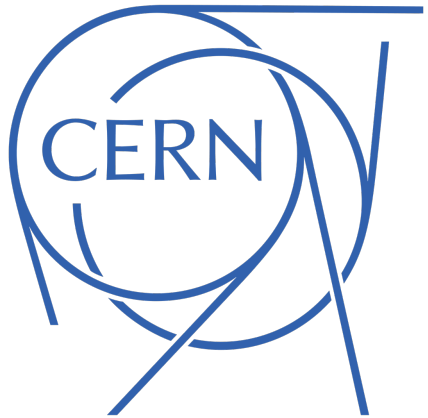
CEA ANTENNE @CERN



The mission of CEA Antenne

- Reinforce Irfu's involvement in CERN's physics experiments, spanning critical phases of research and development, design, installation, and ongoing maintenance.

- Maintain a vital support hub for Irfu personnel undertaking short or long-term assignments at CERN, ensuring seamless integration into the experimental activities.

- Provide Irfu a prominent visibility within the esteemed CERN community.

The CEA Antenne staff

Five CEA-Irfu staffs permanently based at CERN

Left to right

Didier Cotte: Mechanical technician, responsible of the mechanical workshop
Sandrine Javello: Secretary, in charge of accounts, and car management
Yulian Vutov: Mechanical apprentice, BTS Microtechnology design and industrialization
Charlotte Riccio: Instrumentation and quality engineer, head of the Antenne
Kostas Aivazelis: Electronics engineer, responsible of the electronical workshop

Logistical support
Help for orders
Manpower on experiments
Tooling for urgent modifications
Link with CERN services

CEA Antenne at CERN: Location

Blg 182 in CERN Meyrin

Contact:
Antenne IRFU / CEA Saclay
CERN Meyrin
182/R-016
1211 Genève 23
+41 22 767 71 91
sandrine.javello@cern.ch

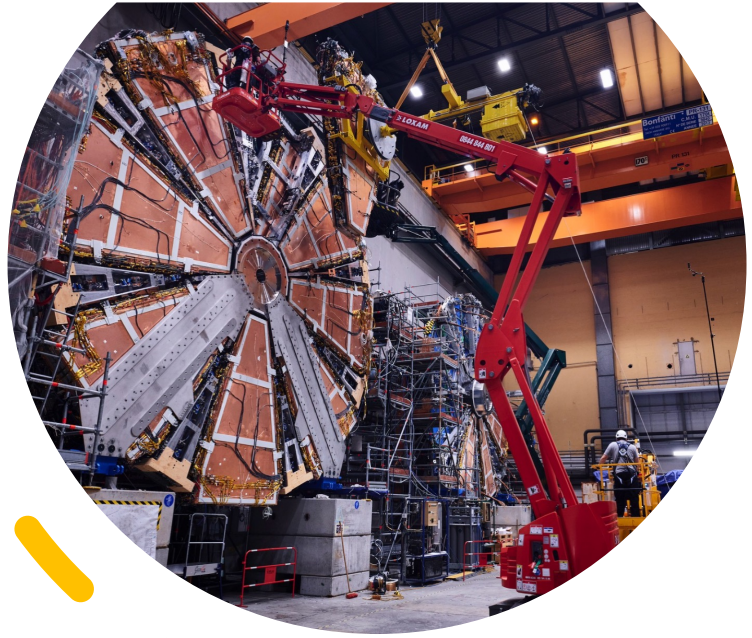
Equipment at CEA Antenne

- Secretariat, offices, meeting room, coffee room
- A temporary office to welcome visitors

- A mechanical workshop (small CNC, 3d printer)
- An electronic laboratory (creation ongoing)
- A room with test benches
- An access to a clean room

