PANDA Barrel EMC
Status + Inventory Review

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

panda

FAIR

GSI

Institute of High Energy Physics
Chinese Academy of Sciences

RUHR UNIVERSITÄT BOCHUM RUB

HIC for FAIR
Helmholtz International Center

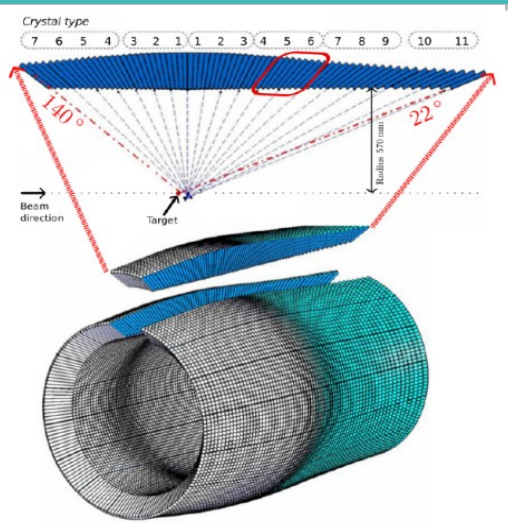
Work Meeting Gießen
Dec 5, 2023

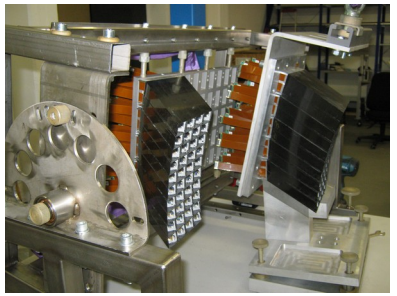
PANDA Barrel EMC

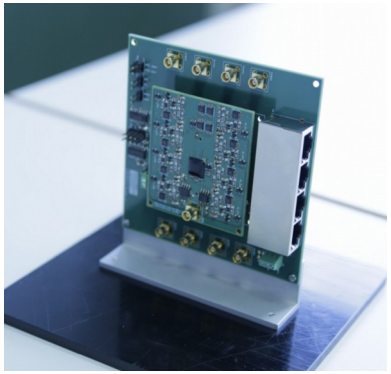
- **Envisaged milestones:**

Assembly of 1st full Barrel EMC slice

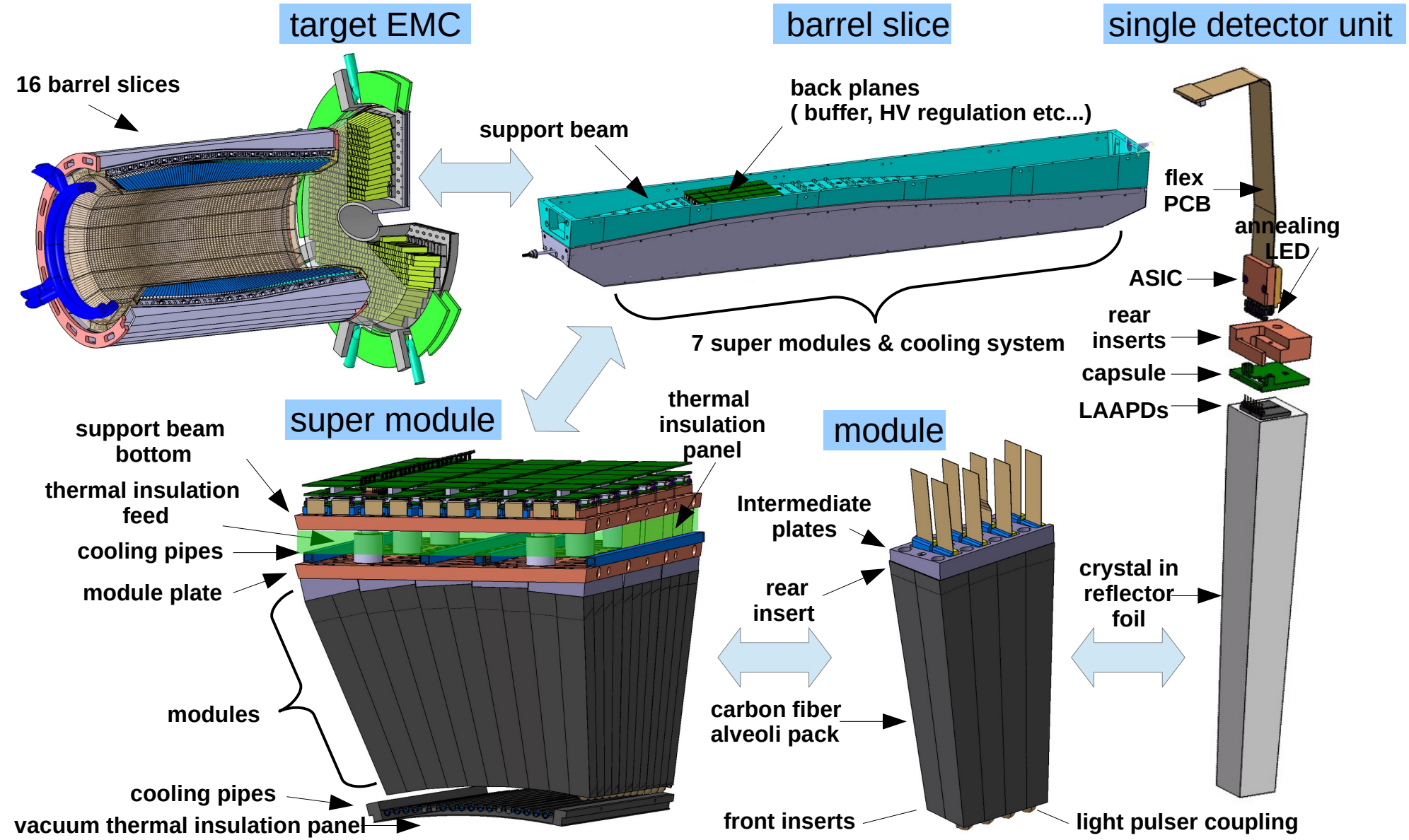
- Infrastructure ✓
- Mechanics (not approved yet) ✓
- 710 detectors ✓
  - 710 crystals in 11 different geometries ✓
  - 1420 APDS ✓
