

EP-DT Group Meeting

Welcome/Bienvenue!

June 12, 2019

Burkhard Schmidt

DT Group Meeting

Wednesday 12 Jun 2019, 14:00 → 20:30 Europe/Zurich

222/R-001 (CERN)

Burkhard Schmidt (CERN)

- | | | | | |
|--------------|---------|--|-------|---|
| 14:00 | → 14:20 | Welcome and Group Information
Speaker: Burkhard Schmidt (CERN) | 🕒 20m | ✎ |
| 14:25 | → 14:35 | Upgrade of the ALICE experiment
Speaker: Massimo Angeletti (EPFL - Ecole Polytechnique Federale Lausanne (CH)) | 🕒 10m | ✎ |
| 14:40 | → 14:50 | ATLAS detector upgrades
Speaker: Diego Alvarez Feito (CERN) | 🕒 10m | ✎ |
| 14:55 | → 15:05 | CMS detector upgrades
Speaker: Tym Pakulski (CERN) | 🕒 10m | ✎ |
| 15:15 | → 15:25 | Upgrade of the LHCb experiment
Speaker: Sune Jakobsen (CERN) | 🕒 10m | ✎ |
| 15:30 | → 16:00 | Coffee break | 🕒 30m | |
| 16:00 | → 16:30 | Illuminating the Dark Sector of Universe
Speaker: Augusto Ceccucci (CERN) | 🕒 30m | ✎ |
| 16:30 | → 16:40 | R&D on environmental friendly gas mixtures and systems
Speaker: Beatrice Mandelli (CERN) | 🕒 10m | ✎ |
| 16:45 | → 16:55 | R&D and challenges for CO2 cooling systems
Speaker: Viren Bhanot (University of Manchester (GB)) | 🕒 10m | ✎ |
| 17:00 | → 17:10 | Final remarks and discussion | 🕒 10m | ✎ |

➤ The meeting will be followed by the BBQ at the Prévessin side

Outline of the Introduction

- **Overview of the EP-DT group composition**
 - Changes in the group since the group meeting of July 2018
 - Comments on the general situation
- **The main activities of the group**
 - An update on the upgrades of the LHC experiments will be given by the subsequent speakers
 - Details can be found in the EP-DT Annual Report
Link: <https://cds.cern.ch/record/2677325/>
- **Brief news about the Update of the European Strategy for Particle Physics**
- **CERN Open Days: September 14 and 15**
 - Our plans for the CERN Open Days



Detector Technologies Group

GROUP LEADER: SCHMIDT Burkhard
166-R-014



DEPUTY: CATINACIO 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
20-1-018

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-Ange

EP-DT-EO Engineering Office



CATINACIO Andrea, 25-R-020
Deputy BAULT Christophe

EP-DT-CO Construction and Operations



ONNELA Antti, 166-R-004
Deputy PEREZ Francisco



GYS Thierry
16-1-047



JACOBSEN Sune
21-1-037



MARTINENGO Paolo
30-1-024



RICARDO Nicola
70-R-008



SKICING Eva
51-1-023



WERTHAUS Peter
25-R-018

BRODSKI Michael (Fell)

Silicon Detectors



MOLL Michael
28-2-002



COSTANTI Rudolf
28-2-014



LA ROSA Alessandro
28-2-012



MANDULESCU Florentina
28-2-014



MAPELLI Alessandro
21-1-009



MACILLI Ivo
28-2-014

CALLEGARI Riccardo (Fell)
CARASCO Albano (TRNE)
CARRALLA Michael (TRNE)
CARRELLA Roberto (Fell)
CANTO Matteo (Fell)
FBI Timothee (Doct)
GURMESKIAN Yana (Fell)
HAKOBIAN Marika (Tech)
HEYMAN Gregory (TRNE)
JATTU Inder (Fell)
LIDSEN Soren (TRNE)
WERN Moritz (Doct)

Gas Detectors



ROPELEWSKI Leszek
70-R-003



OLIVERI Eradio
15-R-009

BRUNBAUER Florian (Fell)

Irradiation Facilities



RAVOTTI Rubenico
14-R-012



JAKEL Martin
70-R-002



PEZZULLO Giuseppe
14-R-012

GROISE Blerna (COAS)
LROSEN Jon (TRNE)

Detector Cooling



PETAGNA Paolo
20-1-048



DAGUIN Jerome
20-1-012



GIAMOUIM Dina
21-1-023



NOEL Jerome
20-1-012



VERJAK Bart
20-1-030



ZWALINSKI Lukasz
21-1-013

BERRUTI Gino (COAS)
BIGNOT Viren (COAS)
CAGLIARI Marco (TRNE)
COSTALES Marco (COAS)
CUSANO Andrea (COAS)
DAGDINE Eric (Fell)
GALUSKA Szymon (COAS)
HULEK Wojciech (Tech)
KOSM Novak (Fell)

LOPEZ MACIA Andro (PAS)
PAGULSKI Tymon (Fell)
PEONIS Marwin (TRNE)
PIMENTE Tiago (Doct)
PUENTE RICO Ricardo (PAS)
SCHERINO Lorenzo (Doct)
SCHMID David (Doct)
URBANAK Klobula (TRNE)

Gas Systems



GUIDA Roberto
21-1-017



CARRI Patrick
15-R-012



DAURIA Andrea
21-1-063



DE MENEZES L-Philippe
21-1-027



KAPUSNAK Keiger
21-1-027



MANDELLI Beatrice
21-1-017



MERLET Frederic
21-1-011



ZIMNY Michal
21-1-011

ALVISON Laura (TRNE)
CORRETTA Mara (Doct)
GRACIARI Luca (Fell)
RISOLETTI Gianluca (Doct)
ZHURAVLOVA Anna (Tech)

FSU PH-02

Support EP-DI-DI
KERNEL Antoine
GARRICHON Alexis
CREPET Gerard
DINGER Bayram

Support EP-DT-FS
EUNGLAND Jonathan
LASSON Andrei
LANDRAUD Cedric
MARENGO Hervé
MORIGADINHAK Frank (SON)

Support EP-ESE-RE
CANIS Robert
GATTO Vincent

Support Expositions
GARDON Vincent
FAUGERE Yann
GAUTHIERON Gilles
LAFROUX Guillaume

Support Neutrino
Allouf Hani
LACARRELE Benoit
MORIGADINHAK Frank (SON)
PARCLET Adrien

FSU PH-02

Support ALICE
RAMBAULT Samuel

Support COMPASS
COT Cyril

FSU PH-40

Support APT
OROZCO Adam
BAGAN Krzysztof
BUDJON Evgen
BUDJON Thierry
BUTON Guillaume
DUBERT Pascal

