

# DT Group Meeting

# Welcome/Bienvenue!

July 4, 2018

Burkhard Schmidt

# EP-DT BBQ on June 14



# Outline

- **Overview of group status and changes**
  - Changes in the group since the group meeting of summer 2017
  - Comments on the general situation
- **Update on the main activities of the group**
  - Contribution to the upgrades of the LHC experiments
  - Contribution to non-LHC experiments
  - Details can be found in the EP-DT Annual Report  
Link: <http://cds.cern.ch/record/2317139/>
- **R&D on Experimental Technologies**
  - Proposed contribution of DT to the initiative of the EP-Department



# Detector Technologies Group

**GROUP LEADER:** SCHMIDT Burkhard  
166-R-014



**DEPUTY:** CATINACCIO Andrea  
25-R-028



**DEPUTY:** MOLL Michael  
28-2-002



**Secretariat:** WEDLAKE Véronique  
166-R-010



## EP-DT-TP Technology and Physics



SCHMIDT Burkhard  
166-R-014

## EP-DT-DD Detector Development



RIEDLER Petra  
70-R-009

## EP-DT-FS Fluidic Systems



TROPEA Paola  
20-R-018

## EP-DT-DI Detector Interface



LEHMANN-MIOTTO Giovanna, 20-1-052  
Deputy PONS Xavier

## EP-DT-EF Engineering Facilities



DANIELSSON Hans, 166-R-008  
Deputy GIUDICI Pierre-Angé

## EP-DT-EO Engineering Office



CATINACCIO Andrea, 25-R-020  
Deputy BAULT Christophe

## EP-DT-CO Construction and Operations



ONNELA Antti, 166-R-004  
Deputy PEREZ Francisco

## Silicon Detectors



GYS Thierry  
16-1-047



MOLL Michael  
28-2-002



LA ROSA Alessandro  
28-2-012



MANOLESCU Florentina  
28-2-011



MARTINENGO Paolo  
30-1-024



MARTELLO Alessandro  
21-1-059



MC GIBL Mike  
28-2-014

COSTANZI Rudy (Staff from September)



PACIFICO Nicola  
70-R-008



BORNALDI Julian (Fall)



BRONZETTI Jonny (Doct)



CALLEGARI Riccardo (TRNE)



CARDELLA Roberto (Fall)



CENTIS Matteo (Fall)



DIAS Paolo (TRNE)



FRET Timothee (Doct)



GUMBSKARA Nina (Fall)



HAKTU Andrej (Fall)



NIETO MARTIN Cristina (Tech)



OTERO Stefan (Doct)



WIEBE Werner (Doct)



SICKING Eva  
51-1-023

## Gas Detectors



HOPLEWSKI Leszek  
70-R-003



OLIVERI Esposito  
15-R-009



BRUNBAUER Florian (Doct)



LUPRINGER Michael (Fall)



THURNER Patrick (Fall)

## Irradiation Facilities



RAVOTTI Federico  
14-R-012



BAKEL Maxim  
70-R-002



PEZZALLO Giuseppe  
14-R-012

GIOTTE Berline (Doct)  
GORINE Georg (Doct)

## Detector Cooling



PETAGNA Paolo  
20-1-048



DAGUIN Jerome  
20-1-013



GAKOLUM Dina  
21-1-029



NOEL Jerome  
20-1-012



VERLANT Bart  
20-1-030



ZWALUNSKI Lukasz  
21-1-013



BOURNI Gael (Fall)



BRANCHI Vireo (Coas)



CONDELLI Marco (Coas)



CUSANO Andrea (Coas)



DAVIDE Thiago (Doct)



HANAUER Doreen (Fall)



HELLESCHMIDT Desiree (Doct)



IRISQUEZ Neemie (TRNE)

Natalia NIOSI  
Kamil KOLCZ

Andreas KOEHLER  
Andreas KUENZIG

Patrick MAJOR  
Thomas MAJUSK

Thiago PIMENTEL  
Doreen RIEBER

David SCHWAB  
Radoslaw SZKARDA

## Gas Systems



GUIDA Roberto  
21-1-017



GAGNIER Patrick  
155-R-012



DAURIA Andrea  
22-1-003



DE MENEZES I Philippe  
21-1-027



KAPUSNIAK Kaija  
21-1-027



MANDELLI Beatrice  
21-1-017



MELEL Frederic  
21-1-011



ZHINI Mehdi  
21-1-011

Mara CORBETTA  
Giulio GIOIELLI (Tech)  
Lina SACCO (TRNE)  
Anna ZHURAVLJOVA (Tech)

## FSU PH-02

Support EP-DI  
Antoine KERRIL  
Marc CARRICHON  
Georges CAUPEY  
Bogdan DINISER

Support EP-DT-FS  
Jonathan DIMARCELLO  
Abdel LAASSIS  
Cedric LANTARD  
Haral MARINATI  
Samiel PASARIKAT

Support EP-ES-BE  
Robert CARRICO  
Vincent GATTO

Support Expositions  
Vincent DARRAS  
Thierry FAUGERE  
Gilles GAUTHIERON  
Gilles LACROIX  
Guillaume LACROIX  
Franck MORGADINHO  
Adrien PARONET

## FSU PH-04

Support SMP  
Adam DRIZD  
Krystof BUDJUN  
Thierry BUDJUN  
Guillaume DUPERT

Katja JUREGIC  
Brendine MARTENS  
Paul NGUYEN  
Elipe PEDRERO  
Borja PEREZ

Xavier THERY

## Thin Film & Glass Lab



SCHNEIDER Thomas  
9-R-020



VAN STENO Miranda  
3-R-009



DE OLIVEIRA Raf  
107-R-A18



FERRE Serge  
107-R-A14



GRS Alexandra  
107-R-A14



MERE Bertrand  
107-R-A14



PEZRUSSO Olivier  
107-R-A14



RANCIEN David  
107-R-A14



RODRIGUES Alexis  
107-R-A14



TEIXEIRA Antonio  
107-R-A14



WILLIAMS Simon  
107-R-A14

## Magnetic Measurements & Instrumentation



BERGAMA Felix  
20-1-054



GARNIER Franjois  
80-R-001



GONCALVES Antonio  
304-R-012



GARGUILLON Simon  
25-R-014



HATCH Mark  
3862-2-015



GIUDICI Pierre-Angé  
304-R-008



BOICE Adam  
304-1-012



BRINDLEN Norman  
108-R-001



CANTIN Bernard  
162-5-057



KERESKES Zoltan  
108-R-008

Robb BONNARD (Fall)  
Jonathan FRANCO (Fall)