    - Screening including irradiation ✓
    - Matching ✓
    - Glueing ✓
  - Capsules ✓
  - Wrapping ✓
- Assembly of 18 modules ✓
- Assembly of Supermodules ✓
  - 360 left and 360 right handed APFEL-ASIC with flex PCBs ✓
  - ASIC housing or fixtures ✓
- Assembly of FOS slice (✓)
  - Cooling & thermal insulation in progress
  - Backplanes ✓ to be tested
  - Cables ✓
  - Light pulser fiber coupling in progress
  - Design Support Beam (✓) done, to be tested



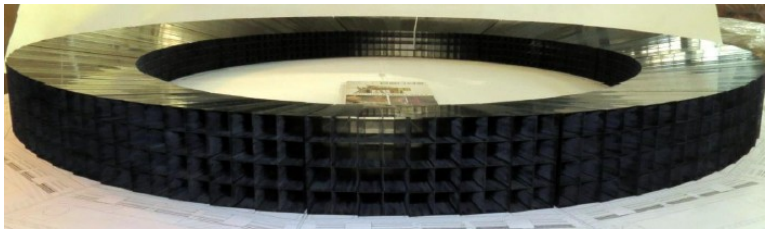




Current Slice Design



Mechanics



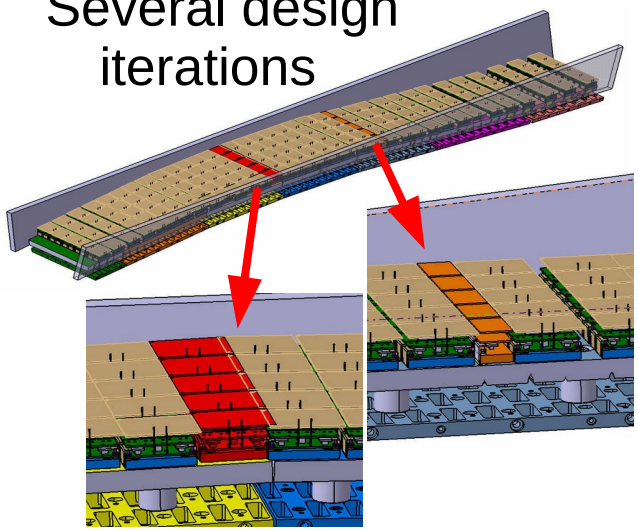
All mechanics parts for all barrel modules produced and delivered by IHEP Protvino until 2021

