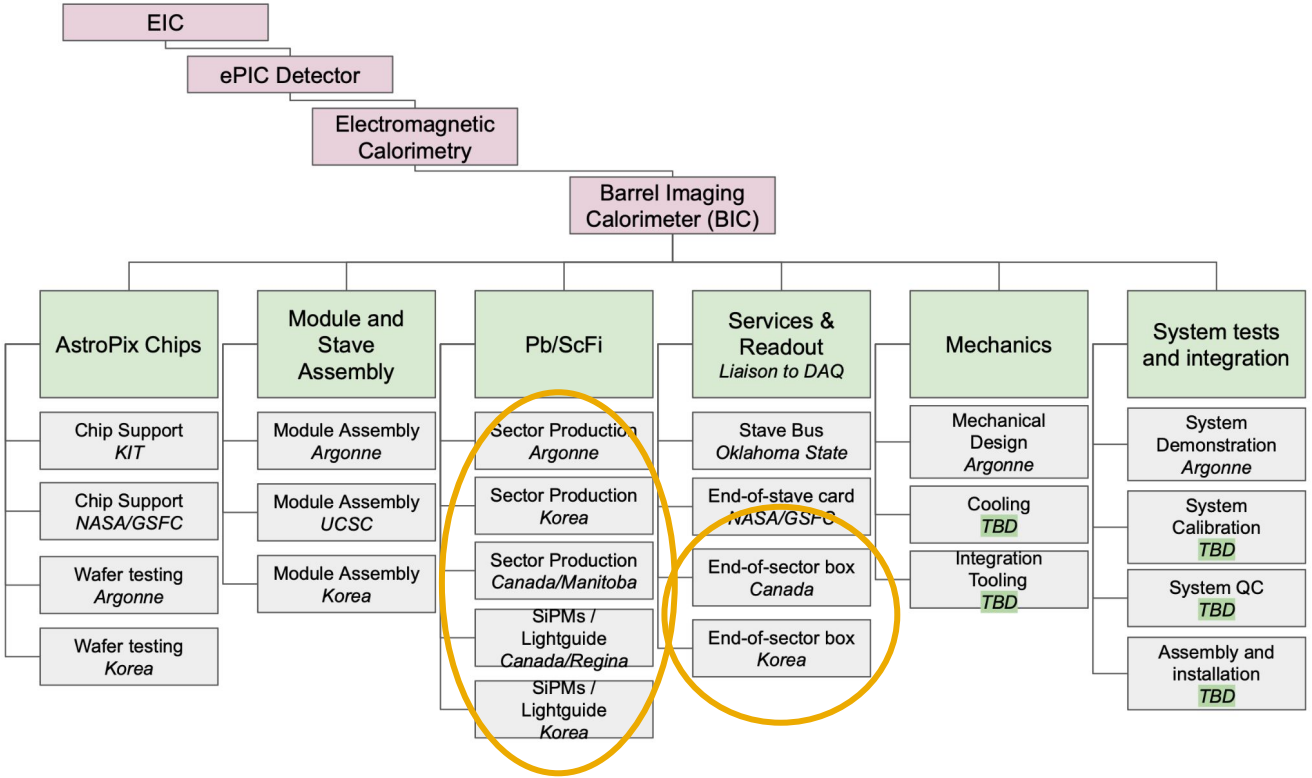
January 10, 2024

Barrel Imaging Calorimeter (BIC)
(PRE-) PRODUCTION MODEL: PB/SCFI

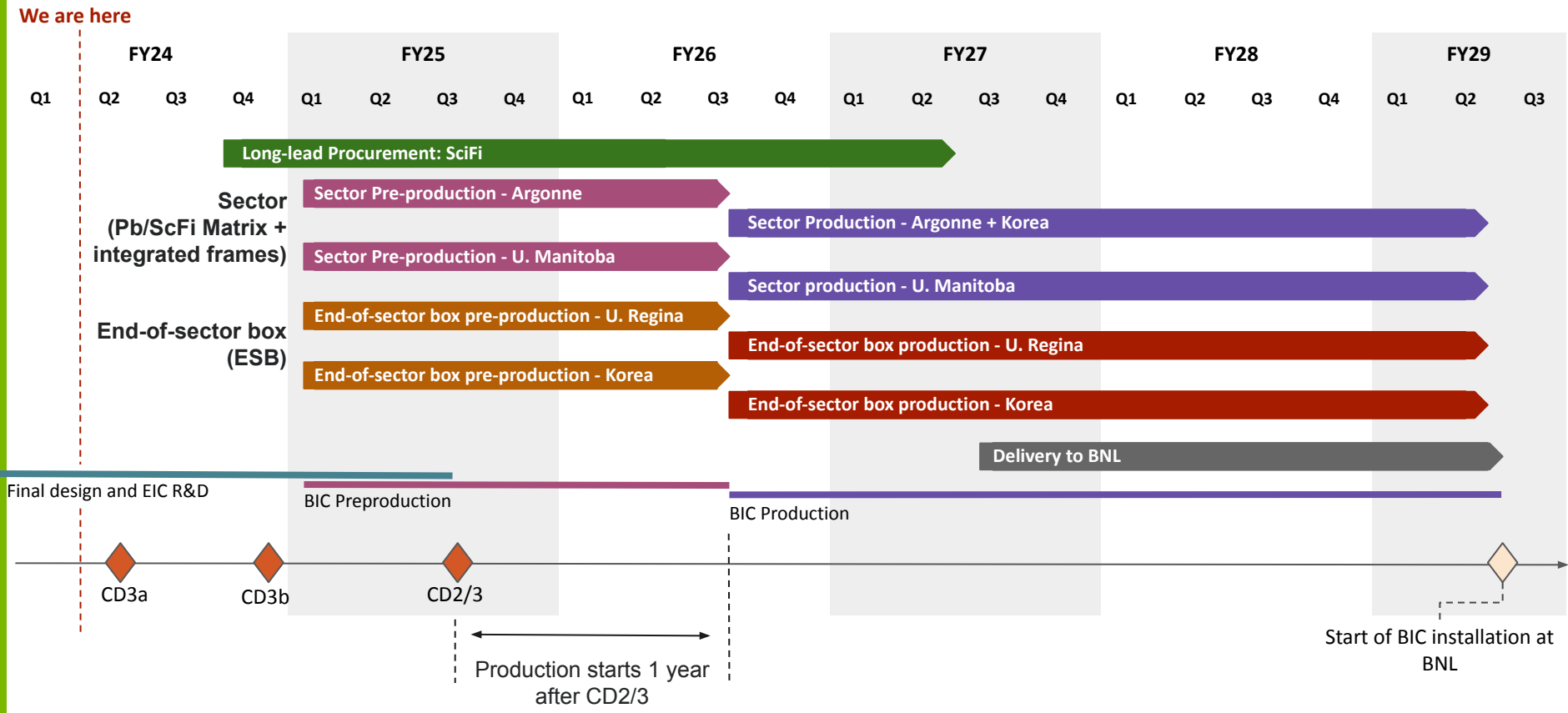


Sylvester Joosten
Argonne National Laboratory

PB/SCFI PRODUCTION IN THE WBS ORG CHART

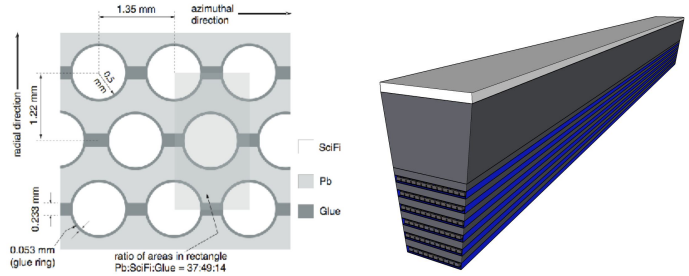


BIC PB/SCFI (PRE)-PRODUCTION SCHEDULE



SECTOR PRODUCTION MODEL 1 - MONOLITH

Currently Two Options → Part of PED Work

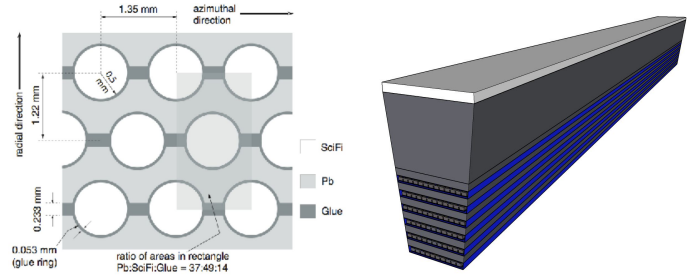


- **Fiber reception** + QC
  - Optional cutting + relaxation (canes vs spools)
- **Lead reception** (rolls to size) + swaging
- **CF frame** component reception “C-channels”, produced as subcontract
- **Manufacter matrix** (lead-epoxy-fiber), mayan pyramid
  - ~ 1 layer / press / day, continuous QC
  - Integrate CF frames in production process (monolith)
- **Machine sectors** at external machine shop
- **Polish** ScFi + final QC
- **Ship**