## Design Room



BAULT Christophe  
25-R-028



DEGRANGE Jordan  
25-R-028



JAMEY Olivier  
3862-2-015



LENOX Philippe  
25-R-028



PEREZ Alexandre  
25-R-028

## Design and Analysis



ALVAREZ Diego  
25-R-028



SAITO Insoo  
25-R-028



GARGUILLON Camilo  
25-R-014



HATCH Mark  
3862-2-015



GARIBOLDI David  
25-R-014



HATCH Mark  
3862-2-015



BOYER Franjois (Fall)

## Composite Lab

Massimo ANGELETTI (Doct)  
Luca DIANGELO (Fall)  
Gala Galica (Fall)  
Galica Michael (Coas)

## Unit1



PEREZ GOMEZ Francisco  
70-R-001



BENDOTTI Jerome  
166-R-026



DIXON Neil  
70-R-005



DUMPHY Robert  
21-1-003



KOTTELAT Luc  
166-R-020



KRSTIC Robert  
20-1-008



LOOS Robert  
16-1-001



PIETROSKI Oskar  
16-1-057



COHEN Kamel (Fall)



PIIRONEN Jaakko (Fall)



PEPER Francois (Fall)



SMITHPOULOUS Stefano (Tech)



STEINER Thomas (TRNE)



WEEBER Robert (Fall)



COHEN Kamel (Fall)



MANNINEN Hanna (Fall)



PEPPER Joacha (Fall)



SERRA Tommaso (TRNE)



WEBER Stefan (Fall)



ANSTETT Robert  
2255-R-002



BOUYER Philippe  
2285-R-001



LIZERMANS Pieter  
581-R-023



LAHU Gregory  
70-R-006



LESENEHAL Yannick  
162-5-008



VAN BELEN Jacob  
581-R-023

Version July 2018



EP-DT  
Detector Technologies

# Changes since last year

- **TP-section: 7 staff (stable)**
  - Christian Joram moved to the EP-DI group, becoming DDH
  - A new LD position has been opened for an Applied Physicist for Light Based Detectors
- **DD-Section: 12 staff (stable)**
  - Alan Honma retired in July 2018
  - The position has been filled again: Alessandro La Rosa will start in September
  - The position of R. Fortin has been filled again: Ruddy Constanzi will start in Sept.
- **FS-section: 15 staff (+2 compared to 2017)**
  - Konstantina Giakoumi has been hired to strengthen the Detector Cooling team
  - Beatrice Mandelli has been hired to strengthen the Gas System team
- **DI-section: 7 staff (stable)**
  - Xavier Pons has been nominated Deputy Section Leader
- **EF-section: 20 staff (-1 compared to 2017)**
  - Claude David retired in March 2018 and has not been replaced (yet)
- **EO-section: 10 staff (+1 new from autumn)**
  - Christophe Bault has been nominated Deputy Section Leader
  - A position for an Engineer on Composite Materials has been opened
- **CO-section: 15 staff (-1 compared to last year)**
  - Maurice Vergain retired in March. The position has not been filled again (yet)

