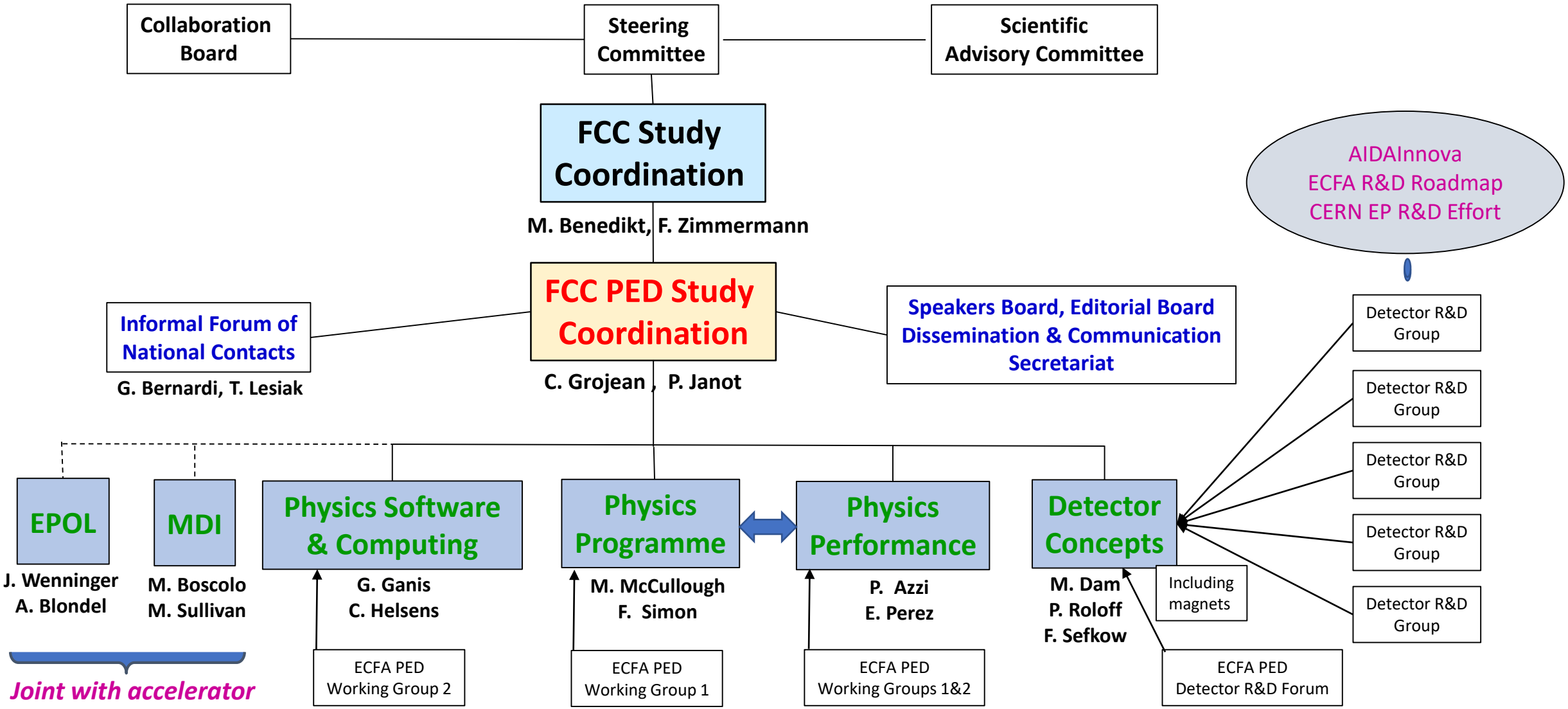