- 9 available cars to borrow

Projects



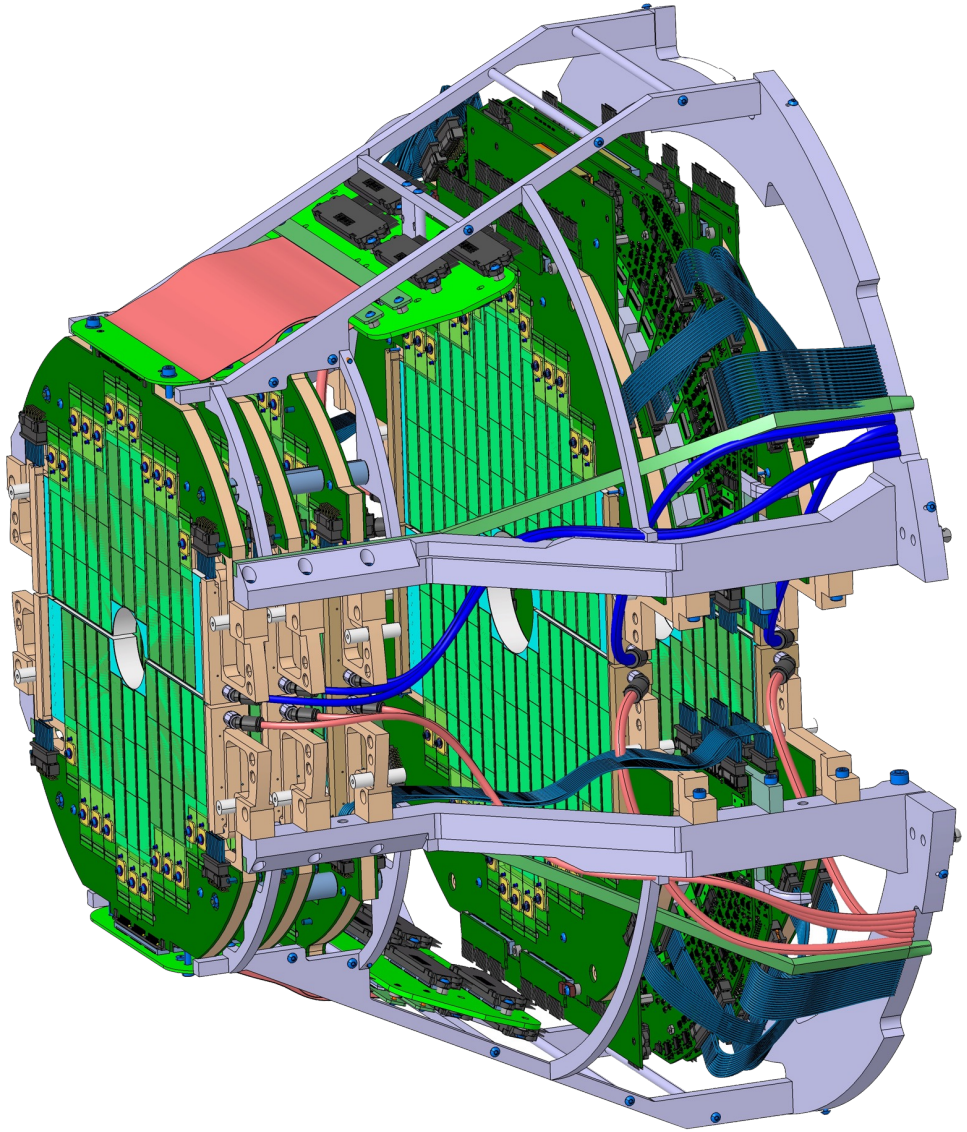
The CEA Antenne is involved in several projects:

- LHC ATLAS NSW, ITk Pixel Detector and spectrometer alignment
  - See Fabrice Balli's presentation
- LHC ALICE Muon Forward Tracker and Muon Chamber
- LHC CMS BCAL upgrade (laser monitoring and electronics VFE)
- GBAR
- T2K-ND280 and Hyper-Kamiokande (Japan)
  - See Sara bolognesi's presentation
- ISOLDE Double Alpha

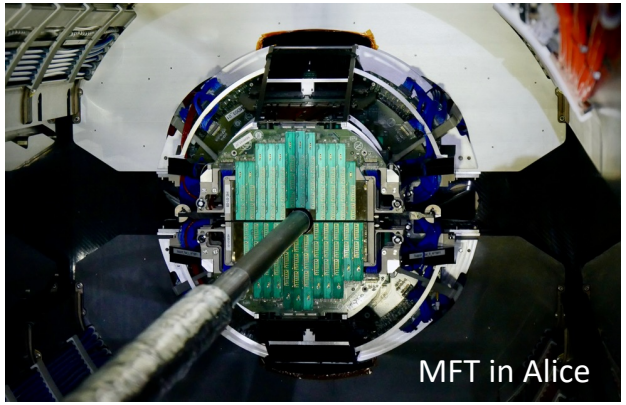
Coming soon:

- LHC LHCb UT
  - See Stefano Panebianco's presentation

ALICE MFT



A word on MFT



The Muon Forward Tracker improves the performance of the ALICE muon spectrometer to detect muons at forward rapidity.

It also opens the path to new measurements; new physics observables are now accessible down to very low p_T : separation of prompt and displaced J/ψ (separation of charm and beauty decay).