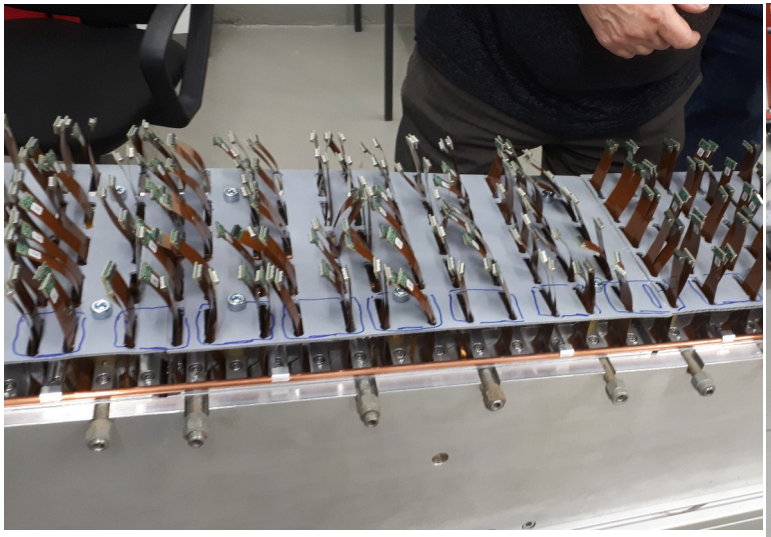
Still missing:

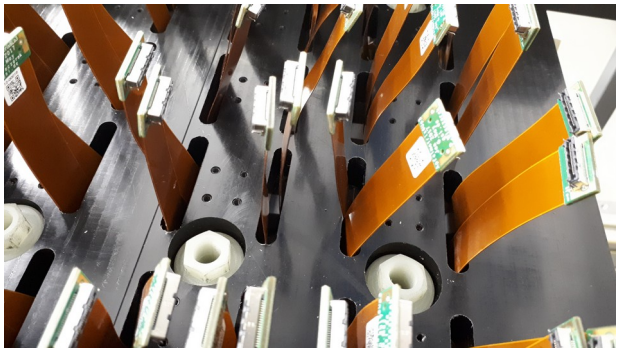
- Support beams
- Barrel mounting mechanics