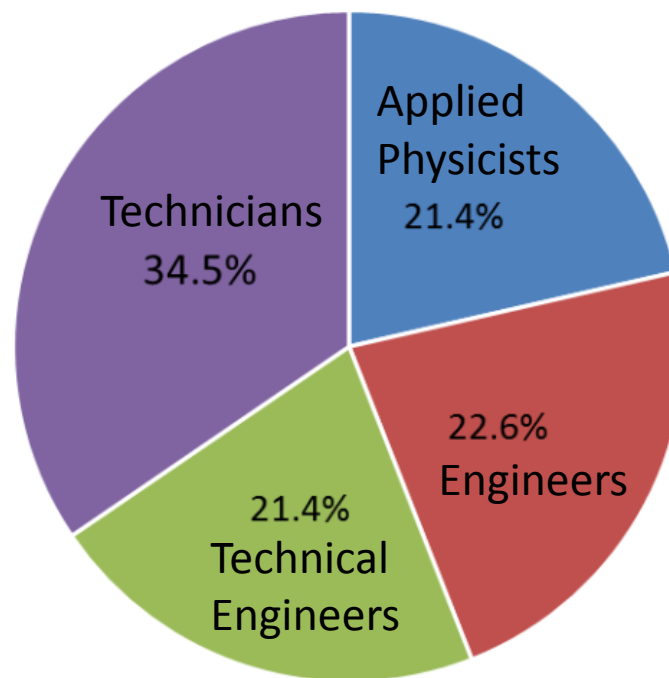


➤ **Total 86 Staff (stable)**

# Changes in the Group Composition

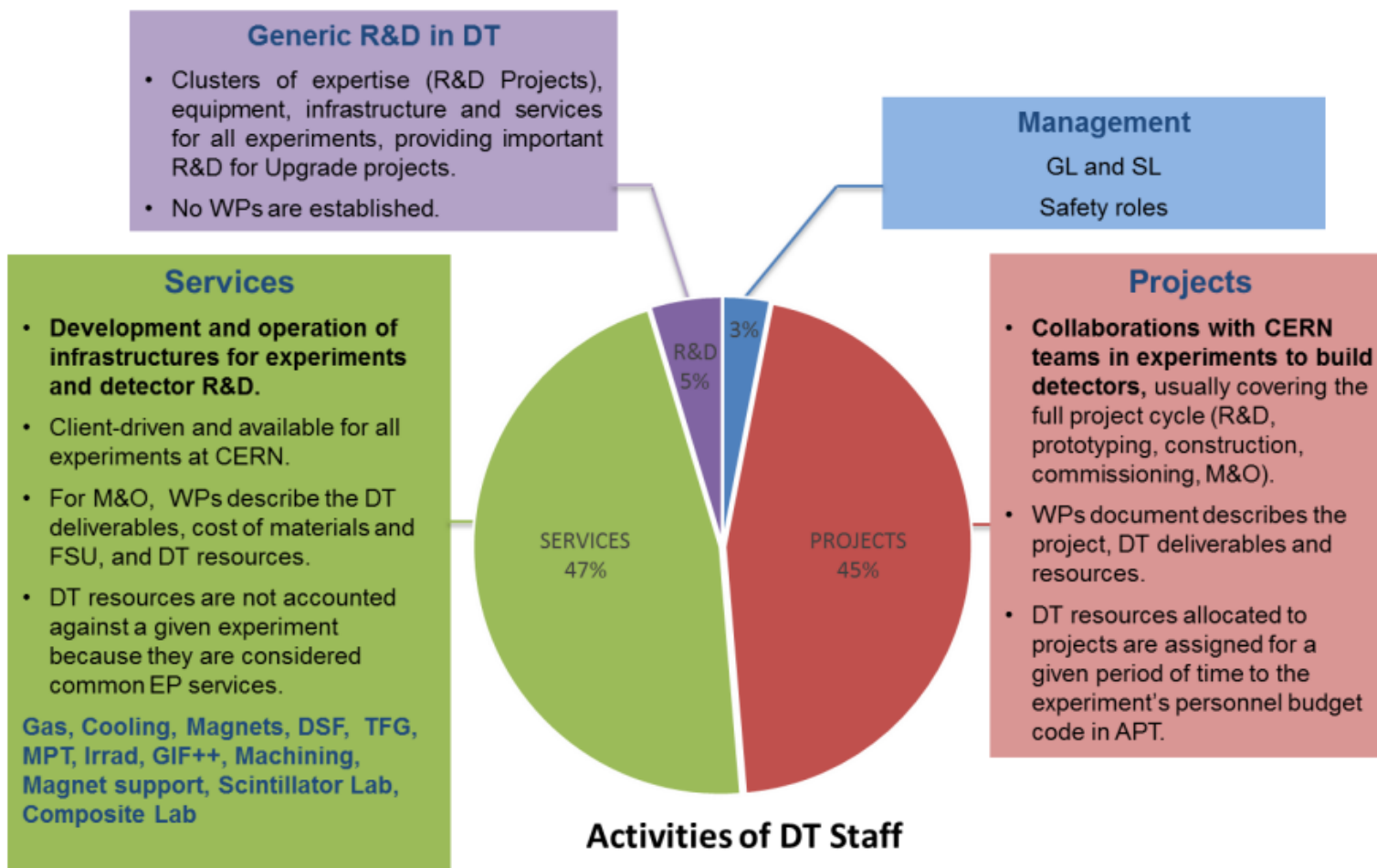
Personnel	FTE 2018	(2017)
Staff	86	(86)
Fellows / TTE	24	(19)
PJAS/COAS	6	(3)
Doct Students	14	(9)
Tech Students	6	(6)
Trainees / FTEC	12	(13)
FSU	31	(29)
Active Honorary M	2	(2)
<b>Total</b>	<b>181</b>	<b>(167)</b>

Professional Categories (staff only)