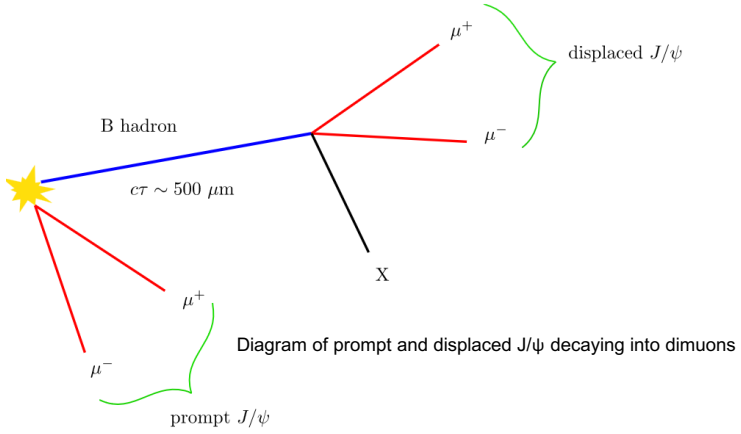
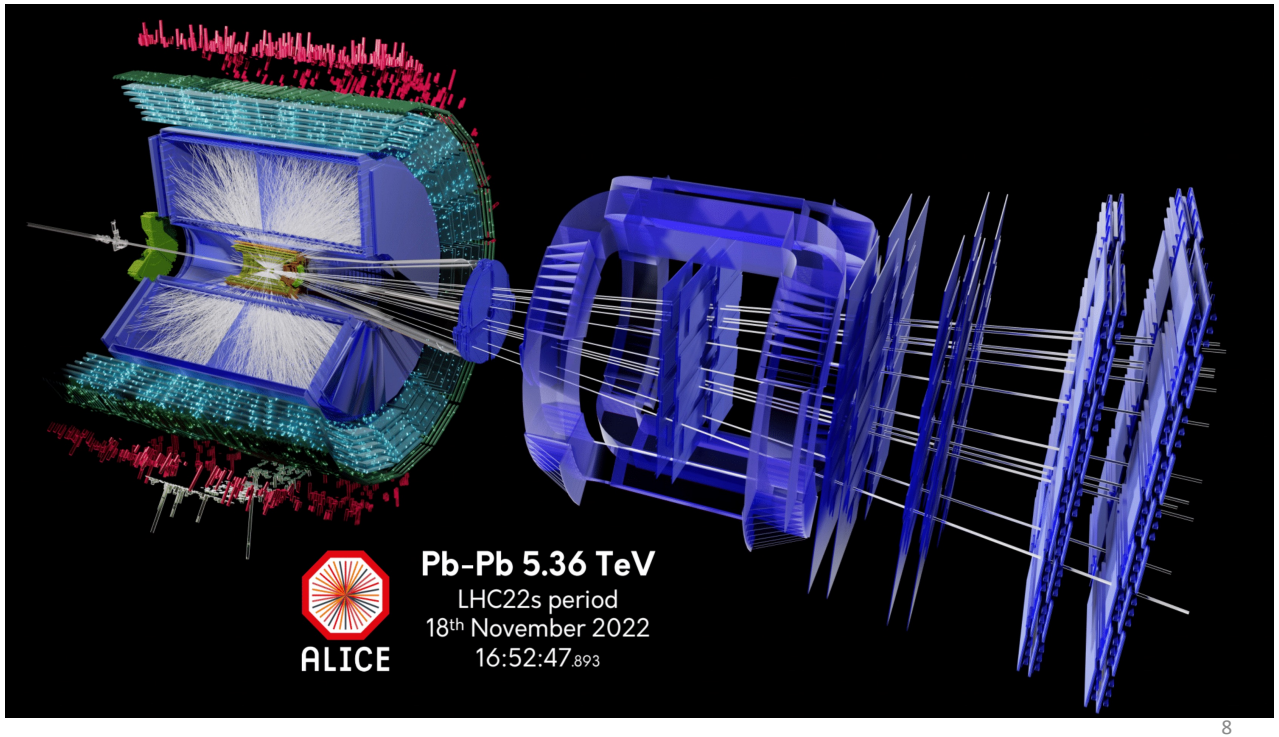
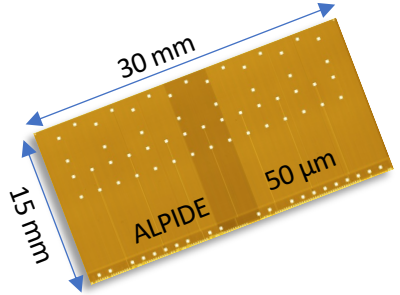