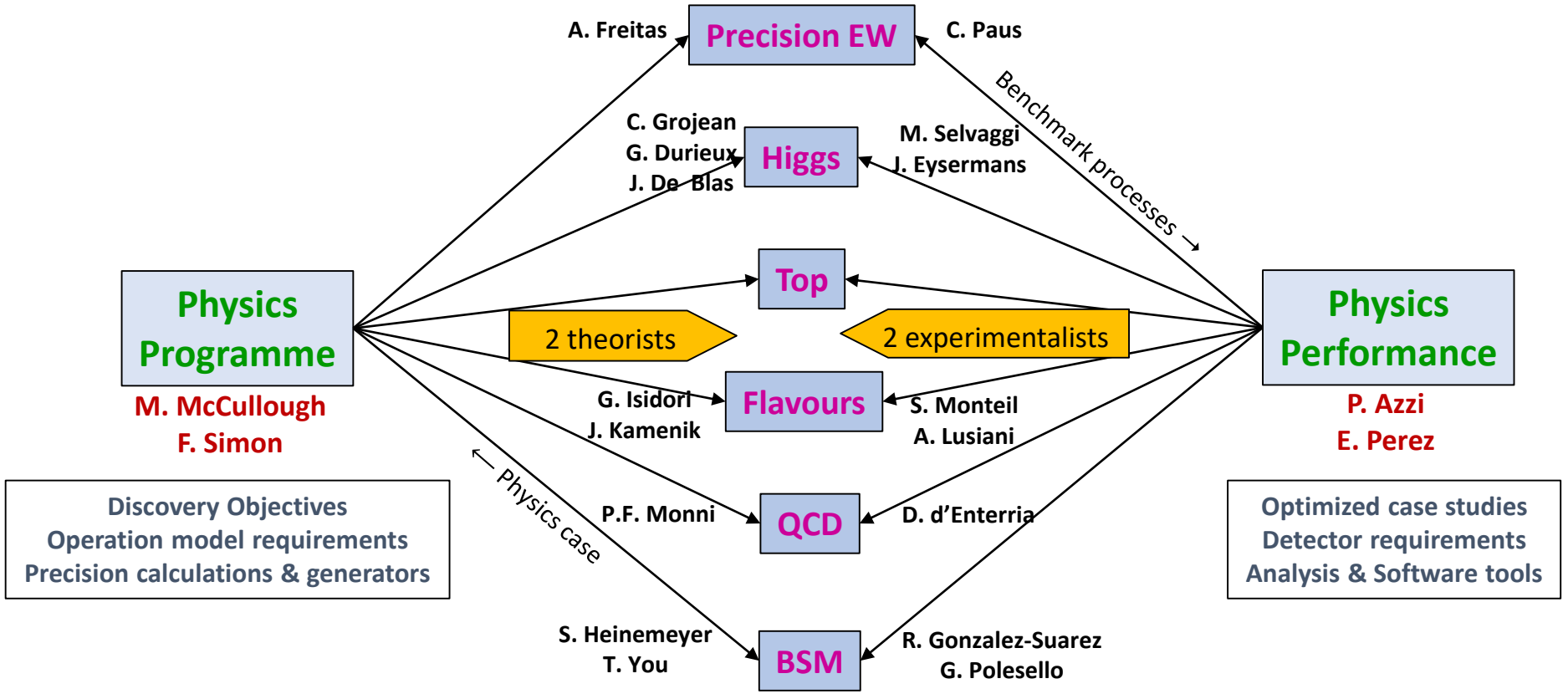
FCC-contacts – February 18th