Support Expositions
JAUREGUI Karim
MARTINS Benjamin
NIGIEN Paul
PENAUD Etienne
FENEDO Serge
THERY Xavier

Thin Film & Glass Lab



SCHNEIDER Thomas
9-R-020



VAN STENS Miranda
18-R-009



DE OLIVEIRA Rui
107-R-A18



FERRY Serge
107-R-A14



GRII Alessandro
107-R-A14



MEHL Bertrand
107-R-A14



PIZZRUSSO Olivier
107-R-A14



RANCHIN David
107-R-A14



RODRIGUES Alexis
107-R-A14



TEJERA Antonio
107-R-A14



WILLIAMS Simon
107-R-A14

Magnetic Measurements & Instrumentation



BERGAMA Felix
20-1-054



GARNIER François
108-R-001



GONCALVES Antonio
304-1-012

Machine Shops



GIUDICI Pierre-Ange
304-1-018



KERKES Zoltan
108-R-008

BONNARD Raouf (Fell)

Micro-Pattern Technologies



DE OLIVEIRA Rui
107-R-A18



FERRY Serge
107-R-A14



GRII Alessandro
107-R-A14



MEHL Bertrand
107-R-A14



PIZZRUSSO Olivier
107-R-A14



RANCHIN David
107-R-A14



RODRIGUES Alexis
107-R-A14



TEJERA Antonio
107-R-A14



WILLIAMS Simon
107-R-A14

Design Room



BAULT Christophe
25-R-028



DESGRANGE Jordan
25-R-028



JAMET Olivier
3862-1-015



LENOR Philippe
25-R-028



PEREZ Alexandre
25-R-028

Design and Analysis



ALVAREZ Diego
25-R-028



BATISTA Joao
25-R-028



GARGIULO Corrado
25-R-014



HATCN Mark
3862-2-015

Composite Lab



BOYER François
25-R-004

ANGELETTI Massimo (Doct)
ESALA Imbiko (Fell)
HAYRE Philippe (TRNE)
MOMAMADI Damoon (TRNE)
SCHMID Manuel (TRNE)
SUIWA Krystof (PAS)

Unit1



PEREZ GOMEZ Francisco
70-R-001



BENDOTTI Jerome
166-R-026



DIXON Neil
70-R-005



DAMP Raphael
21-1-003



KOTILAIN Luc
166-R-020



KOSTIC Robert
20-1-008



LOOS Robert
16-1-051



PIEDROSSI Didier
16-1-057

Unit2



COHEN Kamel (Fell)



FERRI LIZZO Simona (TRNE)



FLENNIG Axel (TRNE)

MANNINGEN Marika (Fell)

MANNINGEN Marika (Fell)

MANNINGEN Marika (Fell)

MANNINGEN Marika (Fell)

MANNINGEN Marika (Fell)

MANNINGEN Marika (Fell)

PIAZZA Quentin (Fell)

PIAZZA Quentin (Fell)

PIAZZA Quentin (Fell)

REALS Guillermo (Tech)

REALS Guillermo (Tech)

REALS Guillermo (Tech)

WEBER Stefan (Fell)

WEBER Stefan (Fell)

WEBER Stefan (Fell)



ANSTETT Didier
235-R-002



BOUYER Philippe
238-R-001



LIZERMANS Pieter
581-R-023



LAMU Gregory
70-R-006



LESNECHEL Yannick
162-5-008



VAN BELEN Jacob
581-R-023

Changes since last year

- **TP-section: 7 staff**
 - Sune Jakobsen joined in November 2018 (replacement Ch. Joram)
- **DD-Section: 12 staff**
 - Alessandro La Rosa and Ruddy Constanzi joined in September 2018
- **FS-section: 15 staff**
 - No changes
- **DI-section: 9 staff (+2 compared to 2018)**
 - Patricia Mendez joined in December 2018
 - Enrico Gamberini and Roland Sipos joined in April 2019
 - Sylvain Ravat works now for BE (temporary detachment)
- **EF-section: 17 staff (-3 compared to 2018)**
 - Bernard Cantin retired in August 2018
 - Alan Bode retired and Romain Brendlen finished his contract (February 2019)
- **EO-section: 11 staff (+1 compared to 2018)**
 - Francois Boyer joined in October 2018
- **CO- section: 15 staff**
 - No changes



➤ **Total 86 Staff (as in 2018)**

Changes in the Group Composition

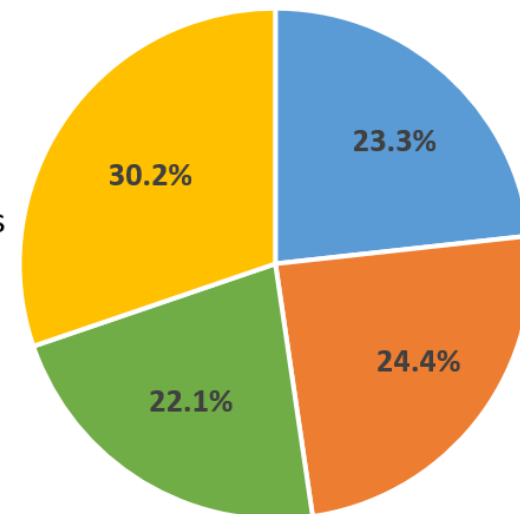
Personnel	FTE 2019	(2018)
Staff	86	(86)
Fellows / TTE	18	(24)
PJAS/COAS	8	(6)
Doct Students	9	(14)
Tech Students	6	(6)
Trainees / FTEC	14	(12)
FSU	32	(31)
Active Honorary M	2	(2)
Total	175	(181)

- While the number of Staff positions is still stable, a shift has taken place towards hiring less Technicians and more Engineers.
- This is mainly do to address urgent needs, but we have to compensate for this in the future.