Diagram of prompt and displaced J/ψ decaying into dimuons



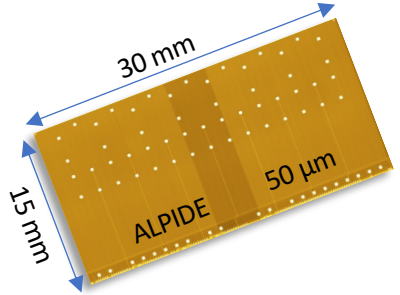
A word on MFT



The ALPIDE (ALice PIxel Detector), main detector element

- Monolithic active pixel CMOS sensor
- 512 x 1024 pixels matrix, with a pixel size of 29.24 µm × 26.88 µm
- spatial resolution of 5 µm and charge integration time of 30 µs

A word on MFT

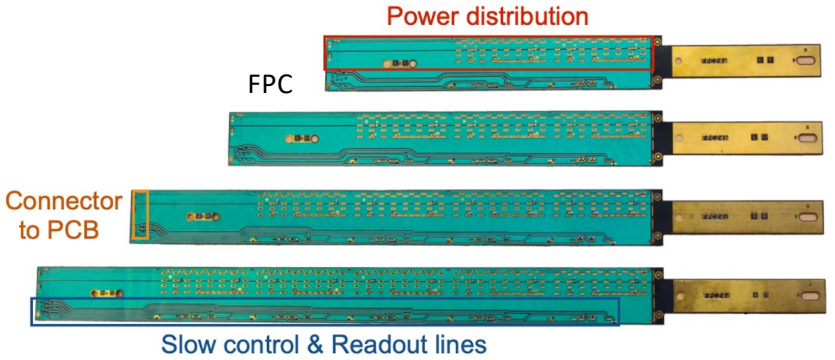


The ALPIDE (ALice PIxel Detector), main detector element

- Monolithic active pixel CMOS sensor
- 512 x 1024 pixels matrix, with a pixel size of 29.24 µm × 26.88 µm
- spatial resolution of 5 µm and charge integration time of 30 µs

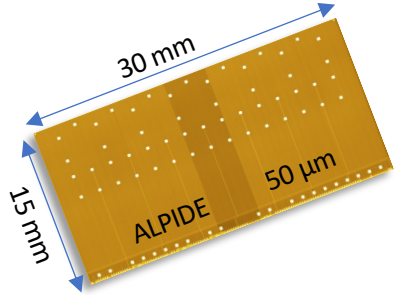
Flexible Printed Circuit:

- 4 types (2, 3, 4 and 5 ALPIDEs)
- Aluminum FPC (production at CERN)



Sensors gluing on FPC

A word on MFT

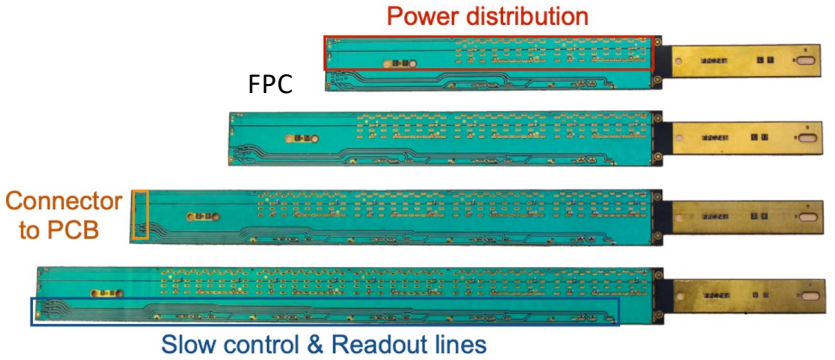


The ALPIDE (ALice PIxel Detector), main detector element

- Monolithic active pixel CMOS sensor
- 512 x 1024 pixels matrix, with a pixel size of 29.24 µm × 26.88 µm
- spatial resolution of 5 µm and charge integration time of 30 µs

Flexible Printed Circuit:

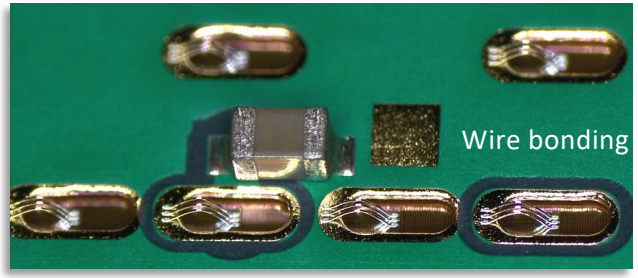
- 4 types (2, 3, 4 and 5 ALPIDEs)
- Aluminum FPC (production at CERN)