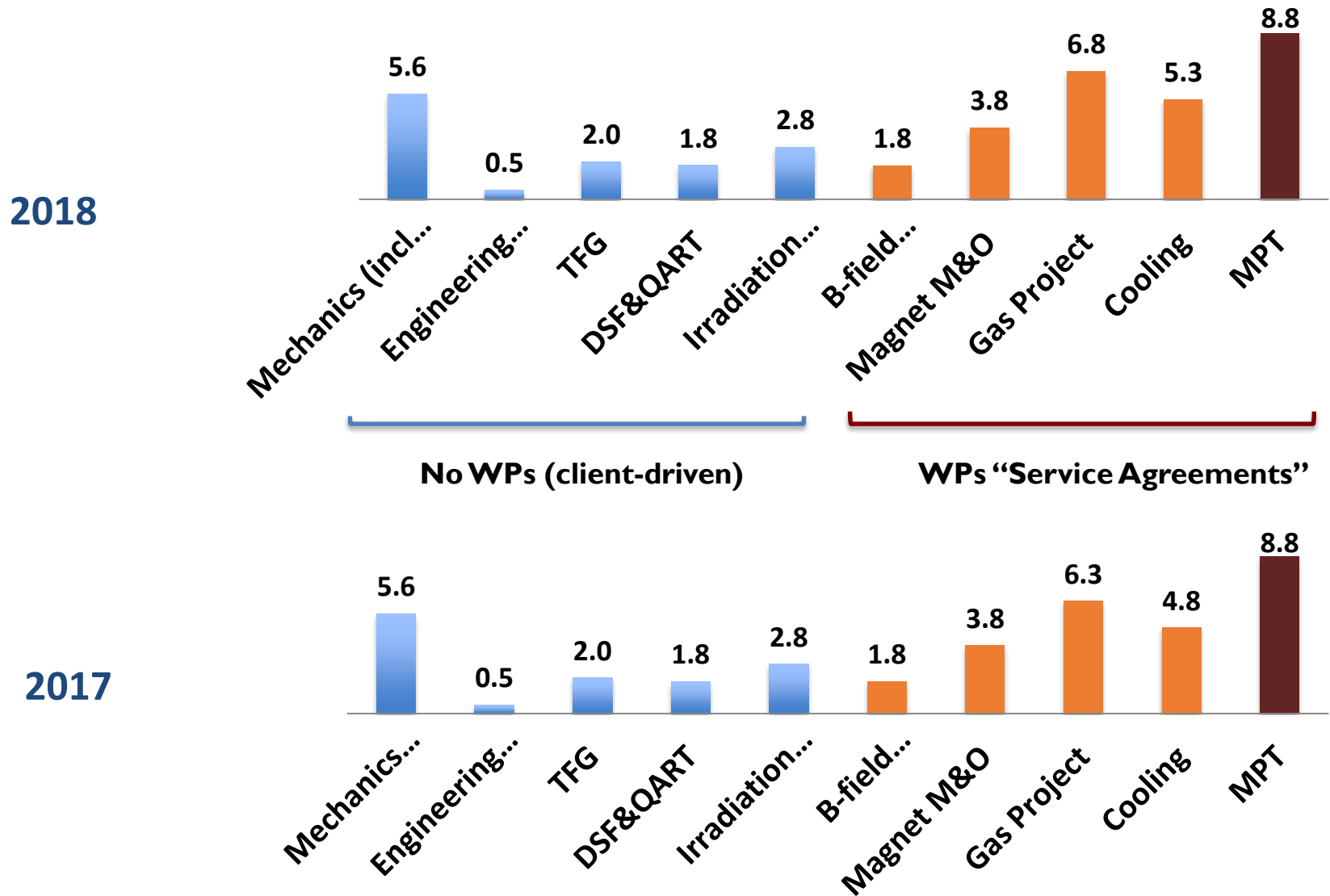


- While the number of Staff positions is still stable, a shift has taken place towards hiring less Technicians and more Engineers/Applied Physicists.
- We try to compensate this for time being through hiring TTEs. We plan/hope to open in the near future again LD positions for Technicians.

# Resources Allocation



# DT Staff involvement in Services

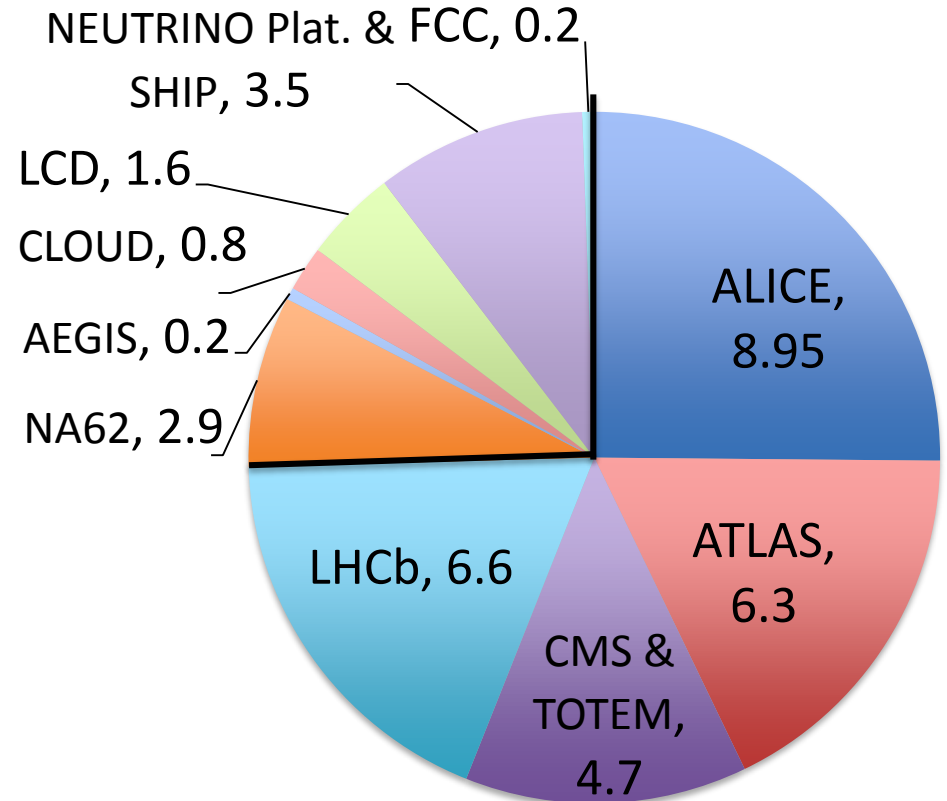
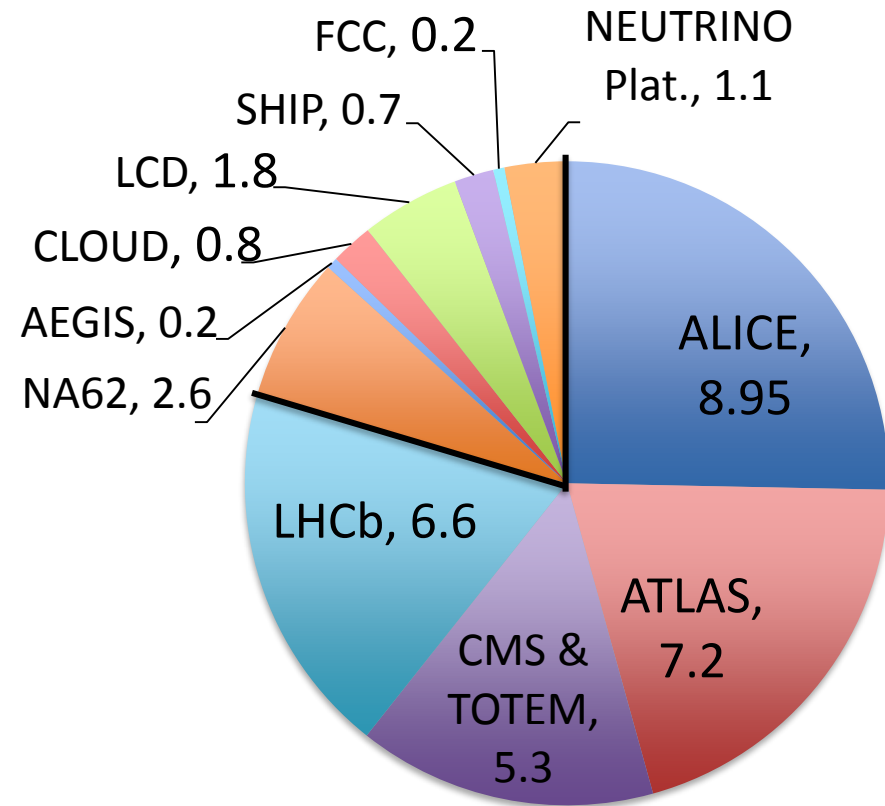