Both options follow the proven GlueX BCAL production model

SECTOR PRODUCTION MODEL 2 - PIECEWISE

Currently Two Options → Part of PED Work



- **Fiber reception** + QC
  - Optional cutting + relaxation (canes vs spools)
- **Lead reception** (rolls to size) + swaging
- **CF frame** component reception “C-channels”, produced as subcontract
- **Manufacter matrix** (lead-epoxy-fiber), mayan pyramid
  - ~ 1 layer / press / day, continuous QC
  - **Build 6 components**: 5 thin layers + 1 bulk volume
- **Machine layers** at external machine shop
- **Assemble sector** by stacking layers with frames (separate press)
- **Polish** ScFi + final QC
- **Ship**

More steps and more pieces (e.g. 288 layers in 6 different types to be machined), second flow at manufacturing site, → **monolith more attractive**

EOSB PRODUCTION MODEL

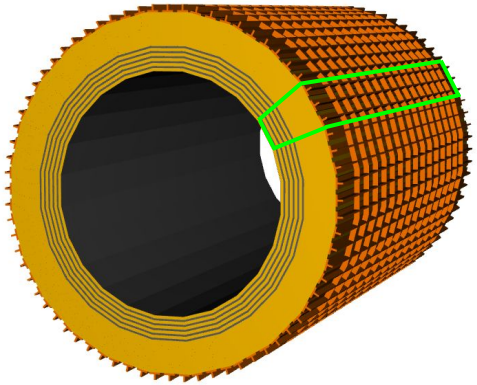
- **Flow 1**
  - Light guide production + QC
  - *(attached to sector during install at BNL)*
- **Flow 2**
  - **SiPM reception + QC**
  - **FEB production** + QC
  - **SiPM mounting** (assuming pre-assembled array)
  - Imaging layer **patch panel production**
  - **Mechanical component production** + QC
  - **Readout box assembly** + QC
  - **Ship**
  - *(install to light guides with optical coupling during install at BNL)*

DISCUSSION

BACKUP

Components

BARREL IMAGING CALORIMETER (BIC)

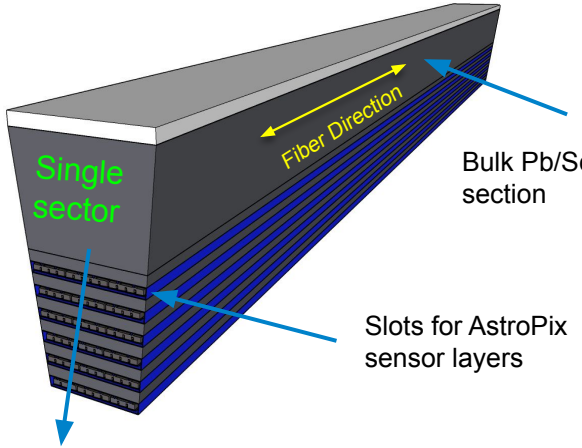


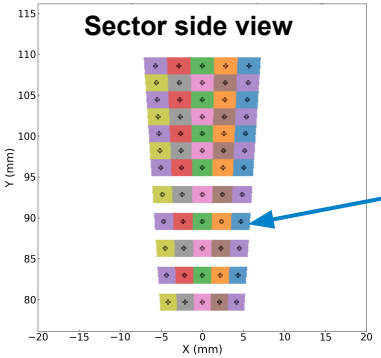
Length: 432.5 cm

Radius: ~ 80 cm radius,

Structure: 48 sectors

η Range: -1.71 < η < 1.31

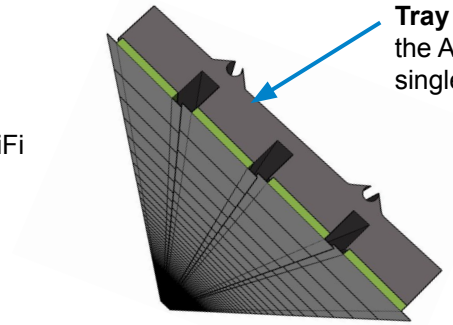




Pb/SciFi **Layer** - 12 layers per sector

Structure: 5 readout cells (one light-guide per readout cell)

Construction: 17 rows of fiber

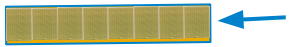


Tray - Structure holding the AstroPix staves for a single layer

Length: ~ 200 cm (half length)

Structure: 6-7 “turbofanned” staves per tray

Stave Structure: ~ 13 **Modules** per stave



Length: ~ 16 cm

Width: ~ 2 cm

Gaps: < 200 μm

Structure: ~ 8 chips/module

Module - Several AstroPix chips daisy-chained together on Flex PCB