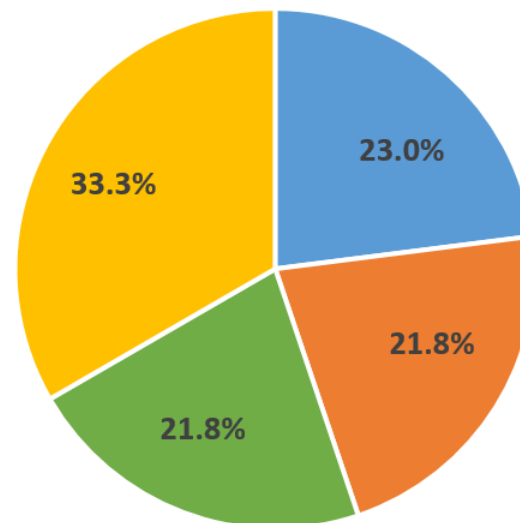
Professional Categories (staff only)

- Applied Physicists
- Engineers
- Technical Engineers
- Technicians

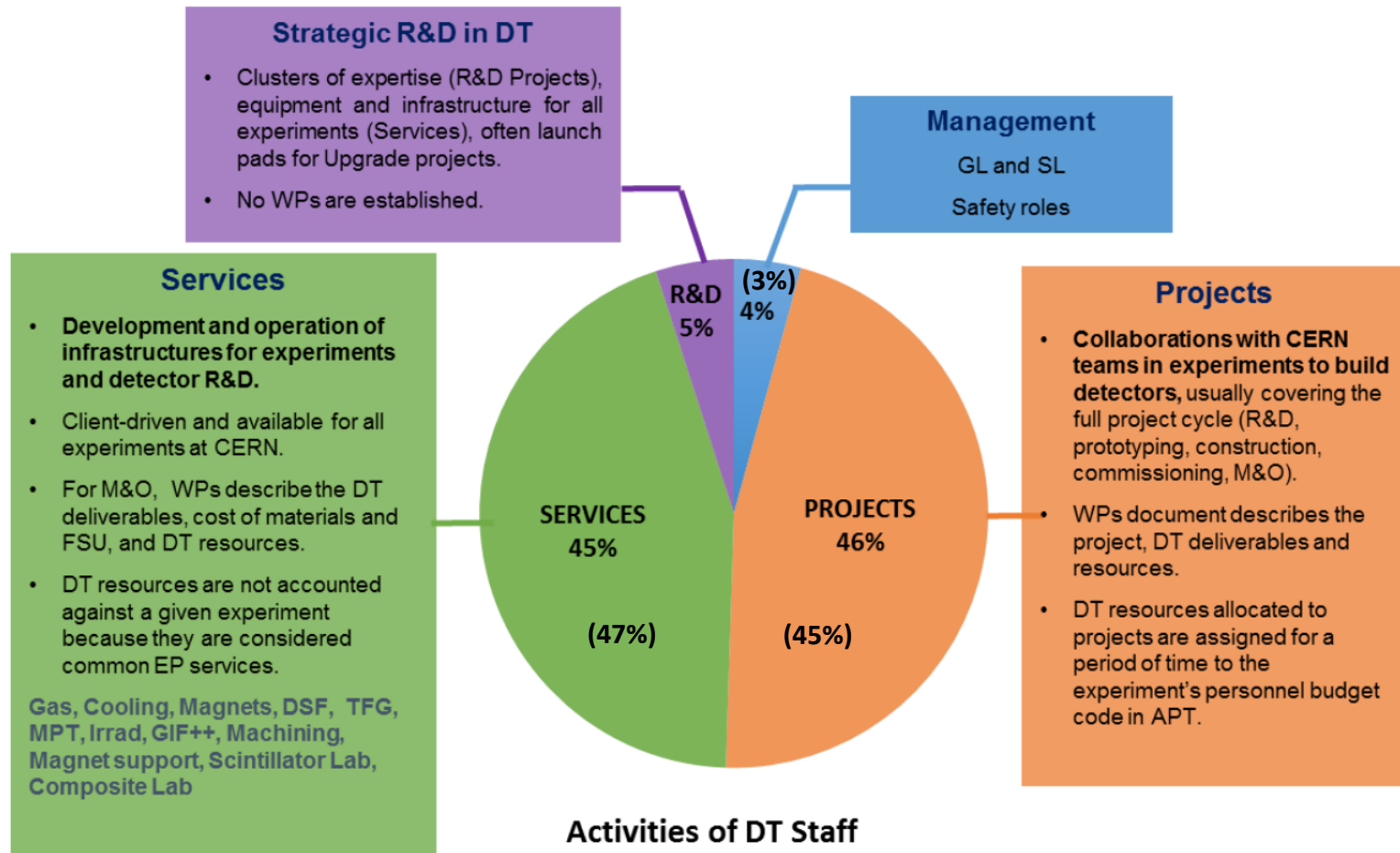
2019



2018



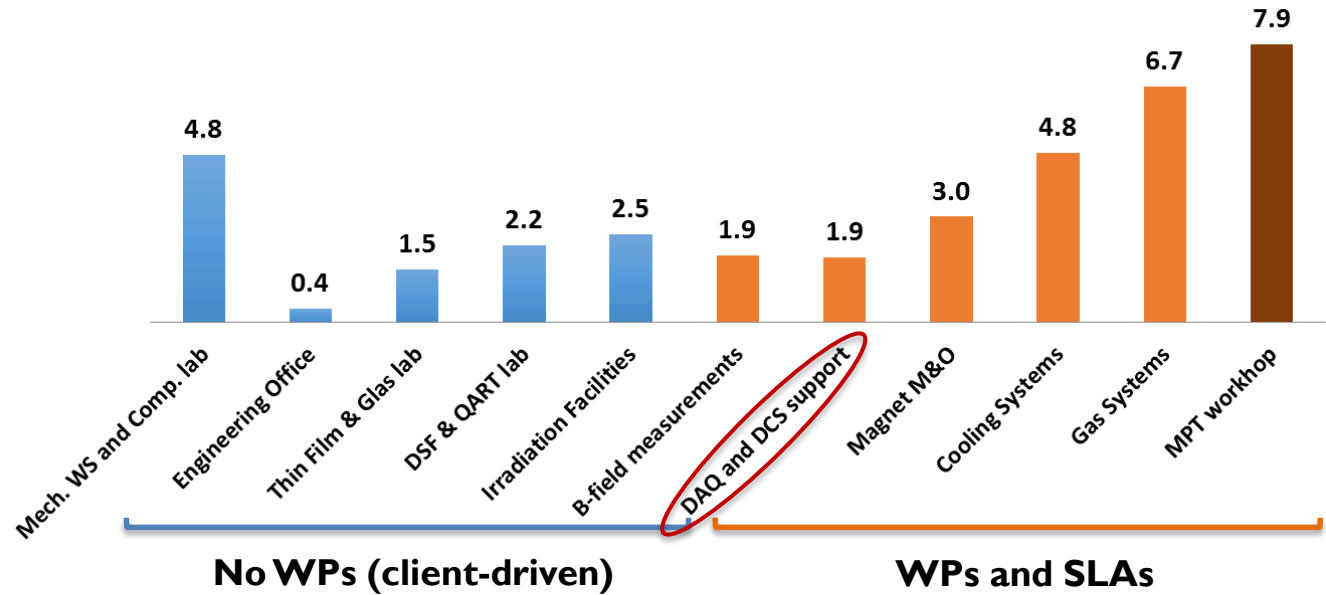