# Staff involvement in Projects

2018

2017

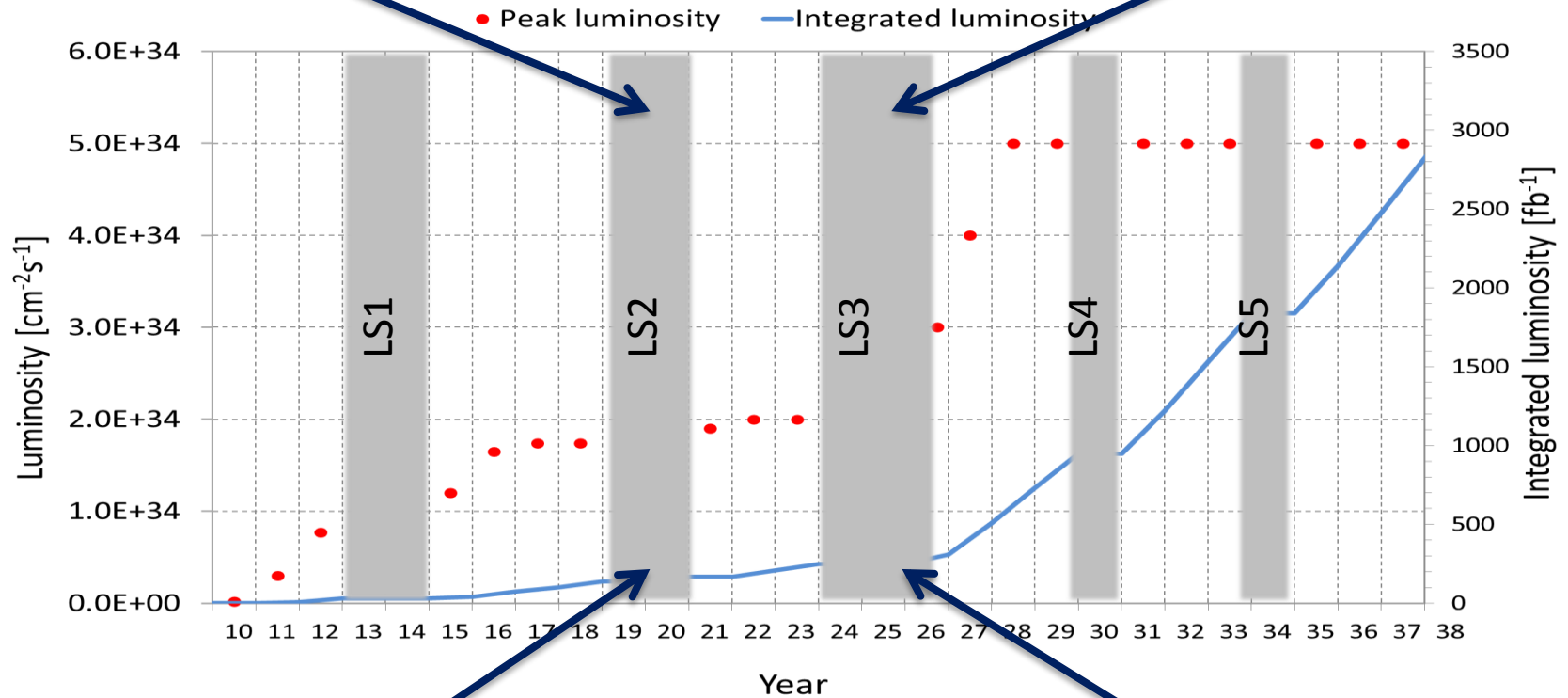


**Our involvement in projects related to the upgrade of the LHC experiments increased from 75% to more than 80%**

# Long Term LHC Schedule

- LHC Injector Upgrade

HL-LHC, pp luminosity increase to  $5 \times 10^{34}$  (levelled)

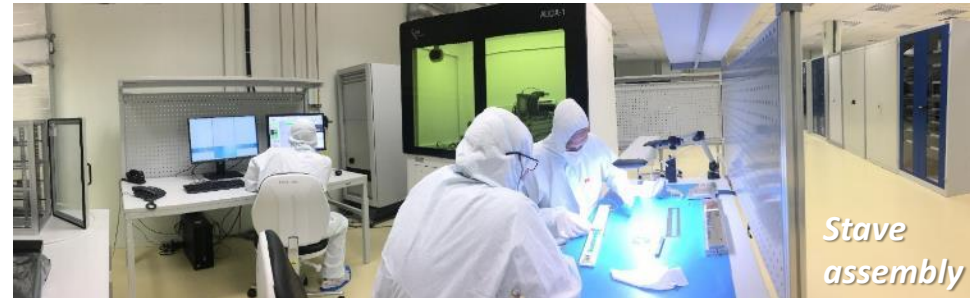
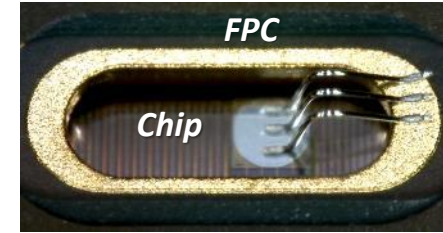
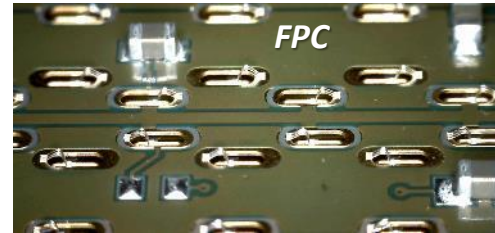
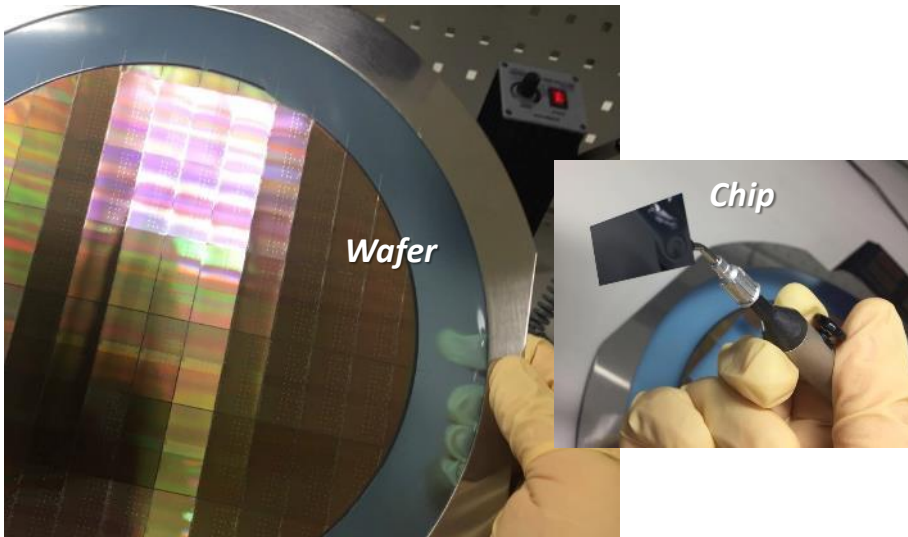