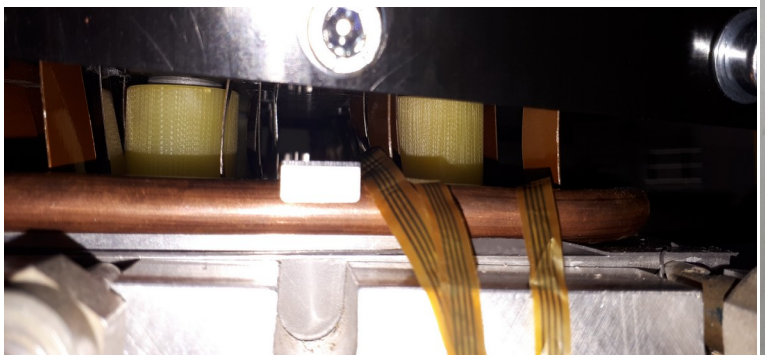
Support Beam - Redesign

Several design iterations





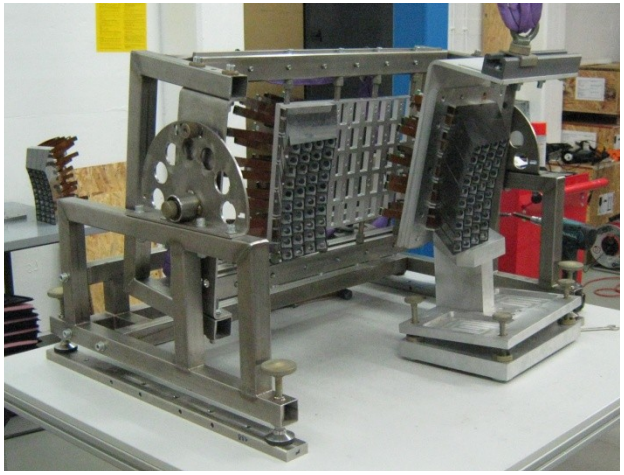


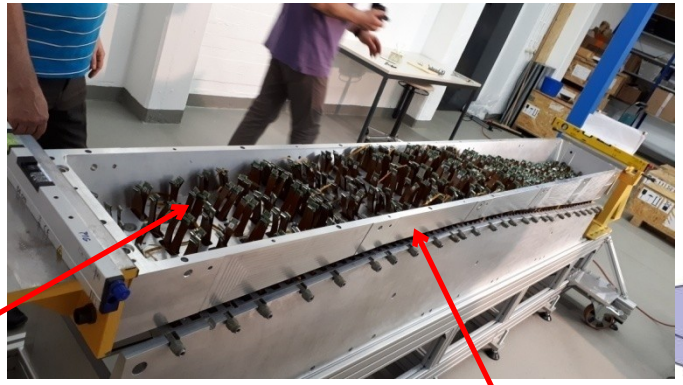


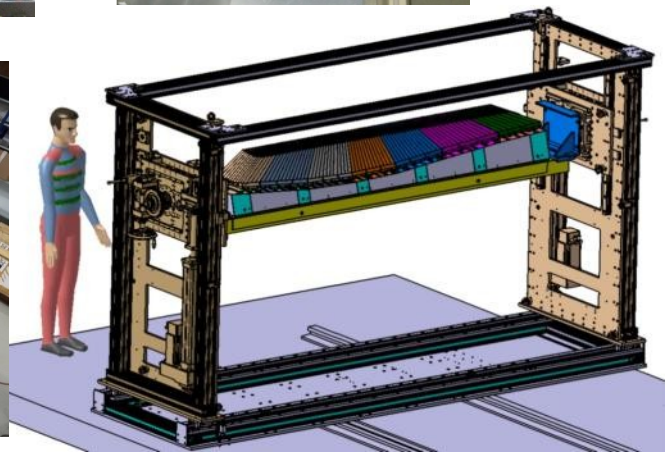
straight FlexPCB routing now possible

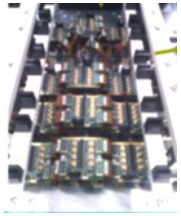
Supp. beam mock-up of final design

Support Beam









Backplanes will sit inside support beam

Thermal insulation feet between cooled crystal volume and support beam

Work Packages – Slice

- WP 1: Crystal QA
- WP 2: APD matching + crystal glueing
- WP 3: Module+supermodule mounting
- WP 4: Front-end electronics
  - APFEL-Flex PCB mounting + assembly
  - APFEL-Flex tests
  - HV-Board tests
  - FE-sandwich tests
- WP 5: Cables and cable routing
- WP 6: DAQ (SADC)
  - FireFly adapter production + tests
  - SADC crates
- WP 7: Cooling system
- WP 8: Slice assembly
- WP 9: Slice test + transportation

not for slice 0
only needed for slice 0

Work Packages – Slice

WP 1: Crystal QA

Requirements:

- Gamma source, spectrophotometer (modified for long DUTs), LY test stand
- 1 FTE

Work Packages – Slice

WP 2: APD matching + crystal glueing

Requirements:

8 Glueing stations, cleanroom (ISO 7)

Resources:

- 1 student per shift - 2 shifts per day (16 xtals) for 10 weeks
- Wrapping – 1 person

Work Packages – Slice

WP 3: Module+supermodule mounting

Requirements:

Mounting tools, sufficient lab space, crane

Resources:

- 2 persons, 2 modules/day, 1 week total

Work Packages – Slice

WP 4: Front-end electronics

Requirements:

2 FEE test stands, climate chamber

Resources:

- APFEL-Flex assembly+tests: → GSI
- HVD calib: 1 person, 2 HVD/day, 100 days
- FEE tests: 4 FEE units/day, 50 days

Work Packages – Slice

WP8+WP9: Slice assembly + transportation

- Slice assembly: placement of FEE units, mech adapters (“H-adapters“), cabling – 2 weeks, 2 persons
- Cosmic measurement, >1 week (statistics?)
- Mounting of transportation beam, placement in transport box, crane-out