Technology and Physics Section

DT Group Meeting November 1, 2016

Section Overview

- 5 applied physicist are in the section since a long time:


Stefan


Paolo


Christian


Thierry


Burkhard

- Martyn retired this year (CAST TC), Wolfgang is close to.
- 2 applied physicists joined recently:


Martyn


Wolfgang


Eva


Nicola

- 2 fellows/students:


Michal


Szymon

Mandate:

- The TP section provides expertise in various detector technologies, detector integration and operation.
- Physicists in this section participate in projects of the group and usually lead and coordinate these.
- They also ensure the direct contact to the experiments for all activities of the group.

AEgIS

Anti-matter and Gravitation experiment at the AD

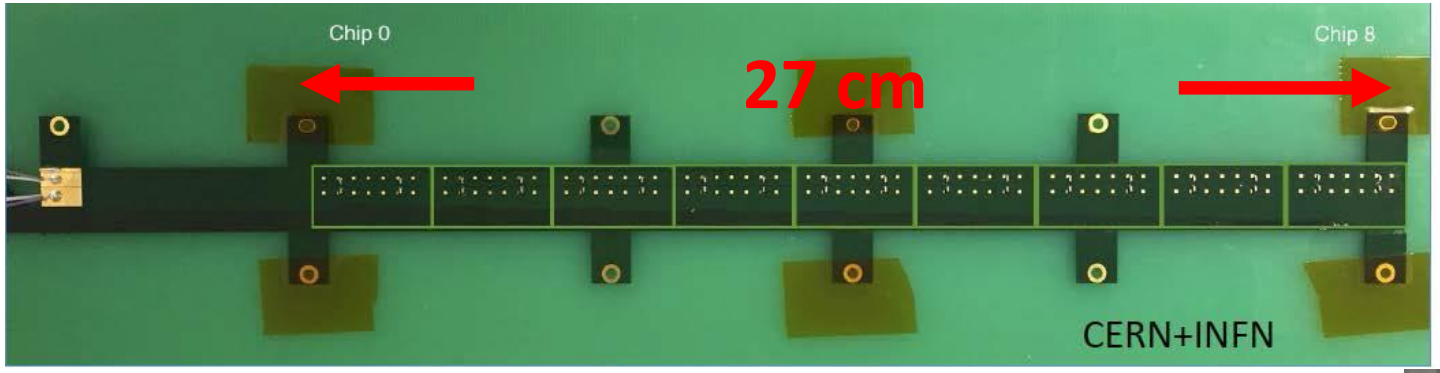
Main idea:

- Produce anti-Hydrogen atoms
- Perform a fall experiment
- Determine if the gravitational constant is the same for matter and anti-matter

DT resources:

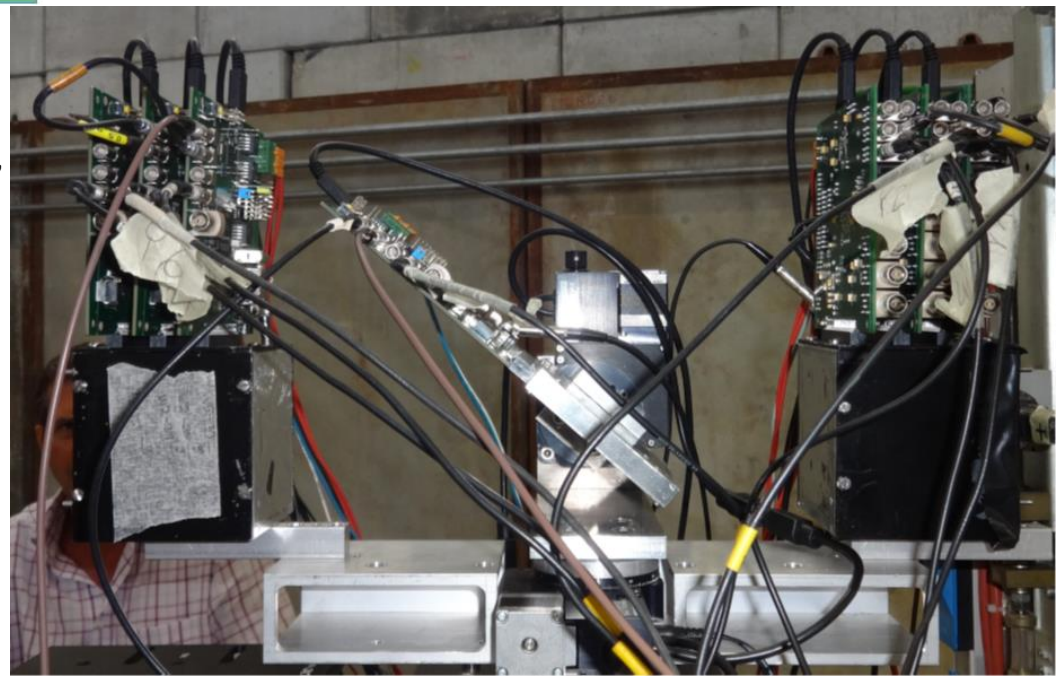
- S. Haider technical coordination (100%)
- R. Loos (30%) constructed the new Entrance Instrumentation Unit (EIU) for the experiment with much improved alignment capabilities and manipulations of instruments
- Technical support and advise from the R. Guida's team, notably F. Merlet, P. Carrie and L.P. de Menezes
- Technical support and advise from T. Schneider

Test-beam coordination for ALICE ITS upgrade



Inner Barrel HIC, 9 chips, 4.5 x 10^6 pixels

- Characterization of ASIC prototypes of the ALice PIxel DEtector (ALPIDE), 3x1.5 cm^2 , 0.5 x 10^6 pixels
- Organization, management and support of test beam activities in and outside CERN (DESY & LNF)
- The chips are qualified before & after irradiation (TID & NIEL)
- ALPIDE, the final chip, is under test, PRR by middle November
- The integration of one full ladder (9 chips) in NA61 is also ongoing



Telescope used to characterize pixel response for inclined tracks

DT resources:

- Paolo Martinengo (100%),
- Technical support of Jaap van Beelen and Pieter Ijzermans for mechanics, including remotely controlled moving stages and cooling.
- Strong interaction with DD (Petra) and EO (Corrado)

Mechanics by Francois Garnier and Pierre Ange Guidici

LHCb SciFi tracker

A very large Scintillating Fibre Tracker (360 m^2) to be ready for Run 3 (2020)

Current DT role

- Fibre refinement (aka bump shrinking)
- Fibre quality assurance and logistics
- Project management
- Fibre R&D for future SciFi trackers

} 11'000 km (2000 are done!)

DT resources

- Christian Joram (90%)
- Robert Kristic (40%)
- Thomas Schneider (20%)