- News from FCC
- Detector concepts

PED Organisation & conveners



Joint Physics groups

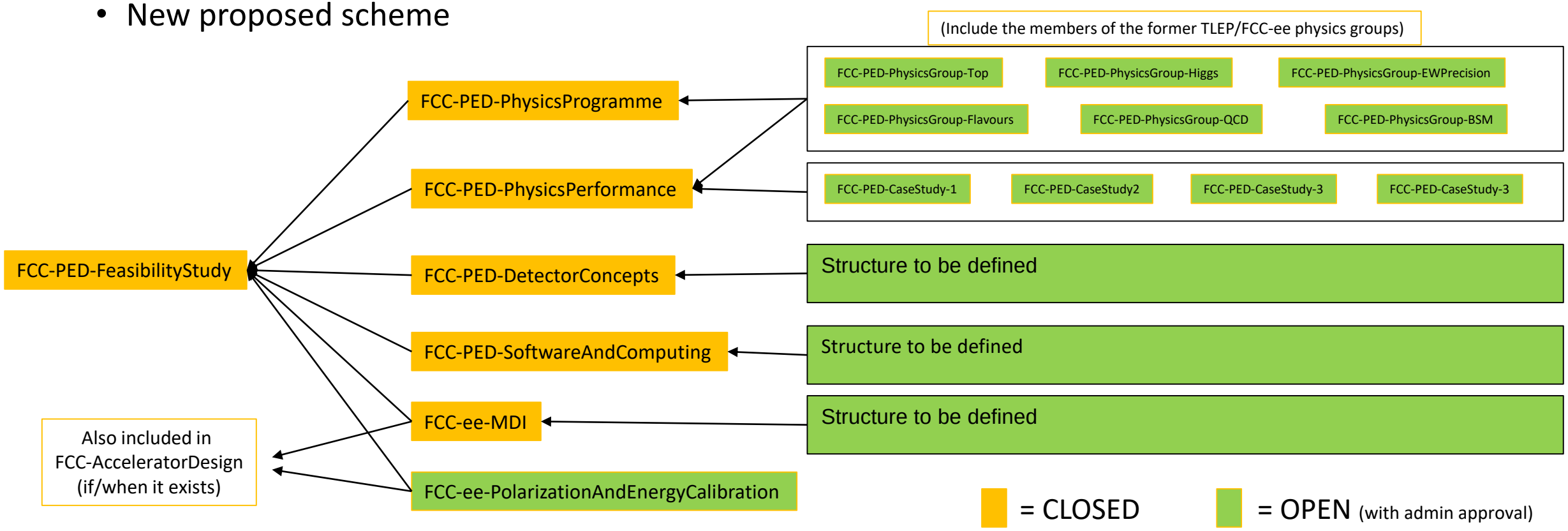


Next steps

- Organisation and planning of Activities has to start
  - Kick-off workshops for the physics groups
    - Address Physics Programme and Physics Performance aspects
    - Define scientific/managerial objectives, deliverables and timeline, with WP coordinators
  - Detector Concepts kick-off organisational workshop
    - Boundaries and interactions with other work packages
    - Interactions with R&D groups and ECFA working groups
    - Internal structure and programme of work towards a coherent set of FCC-ee detector concepts
  - Software and Computing : Implement the SW Task Force recommendations
  - Machine-Detector Interface
    - Define interaction with Detector Concepts and identify/find resources for PED-related tasks
  - Community building and communication
    - Starting with internal communication (e.g., mailing lists, FCC-PED web site)

Mailing lists

- Popular request during the workshop: mailing lists to subscribe to !
  - Previous scheme too complicated, and not adapted to PED structure
    - Subscription through the FCC-ee web interface, required manual intervention
      - https://fcc-ped.web.cern.ch/form/subscribe
  - New proposed scheme



FCC-PED webpage

- A lot of work needed – see https://fcc-ped.web.cern.ch/
  - The landing page is still very much FCC-ee (and even TLEP) oriented – and needs updating
    - For example, the “contact us/join us” tab is outdated and should point to the new lists
    - The introductory text ought to refer to the FCC feasibility study, not to FCC-ee/TLEP
  - The Work Package pages are “under construction” (except the Physics Performance page)
    - It is up to the work package coordinators to put something useful there
      - With some introductory text (high-level objectives, organization, etc.)
      - With links towards more detailed/technical pages
- Action: make a plan to make this page a useful tool for community building

What about the FCC-France page?

we must develop it

FCC-FRANCE

FUTURE CIRCULAR COLLIDER
Expanding our Horizons

cnrs IN2P3

cea

The Future Circular Collider (FCC) study is developing designs for a new research infrastructure to host the next generation of higher performance particle colliders to extend the research currently being conducted at the LHC, once the High-Luminosity

Contact us

Follow-up from previous coordination meeting

- Transition from HL-LHC to FCC-ee
  - Slide from J. Mnich brought some clarifications

Long-term Schedule

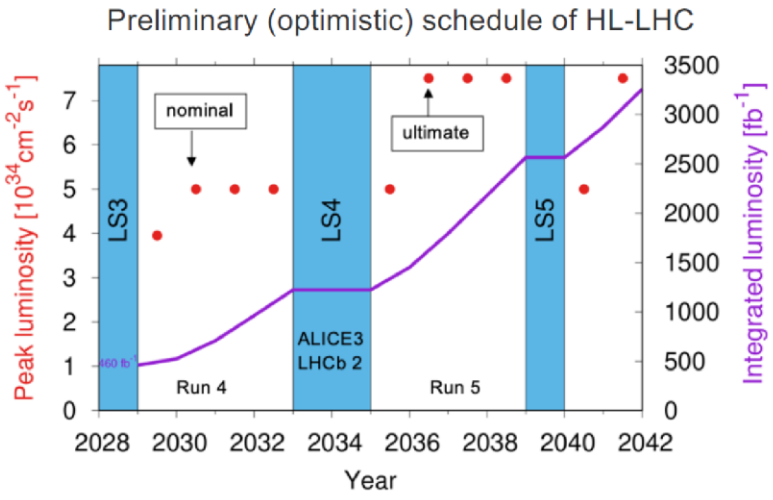
Run 3 will be extended by 1 year until end 2025
and LS3 by ½ year until end 2028