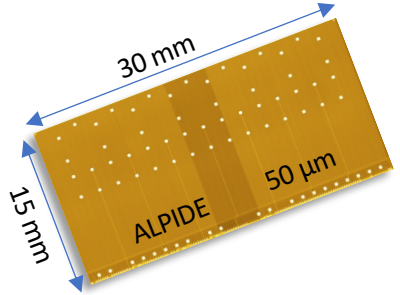
Sensors gluing on FPC

Ladder Production

- 936 ALPIDEs on 280 ladders
- Bonding with 25µm wires in aluminum



A word on MFT

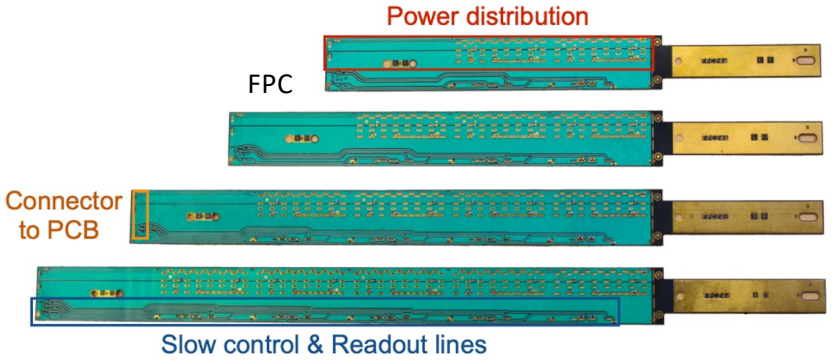


The ALPIDE (ALice PIxel Detector), main detector element

- Monolithic active pixel CMOS sensor
- 512 x 1024 pixels matrix, with a pixel size of 29.24 µm × 26.88 µm
- spatial resolution of 5 µm and charge integration time of 30 µs

Flexible Printed Circuit:

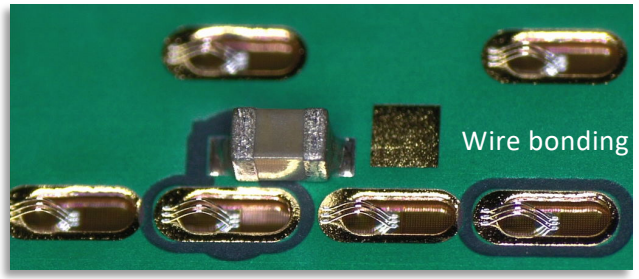
- 4 types (2, 3, 4 and 5 ALPIDEs)
- Aluminum FPC (production at CERN)




Sensors gluing on FPC

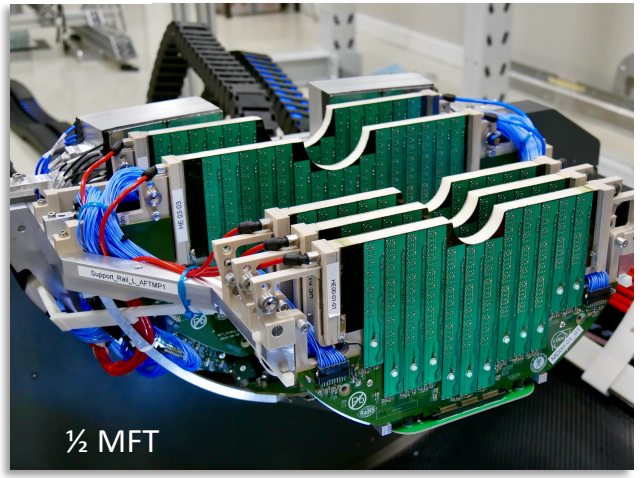
Ladder Production

- 936 ALPIDEs on 280 ladders
- Bonding with 25µm wires in aluminum



Muon Forward Tracker in Alice

- 5 Disks with 2 detection planes each
- 512000 pixels



A word on MFT

Installation: insertion in cavern

December 2020

- Challenge 1: Covid period, very reduced team
- Challenge 2: Install a detector at the bottom of the barrel, where nobody can access and very close to the beam pipe (3 mm clearance)
- Challenge 3: Install each half-MFT in one day

Thank you!