Resources Allocation



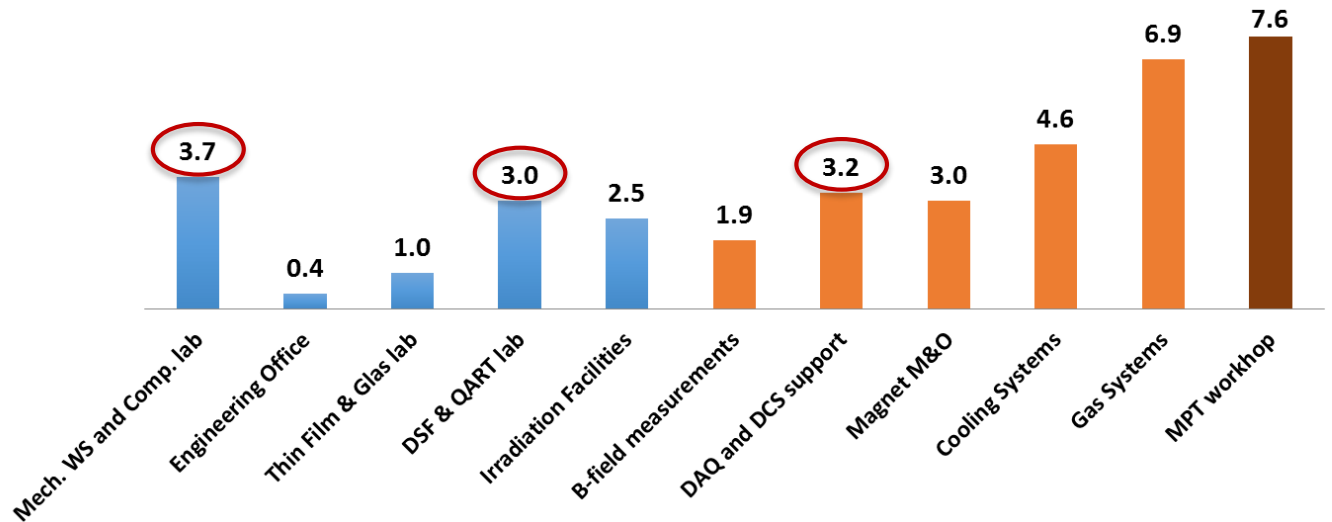
➤ Only minor changes between 2019 and (2018)

DT Staff involvement in Services

2018



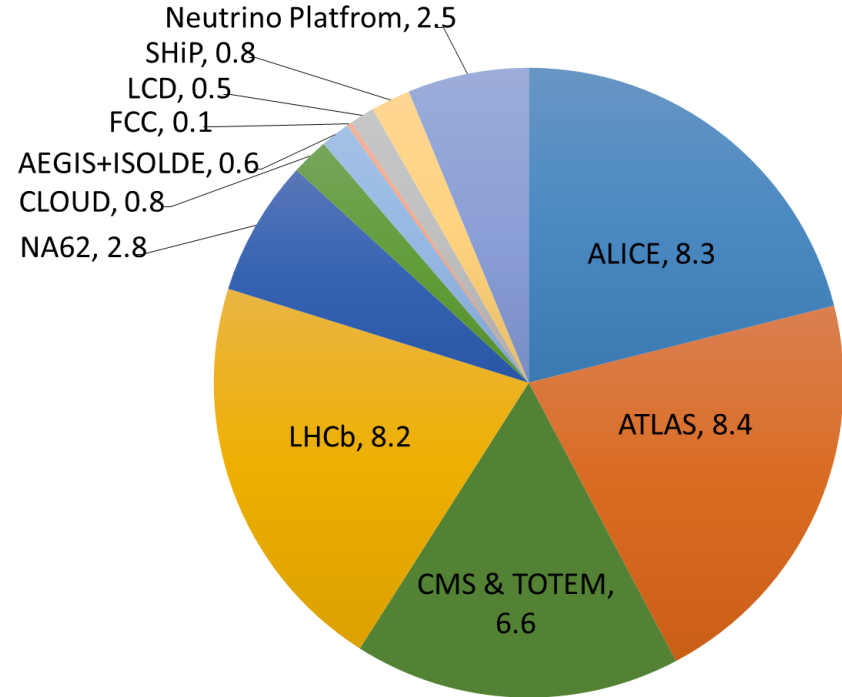
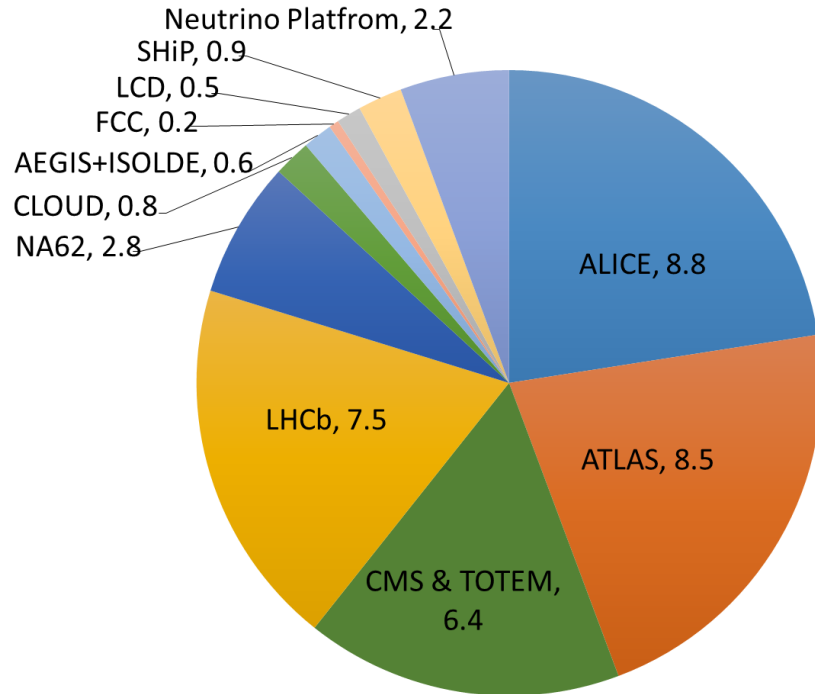
2019