ALICE & LHCb major upgrades  
ATLAS & CMS Phase I upgrades

ATLAS & CMS Phase II upgrades

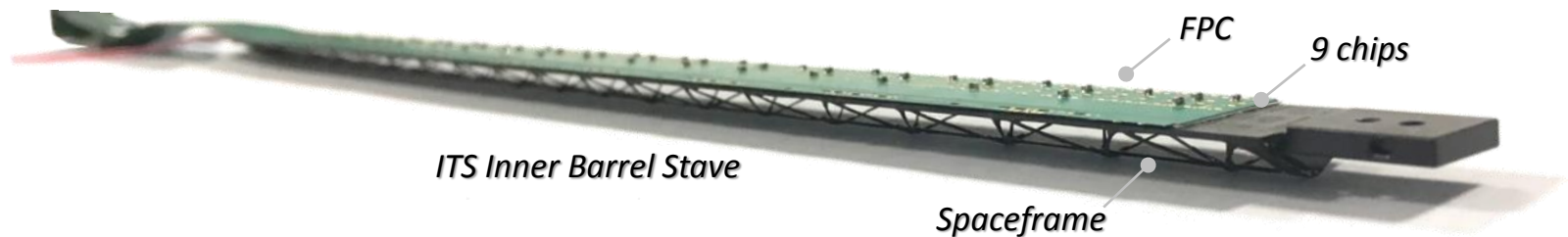
# ALICE ITS upgrade

- ITS Stave: Chips, Flex Printed Circuit and Stave production is in full swing
- DT contribution is carried out according to Work Package **EDMS 1735468**



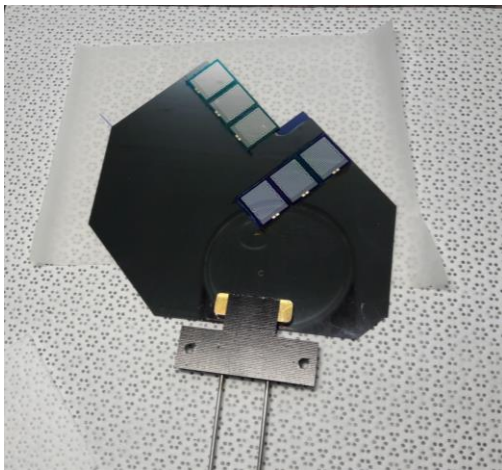
- **DT** coordination of ALPIDE chip production, irradiation and test beam activity

- Aluminum Flex Printed Circuit (FPC) Production,
- Development Stave assembly procedure

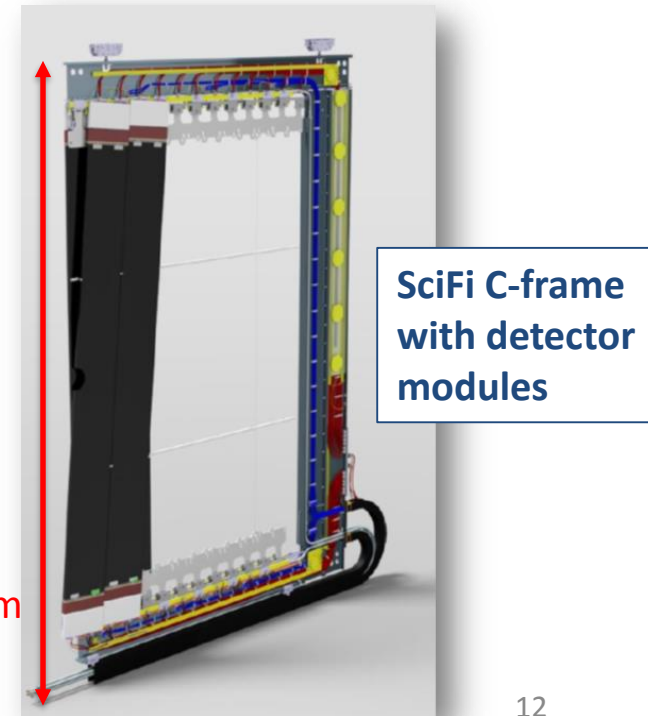
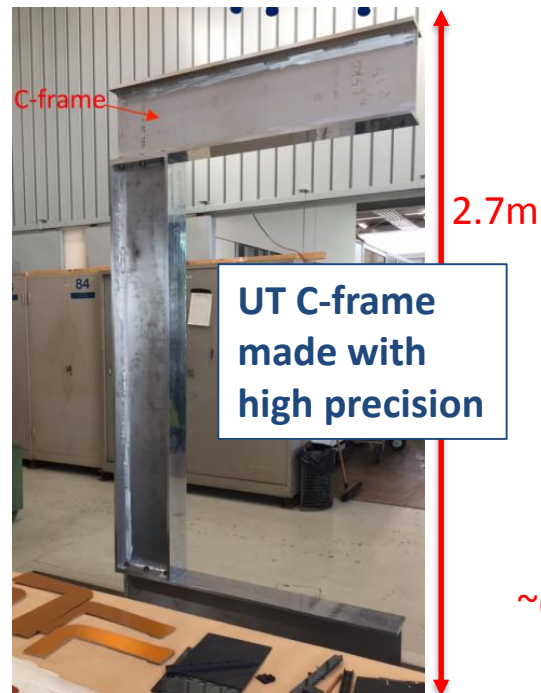