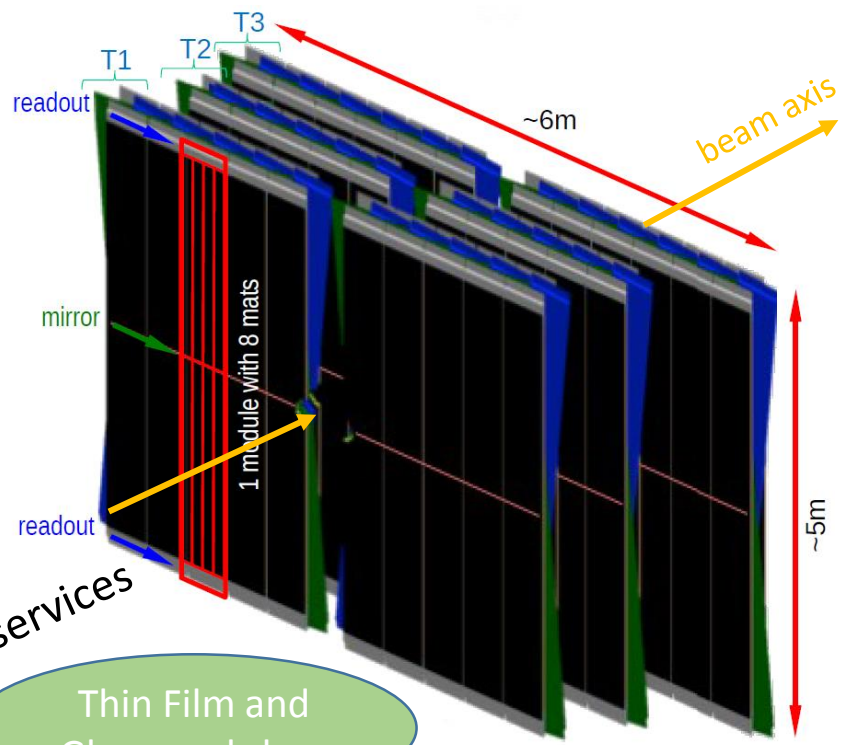
Labs in 304-1-004 and 304-1-070

CERN / LHCb resources

Lukas Gruber (LHCb fellow, 100%)

Laura Gavardi (PhD student, U Dortmund, 100%)

Ana Barbara Cavalcante (PhD student, U Rio, 100%, just left after 2 years)



Nice support from DT services

Thin Film and Glass workshop

Irradiation facility

Mechanical workshops

Cabling workshop

LHCb RICH and TORCH

- Current LHCb-RICH maintenance and operation
  - Follow-up of HPD reprocessing
  - Replacement of vacuum-degraded HPDs whenever required
  - Punctual interventions (e.g. HV, L0, LV, cooling)
  - (E)YETS activities

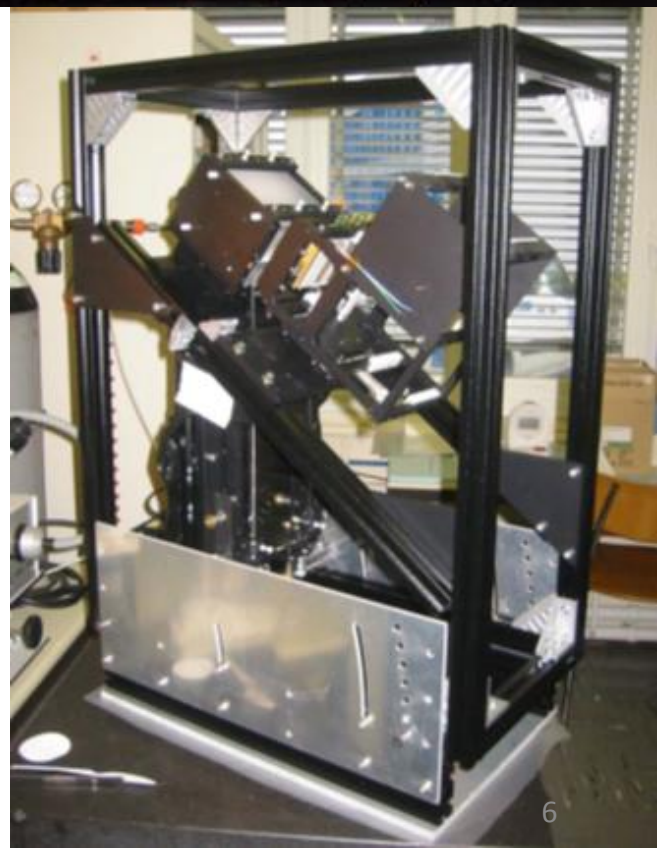
Labs in 16, 17, 153 and 169

- LHCb-RICH upgrade
  - Support for and follow-up of laboratory activities, including related laboratory space renovation and management
  - Support of beam test activities