DT Involvement in Projects

2018

2019



2018 FTE (Staff) in PROJECTS

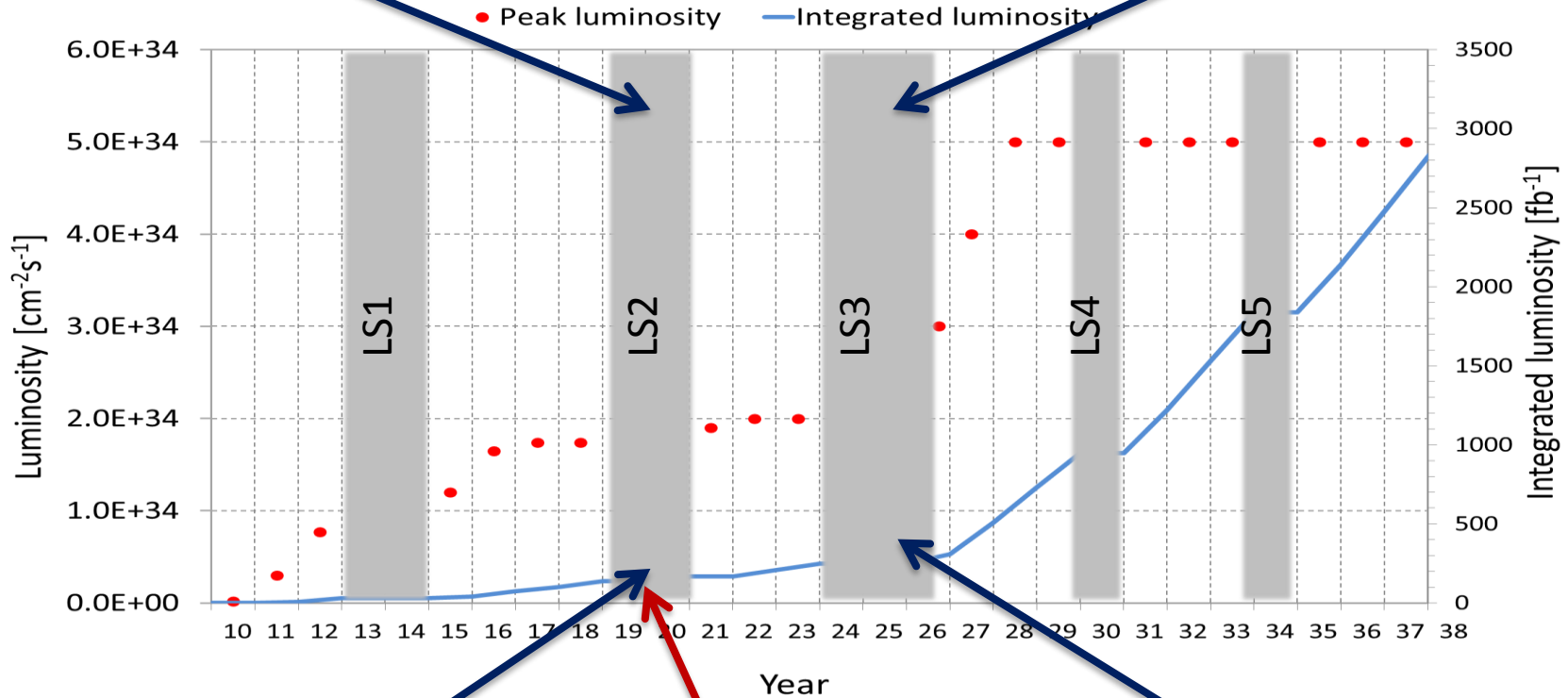
2019 FTE (Staff) in PROJECTS

- Our involvement in projects related to the upgrade of the LHC experiments increased to more than 80%.
- The remaining 20% are shared equally between other experiments and project studies.

Long Term LHC Schedule

- LHC Injector Upgrade

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



ALICE & LHCb major upgrades
ATLAS & CMS Phase I upgrades

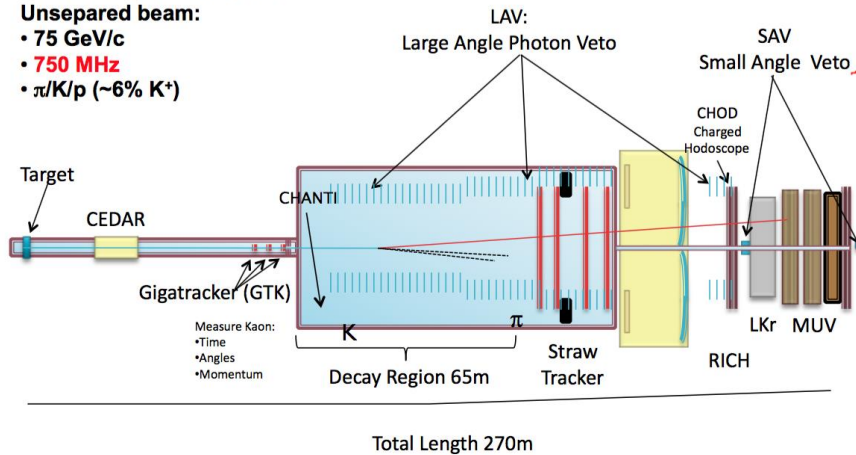
ATLAS & CMS Phase II upgrades

November 27, 2019: meeting to discuss
LS2 Status and Run 3 Planning

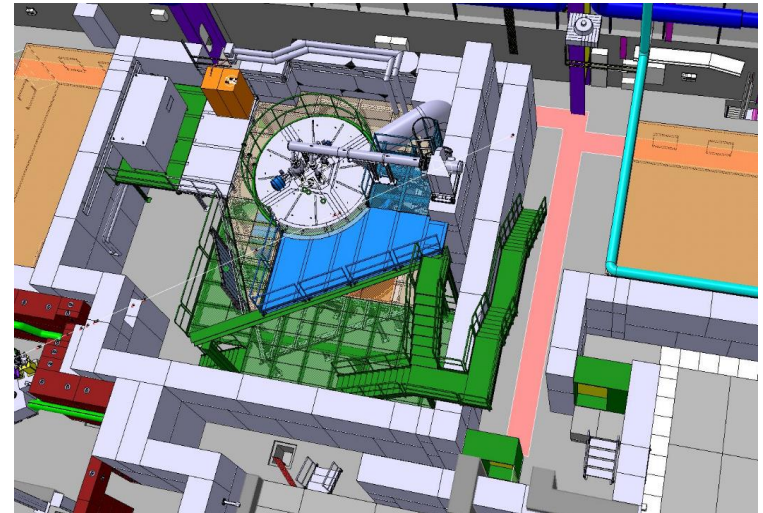
Non-LHC Projects

- DT contributions proceed according the agreed Work Packages for NA62, CLOUD, COMPASS, etc.