# LHCb upgrade

- EP-DT contributes to several sub-detectors:
  - VELO, UT, SciFi, RICH and Muon systems
  - Work proceeds in close collaboration with the LHCb team (Technical Coordination, LHCb Detector group)
  - In order to fulfil our commitment as defined in the Work Package **EDMS 1735466**, adjustments were needed (a Fellow has been added, now a new staff position has been opened, etc.)

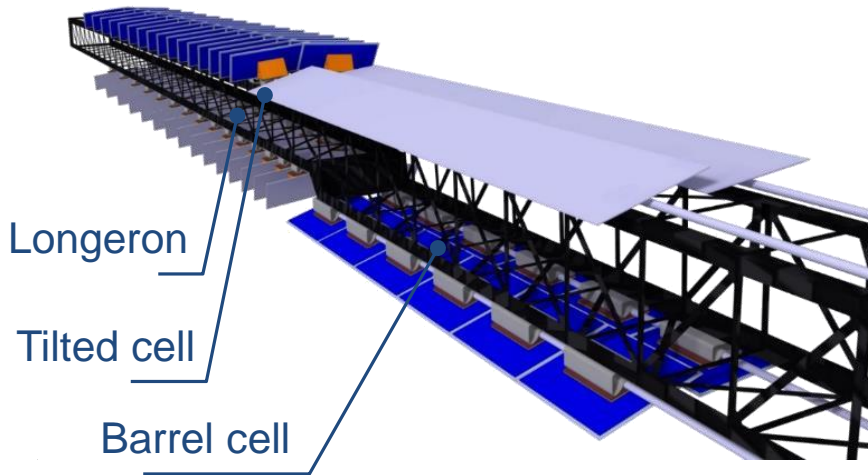


**VELO microchannel substrate  
with VELOpix chips**



# Contribution to the ATLAS upgrade

- Our contribution to the ATLAS ITk upgrade is taking shape
  - Fruitful discussions took place with the ATLAS CERN team, in which our contribution to the ITk has been clarified
  - The outcome has also been communicated to the Department management
  - Note that additional contributions are foreseen through Fellows, TTE, etc.



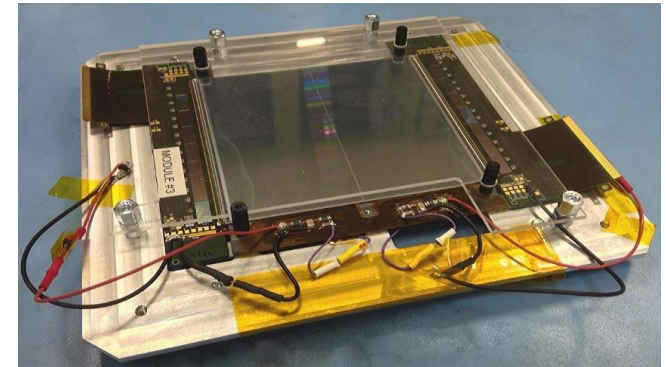
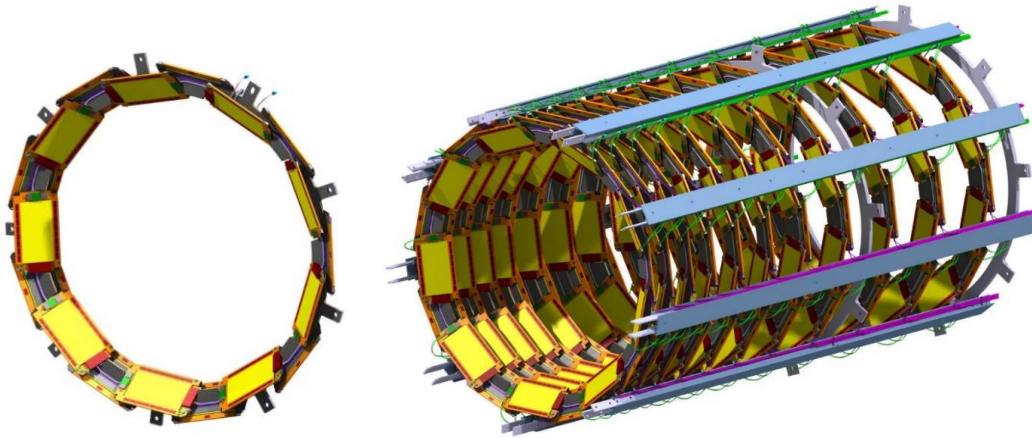
DT staff contr.	Until 2021	After 2021
Appl. Physicist	0.8	0.8
Engineers	2.0	2.8
Technicians	4.2	4.6
<b>Total</b>	<b>7.0</b>	<b>8.2</b>

**The existing Work Package  
EDMS 1735463  
will be updated soon.**

- We are also still helping out / providing advice to the construction of the Micromegas for the New Small Wheel, for which installation is planned in LS2 ...