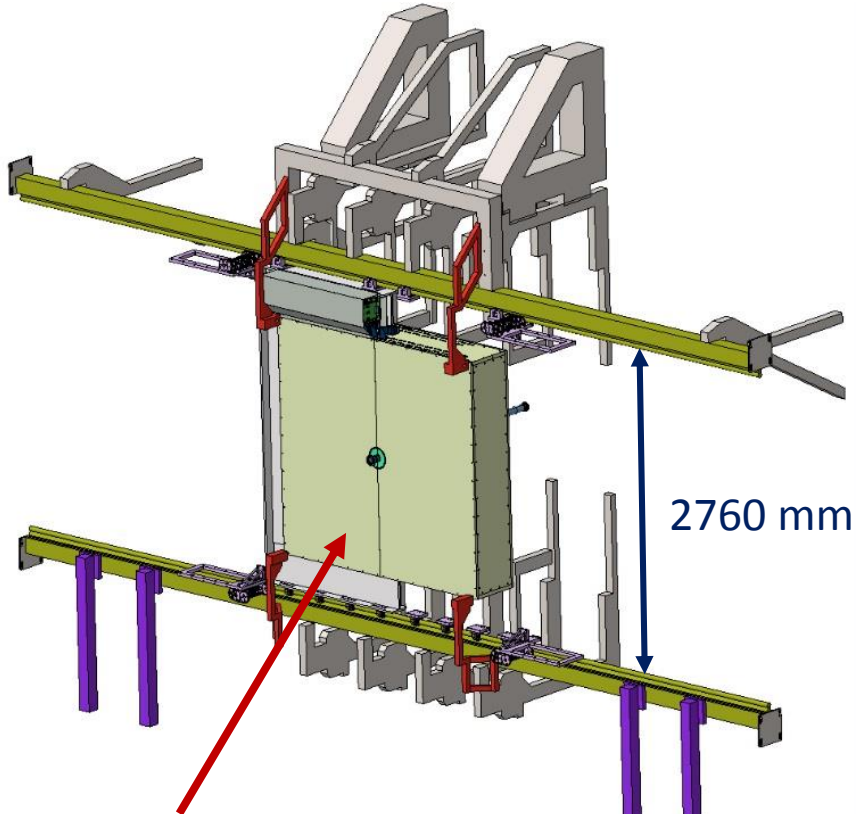
- TORCH (**T**ime **O**f internally **R**eflected **CH**erenkov light)
  - Organization, management and support of beam test and lab activities
  - Organization and management of regular TORCH analysis meetings

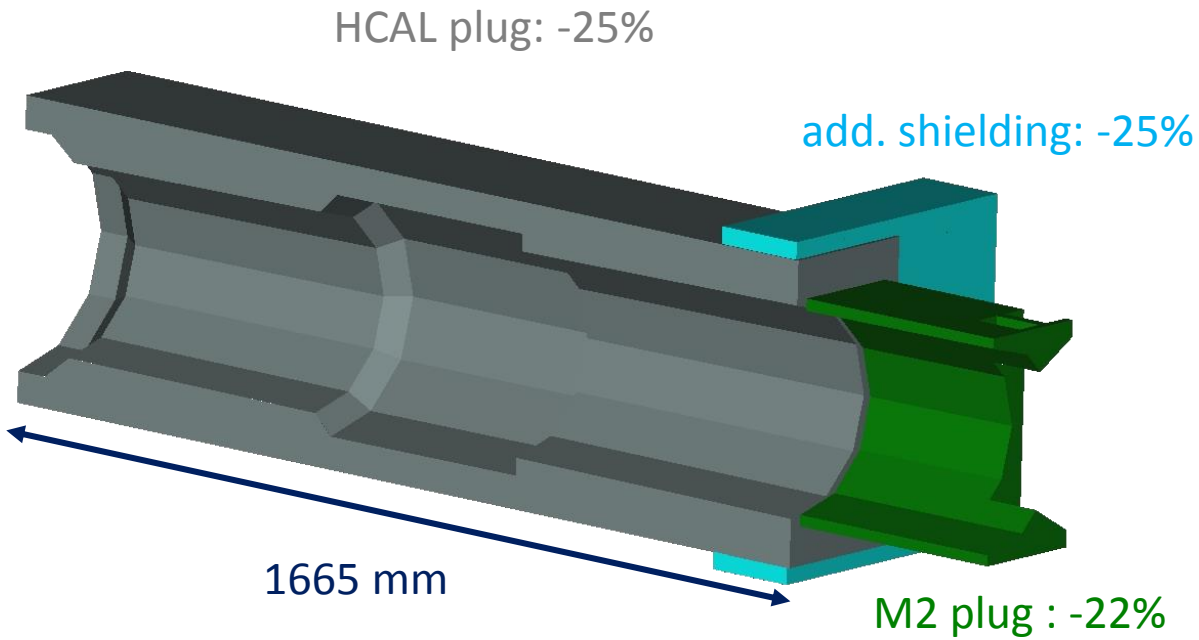
DT resources:

- Thierry Gys (100%) and D. Piedigrossi (90%)
- Work done in close collaboration with Ch. Frei and C. D'Ambrosio



LHCb Upstream Tracker (UT) and Muon System





- Engineering design and prototyping for detector box
- Work package coordination for detector integration

DT resources:

- J.Batista (10%), Michal Galka (70%), B. Schmidt (20%)
- DT support of Francois Boyer and Gregory Lahu

- Design and implementation of an improved shielding around the beam-pipe (reduce background in M2)
- Project management, ECP for LHCb

DT resources:

- Michal Galka (30%) and Burkhard Schmidt (20%)

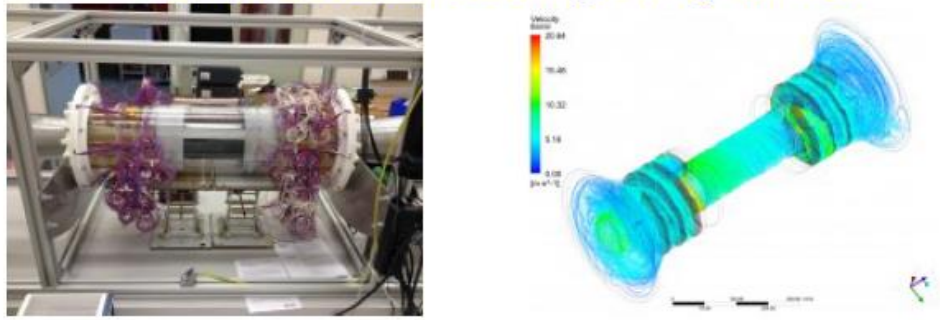
DT activities and support for LCD

CLIC vertex and tracker R&D:

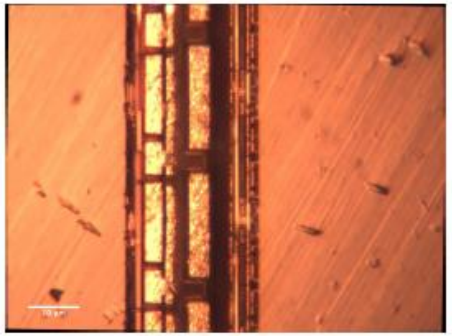
- Design, electronics, mechanics and metrology
- Cooling: e.g. thermal stave prototypes
- Fine-pitch interconnects of hybrid pixel detectors
- Test beams, including infrastructure

CLIC tracker mechanics

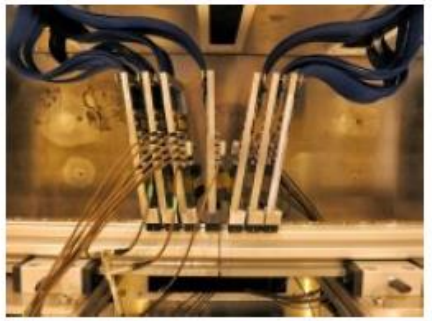
Vertex detector cooling using air flow



X-section measurement



Timepix3 beam telescope



DT resources:

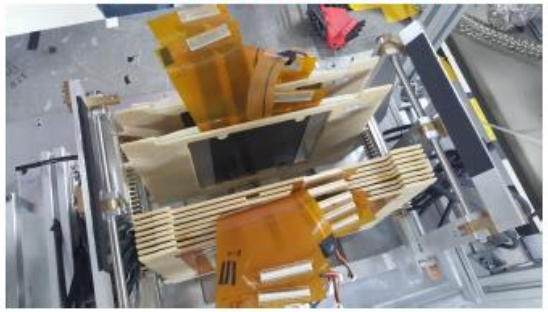
- Fernando Duarte Ramos, Szymon Sroka
  Eva Sicking, Wolfgang Klempt
- Participation of
  Francois Boyer (Composite lab) and Xavier Pons (Test-beam infrastructure)

DT activities and support for LCD/CMS

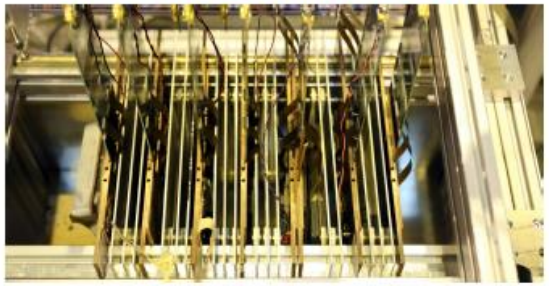
High granularity calorimetry R&D

- FCAL test beams
- CMS HGCAL test beams
- Support for setting up laboratory measurements (design, mechanics, electronics)
- CMS HGCAL sensor characterisation in the DSF

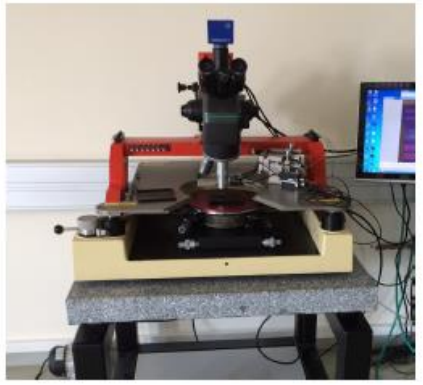
FCAL test-beam



CMS HGCAL test-beam



CMS HGCAL sensor testing



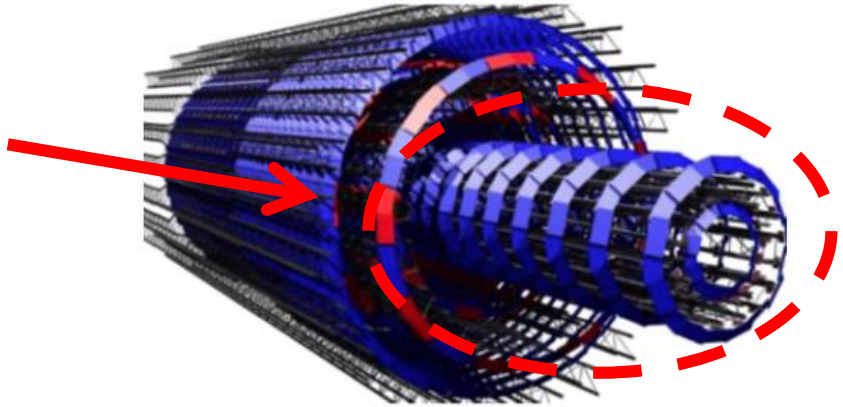
Lab in B21

DT resources:

- Eva Sicking, Wolfgang Klempt, Fernando Duarte Ramos
- Participation of Pascal Blanc, Giovanna Lehmann, Yannick Lesenechal, Samuel Rambaut

ATLAS ITK – Pixel Detector

- CERN is responsible for the construction of 1/3 of the ATLAS ITK Pixel Detector (inner barrel)
  - DT involved in stave design and production, stave integration
  - Layout decision awaited later this year.
- One of the candidate designs (SLIM) is a common effort of DT (PO) and UniGE (with LAPP involvement)



- Ongoing activities within DT/TP (Nicola Pacifico):
  - Stave design and testing
  - Planning of stave loading activities
  - Radiation hardness characterization of new candidate materials for the stave construction (not design specific, of interest also outside ATLAS)