SPS primary p: 400 GeV/c
 Unseparated beam:
 • 75 GeV/c
 • 750 MHz
 • $\pi/K/p$ (~6% K^+)



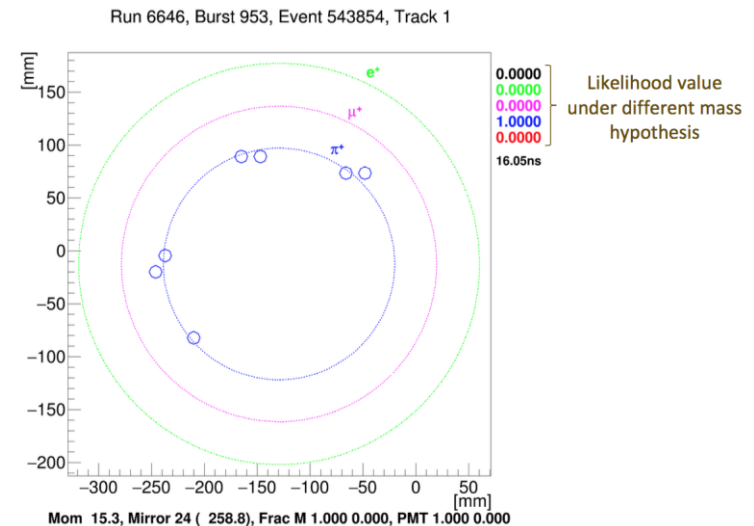
NA62 setup in the North Area



CLOUD setup in the PS East-Hall

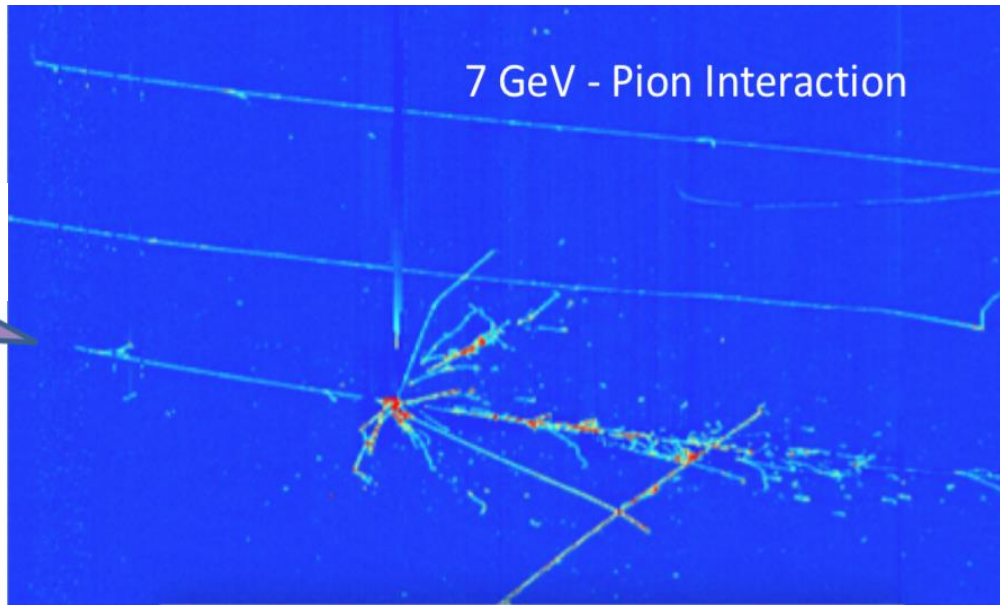
NA62 measurements:

- Search for very rare decays: $BR(K^+ \rightarrow \pi^+ \nu \nu)$ predicted by theory to be $(8 \pm 1) \times 10^{-11}$
 - Successful physics runs in 2017 and 2018: collected 3×10^{12} resp. 4×10^{12} K^+
- First event observed in 2016 data

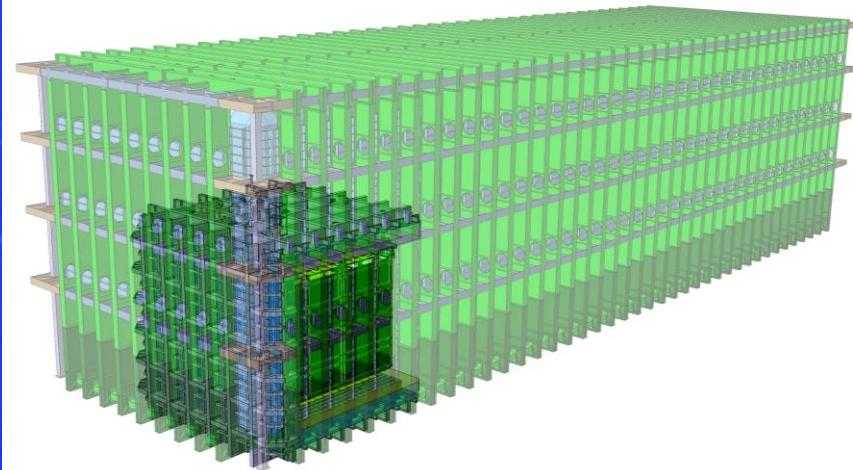


Projects under Study

- DT contributions proceed according the agreed Work Packages also for LCD, SHiP and the Neutrino Platform.
- Much effort went into the DAQ, Control and Safety Systems for NP04 and NP02 cryostats. Over 4 million beam events could be collected with the ProtoDUNE Single-Phase detector in autumn 2018.