Note:

- no further extension of Run 3 or LS3 possible!
  For technical and political reasons
- the HL-LHC goal of providing 3000/fb integrated luminosity to ATLAS and CMS would require HL-LHC operation until ≈ 2041
- ending HL-LHC in 2038 would provide ≈ 2500/fb per experiment

Final decision on the long-term HL-LHC schedule will have to be taken at the next (or next-to-next?) strategy update in light of:

- performance and results from the LHC, progress with the next project (FCC), …



Important:

- we have to find the right balance between motivation and commitment of the community for the success of the LHC
- and preparing the ground for the future with a visionary project like the FCC

Our comments and reflections:

- **Beginning of HL-LHC delayed to 2029 instead of 2027 in the previous schedule**
  - **Direct impact on FCC start date**
    - ➔ **Availability of accelerator experts**
- **End of HL-LHC still scheduled in 2038**
  - **2.5 ab^{-1} delivered to ATLAS/CMS in this plan**
- **Stressed the tension between**
  - **Accumulating 3 ab^{-1}, and**
  - **Starting the next project at CERN**
- **Decision on transition HL-LHC to FCC-ee**
  - **To be taken by ESU**
  - **Depends on FCC project progress**
  - **Depends on HL-LHC performance and results**
  - **Depends on available resources and budget**
- **A careful study is starting to minimize the gap**
  - **Reminder: LEP started two years before the SppS shutdown.**

Follow-up from previous coordination meeting

- (Good!) News from Host States
  - Nov'21: Préfet de region becomes official French representative with CERN & Switzerland
    - To facilitate the execution of the FCC Feasibility Study
  - Dec'21: Swiss Federal Council will draw up a federal sectoral plan
    - To facilitate administrative procedures for FCC planning in the event of its implementation
  - 14 Feb' 22: First French information meeting about the FCC
    - Préfet de Région + deputés, sénateurs, communauté de communes, … in Ain & Haute Savoie
  - 24 Feb' 22: Symbolic ceremony and joint declaration
    - CERN DG, Préfet de Région, Swiss Ambassador, Representative of Canton de Genève
  - In short: very fast political evolution towards FCC planning in France and Switzerland
    - More meetings will follow
    - Michael Benedikt will be present in all meetings and will report to the FCC Coordination Group
      - And we will report here in turn

Mid-term review (mid-2023)

FUTURE CIRCULAR COLLIDER

M. Benedikt

Context:

Mid-term review requested by CERN Council

From council document on FCC Feasibility Study:

- A committee including external experts will be established to review the cost of the first-stage project (the tunnel and the FCC-ee collider) by mid-2023; a second cost review will take place at the end of the Feasibility Study in 2025;

- **to allow better understanding of progress and evolution of feasibility study**
- **Anticipation of the direction towards Strategy Update in 2026/27**
- **Potential date: mid 2023**
  - Integrated in FCC Week 2023
- **Proposal by Greek delegate:**
  - presentation of review draft proposal to SPC/scientific council delegates to receive feedback BEFORE presentation to CERN Council.
  - Presentation of proposal to Council at June 2022 meeting (~1 year prior to review)
- **Review committee not yet discussed, perhaps SAC?**

FCC Week: Key information

- Dates: from Monday, 30 May morning to Friday, 3 June 2022 afternoon
- Location: **Campus des Cordeliers (SU) Odéon**

- Hybrid event: 300 people on site, other participants in remote mode

- Registration fees for on-site participants:
  Regular: 460 Euro, Student: 260 Euro, 1-day pass: 90 Euro