# Contribution to the CMS upgrade

- Our contribution to the CMS upgrade is also being clarified
  - The CMS CERN team management had recently a retreat, to which also a DT person was invited, in which our contribution to CMS and its upgrade has been discussed
  - Our contribution is focussed on the Tracker Upgrade (mechanics and module QA) and the cooling systems for the Tracker and HGCAL

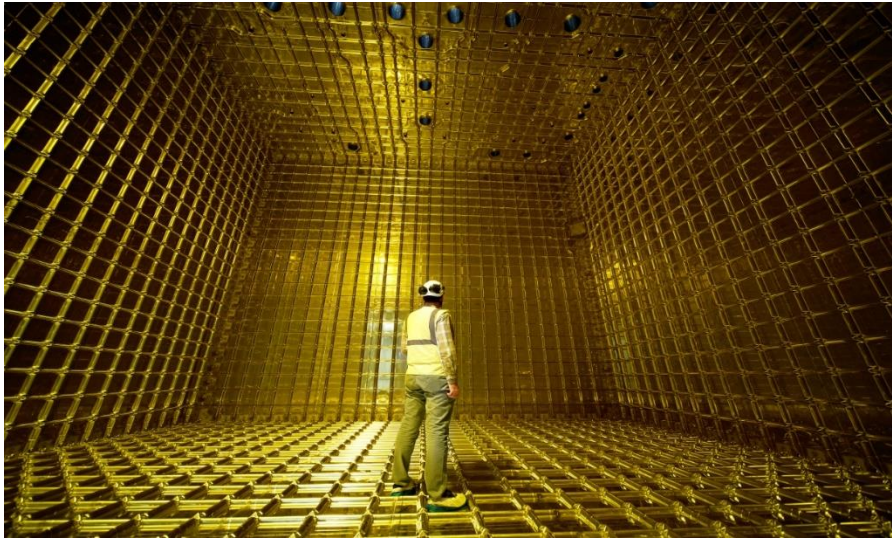


**The existing Work Package  
EDMS 1735465  
will be updated soon.**

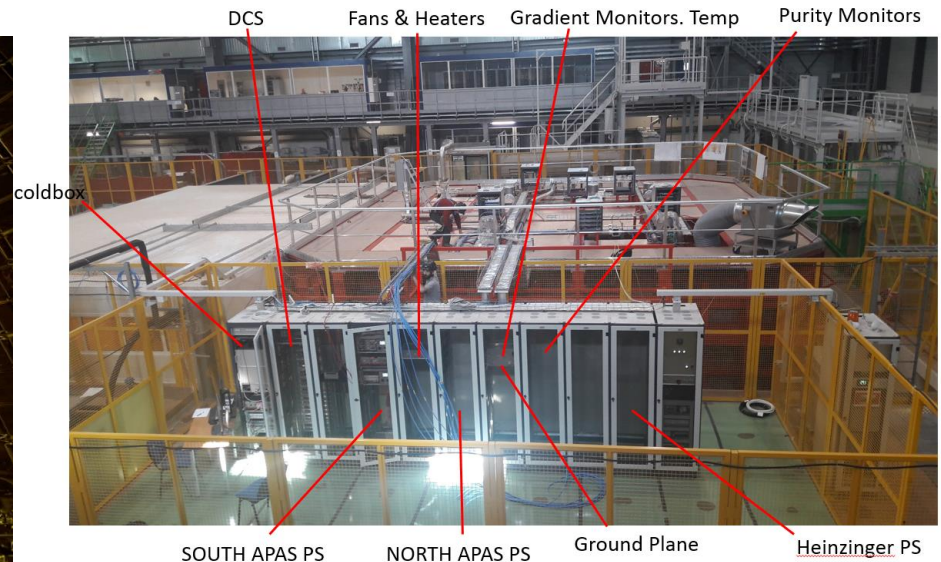
DT staff contr.	Until LS3
Appl. Physicist	1.0
Engineers	2.1
Technicians	2.2
<b>Total</b>	<b>5.3</b>

# Non-LHC Projects

- DT contributions proceed according the agreed Work Packages for NA62, CLOUD, LCD and the Neutrino Platform.
- Much effort is going into the preparation of the DAQ, Control and Safety Systems for the cryostats NP04 (and NP02), in order to be ready for data taking this autumn.



ProtoDUNE Single Phase cryostat, inside view



ProtoDUNE Single Phase DCS Zone<sup>15</sup>

- New Work Packages have been prepared for SHiP (EDMS 1967878) and COMPASS (EDMS 1843654) to define our (minor) contributions

# R&D within DT

## Silicon Detectors

- Rad-hard Sensor Development  
→ RD50
- Pixel R&D
- Bonding and Quality Assurance
  
- $\mu$ -channel cooling ( $\mu$ -fabrication)
- CO<sub>2</sub> cooling
  
- IRRAD and radiation monitoring

## Gas Detectors

- Gaseous Detector Development  
→ RD 51
- Micro Pattern Technology workshop
- Thin Film Lab (coatings)
  
- Gas System Development
- Environmental friendly Gas Mixtures
  
- GIF++

- **Engineering Office and Composite Lab**
- **Detector Interface section**



# R&D on Experimental Technologies

- Initiative by the EP department, which started in autumn 2017
- 8 Working Groups have been set up, focussed on different areas of R&D:

## Working Groups

Silicon detectors

Gas detectors

Calorimetry and light based detectors

Detector Integration

IC technologies

High Speed Links

Software

Detector Magnets

## DT contributes to several of the WGs:

→ Major contribution, DT convener

→ Major contribution, DT convener

→ Major contribution, DT conveners

→ Minor contribution

→ Minor contribution

# Concluding remarks

- The resources of the group are well shared between projects and services.
- We are committed to support the CERN experiments with the resources available, in particular the LHC detector upgrades.
- It is important to maintain the expertise and facilities of EP-DT and the various services.
- The CERN program for R&D on Experimental Technologies beyond 2020 is being defined this year.
- The EP-DT group plays an important role in this process.
- We will have contributions about our plans to some of the Working Groups after the Coffee break.