LAr –TPC data of unprecedented quality



***The LBNF cryostat warm structure
It is about 20x larger than ProtoDUNE***

CERN – Building 156

Scale rendering of the new cryostat design



R&D within DT

Silicon Detectors

- Rad-hard Sensor Development
→ RD50
- Pixel R&D
- Bonding and Quality Assurance
- μ -channel cooling and fabrication
- CO₂ 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++

R&D on Detector Mechanics

- Engineering Office, Composite Lab

R&D related to TDAQ

- Detector Interface section

➤ **The initiative of the EP department on Strategic R&D on Experimental Technologies has been well received at CERN and beyond. Funding for material and manpower is included in the CERN Medium Term Plan; however, the amount is not yet fully clear.**

Strategy Update – Open Symposium

CERN Council Open Symposium on the Update of

European Strategy for Particle Physics

13-16 May 2019 - Granada, Spain



- 600 participants
- Talks on all projects relevant for the strategy
- Lively discussions
- Presentations can be found under <https://cafpe.ugr.es/epps2019/>

Physics Preparatory Group

Halina Abramowicz (Chair)
Shoji Asai Beate Heinemann
Stan Bentvelsen Xinchou Lou
Caterina Baccał Krzysztof Redlich
Marcela Carena Leonid Rivkin
Jorgen D'Hondt Paris Sphicas
Keith Ellis Brigitte Vachon
Belen Gavela Marco Zito
Gian Giudice Antonio Zoccoli

Local Organizing Committee

Francisco del Aguila Juan José Hernández
Antonio Bueno (Chair) Mario Martínez
Alberto Casas Carlos Salgado
Nicanor Colino Benjamín Sánchez Gimeno
Javier Cuevas José Santiago
Eivira Gámiz
María José García Borge
Igor García Irastorza
Eugeni Graugés

<https://cafpe.ugr.es/epps2019/>

epps2019@pcgr.org



Sponsored by:



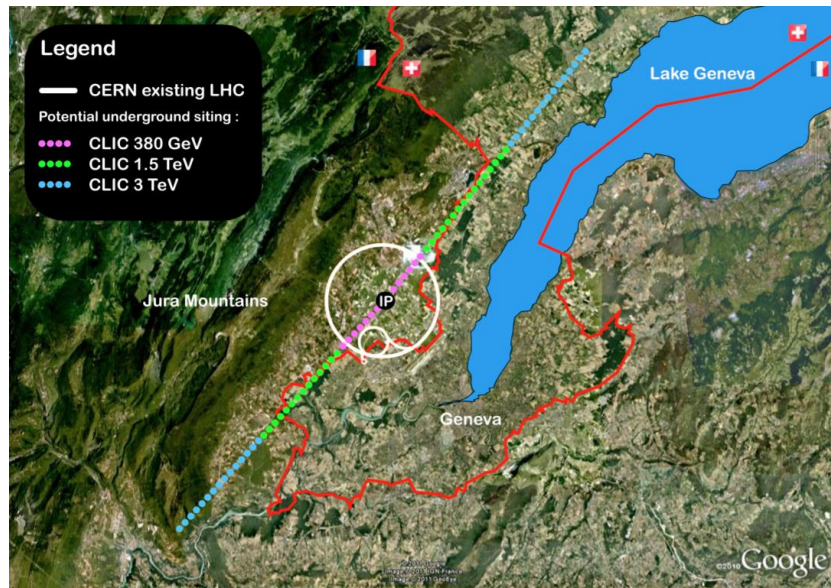
Towards the next CERN Flagship Project

The LHC and its upgrade to higher luminosity is central to CERN program for next decade(s)
Due to long lead time, there is a need to prepare for what will come after the LHC.
Future accelerators are under study, at CERN and Worldwide. CERN projects:

CLIC – Compact Linear Collider

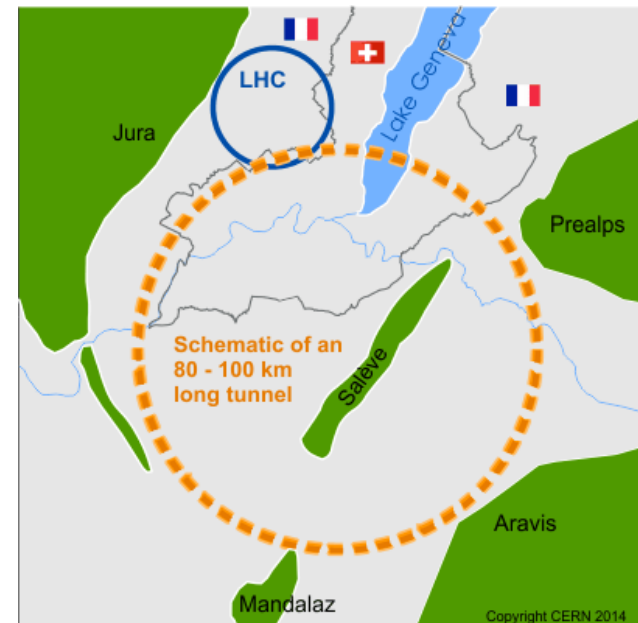
Study of the design for a possible future e^+e^- linear collider.

Energies: 380/1500/3000 GeV



FCC – Future Circular Collider

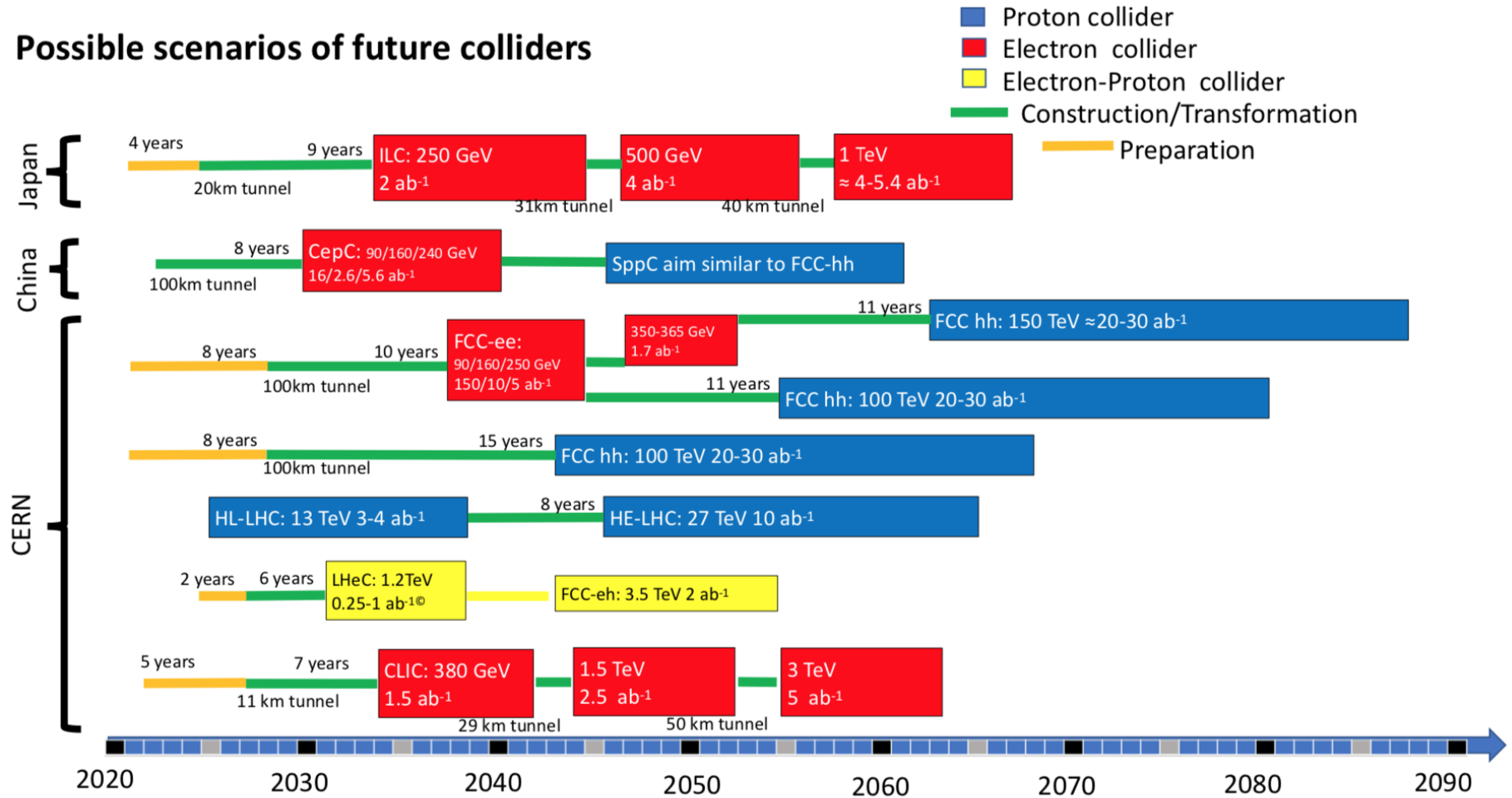
Study of a 100 km circumference machine for pp collisions at 100 TeV, possible preceded by an e^+e^- collider with energies 90/160/240/365 GeV



One has to weight physics programme, timeline, power consumption, cost & expectations for funding !

(Optimistic) Timelines for proposed Colliders

Possible scenarios of future colliders





CERN OPENDAYS

- ▶ Explore the future with us
- ▶ Explorez le futur avec nous

Saturday & Sunday September 14 & 15 , 2019

➤ **Main contact from EP-DT : Neil Dixon**

Planned Activities of EP-DT

Activity	Responsible	Interactive	short description	Laptop or PC needed	No of volunteers on your stand at any one time
Scintillators/fibers	Sune Jakobsen/Thomas Schneider	Yes	Exhibition with photodetectors and scintillating fiber detectors (ATLAS-ALFA and LHCb SciFi). Interactive detector model to practice track reconstruction.	no	3
Straw Trackers and tubes	Neil Dixon	Yes	Assembly of signalwire in straw tubes, and possible a prototype running cosmic rays	no (154 laptop will be used)	5
The GigaTrackKer silicon pixel detector	Alessandro Mapelli	No	The GigaTrackKer is a one of a kind particle detector. It is the first detector to be cooled with a microfluidic circuit and contains 3D-printed mechanical components.	1 pc or laptop	2
Silicon detectors	Isidre Mateu / Nicola Pacifico	Yes	Demonstration of the operation of a silicon detector, using different kind of excitation sources (laser, potassium salts, etc.)	1 Desktop	2
Composite Materials / Engineering Office	François Boyer / Francisco Perez	YES	Overview of the activities from the design, calculation to the composite manufacturing (exhibition, videos, Practical demonstration)	4 Desktop	4
3D printing	Florian Brunbauer	Yes	Filament-based 3D printer operated continuously to print components such as readout planes. Smaller 3D printer used by visitors interactively to print take-home objects (e.g. logo). Examples of printed structures are exhibited (together with composite lab/engineering office).	no (using GDD devices)	2
Gaseous detectors	Florian Brunbauer	Yes	Optically read out detector operated in the lab (with screen outside for visitors) and showing live images of radiation events. Different types of MicroPattern Gaseous Detectors exhibited. Microscope to view detector structures.	no (using GDD devices)	2

Volunteers are needed ...

You can subscribe here to help for our activities:

<https://docs.google.com/spreadsheets/d/1zpw97rBoVVwnovcuXw9t2T3GUQb27MFv/edit#gid=957069004>

(There is also a link on the official CERN Open day page to subscribe)

activity	Name	First Name	CERN Id	GSM Number	preparation/ setup 12 September	13 September family Day	OPEN DAYS				Comments	Volunteers will start and finish 60 minutes before opening time and finish 60 minutes after.
							PUBLIC DAYS 08:30 - 19:00		PUBLIC DAYS 08:30 - 19:00			
							14 september 08:30 - 14:00	14 september 14:00 - 19:00	15 september 08:30 - 14:00	15 september 14:00 - 19:00		
scintillator fibres Sune Jakobsen											(floating physicist)	Sune Jacobsen
scintillator fibres Sune Jakobsen												
scintillator fibres Sune Jakobsen												
scintillator fibres Sune Jakobsen												
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scintillator fibres Sune Jakobsen												
scintillator fibres Sune Jakobsen												
scintillator fibres Sune Jakobsen												
TOTAL							0	0	0	0		
Straw tubes Neil Dixon	Dixon	Neil	36025	163451	1		1	1	1	1		Neil Dixon
Straw tubes Neil Dixon												
Straw tubes Neil Dixon												
Straw tubes Neil Dixon												
Straw tubes Neil Dixon												
Straw tubes Neil Dixon												
Straw tubes Neil Dixon												
Straw tubes Neil Dixon												
TOTAL							1	1	1	1		
GTK/microfabrication Alessandro Mapelli												Alesandro Mapelli
GTK/microfabrication Alessandro Mapelli												
GTK/microfabrication Alessandro Mapelli												
GTK/microfabrication Alessandro Mapelli												
GTK/microfabrication Alessandro Mapelli												
GTK/microfabrication Alessandro Mapelli												
TOTAL							0	0	0	0		
Composite materials EO François Boyer												François Boyer / Christophe Bault
Composite materials EO François Boyer												
Composite materials EO François Boyer												
Composite materials EO François Boyer												
Composite materials EO François Boyer												
Composite materials EO François Boyer												

...



Concluding remarks

- The resources of the group are well shared between the various activities, 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 existing expertise and facilities of EP-DT and to adjust for upcoming needs.
- The CERN program for Strategic R&D on Experimental Technologies will allow us to continue R&D in EP-DT from 2020 onwards.
- The Update for European Strategy for Particle Physics is ongoing. The outcome will be known only next summer. A difficult process!
- **Volunteers are needed for the open days. Take part!**