FCC Week: Preliminary Schedule

Day	Monday	Tuesday				Wednesday			Thursday				Friday	Time
Room / Time	Plenary room 470 p.	Parallel 1 room 80 p.	Parallel 2 room 80 p.	Parallel 3 room 80 p.	Parrallel 4 room 30 p.	Parallel 1 room 155 p.	Parallel 2 room 75 p.	Parallel 3 room 100 p.	Parallel 1 room 470 p.	Parallel 2 room 155 p.	Parallel 3 room 75 p.	Parallel 3 room 100 p.	Plenary room 470 p.	Room / Time
09:00-09:30	**Plenary session**	FCCee accelerator FCCIS WP2	PED	Organisation Model		FCC hh accelerator	PED	FCCIS WP3 Placement	WS Economy of Science	FCCee EPOL	Technical infrastruct.	Technology	**Plenary session**	09:00-09:30
09:30-10:00														09:30-10:00
10:00-10:30	Chairperson	Chairperson	Chairperson	Chairperson		Chairperson	Chairperson	Chairperson	Chairperson	Chairperson	Chairperson	Chairperson	Chairperson	10:00-10:30
10:30-11:00	**Break**	**Break**				**Break**			**Break**				**Break**	10:30-11:00
11:00-11:30	**Plenary session**	FCCee accelerator FCCIS WP2	PED	Technical infrastruct.	*Dialogue group CLOSED*	Technology	PED	Civil Engineering	WS Economy of Science	FCCee MDI	Technical infrastruct.	Technology	**Plenary session**	11:00-11:30
11:30-12:00														11:30-12:00
12:00-12:30	Chairperson	Chairperson	Chairperson	Chairperson	F. Eder	Chairperson	Chairperson	Chairperson	Chairperson	Chairperson	Chairperson	Chairperson	Chairperson	12:00-12:30
12:30-13:00	**Break**	**Break**				**Break**			**Break**				**Break**	12:30-13:00
13:00-13:30														13:00-13:30
13:30-14:00													**Plenary session** (optional)	13:30-14:00
14:00-14:30	**Plenary session**	FCCee injector FEB	PED	Technology SRF	*SC meeting CLOSED*	FCCee accelerator	PED	FCCIS WP5 Collaboration	WS Economy of Science	FCCee MDI	Technical infrastruct.			14:00-14:30
14:30-15:00													Chairperson	14:30-15:00
15:00-15:30	Chairperson	Chairperson	Chairperson	Chairperson	F. Gianotti	Chairperson	Chairperson	Chairperson	Chairperson	Chairperson	Chairperson			15:00-15:30
15:30-16:00	**Break**	**Break**				**Break**			**Break**					15:30-16:00
16:00-16:30	**Plenary session**	FCCee injector FEB	PED	Technology SRF	*SC meeting CLOSED*	FCCee accelerator	PED	FCCIS WP5 Communication	**France special plenary session**					16:00-16:30
16:30-17:00														16:30-17:00
17:00-17:30	Chairperson	Chairperson	Chairperson	Chairperson	F. Gianotti	Chairperson	Chairperson	Chairperson	Chairperson					17:00-17:30
17:30-18:00									**Poster session** (50 posters) **& drink**					17:30-18:00
18:00-18:30														18:00-18:30

Eight PED sessions
- Tuesday 31/05
- Wednesday 1/06

Two MDI sessions

One EPOL session
- Thursday 2/06

90 minutes each
- 4 or 5 talks

Plenary talks
- Monday 30/05
- Friday 3/06

Is is what we want?

ILC@MEXT

- Summary of recent discussions about ILC available here (mostly in Japanese)
  - Main topic was the assessment of the "preparatory Lab", with the following "conclusions"
    - Academic significance maybe not commensurate with huge investment
    - No prospects for international cost sharing for the ILC itself
    - Insufficient support from the population and the scientific community
    - No important financial support from France, Germany, UK
    - In spite of the government interest to attract the ILC to Japan, a decision on the transition to the pre-Lab would be premature
      - and not matched to the way the researchers proceed in doing the R&D still necessary for the project.
    - Re-examination of the proposed process for the pre-lab is needed
    - For the first time, the prospect of comparing with FCC is mentioned. (CEPC is not.)

(Translation from Japanese to English by Oide-San)

Summary of the IFNC Round table

Questions to the National Contact

What were the Physics-Expts and Detectors (PED) Activities in 2021 in your country (type and FTE) ?

What is the situation with the MOU and Addenda for your country ? Are there commitments related to PED ?

Relations between PED and the Accelerator community working on FCC ?

How is the FCC vs. other ee-colliders situation evolving in your country ?

Estimate of the resources (human and funds) that the labs in your country or your national institute plan to commit for FCC PED in 2022 and 2023 ?

What are the initiatives to recruit new people and to connect to other groups internationally ?

IN WHICH DOMAIN THE ADDITIONAL PERSONPOWER WILL ENGAGE ?

Do you plan a National (or Regional) FCC workshops in 2022?

Are you building or planning to join a Regional FCC “cluster” with neighboring nations (cf. Nordic countries) ?

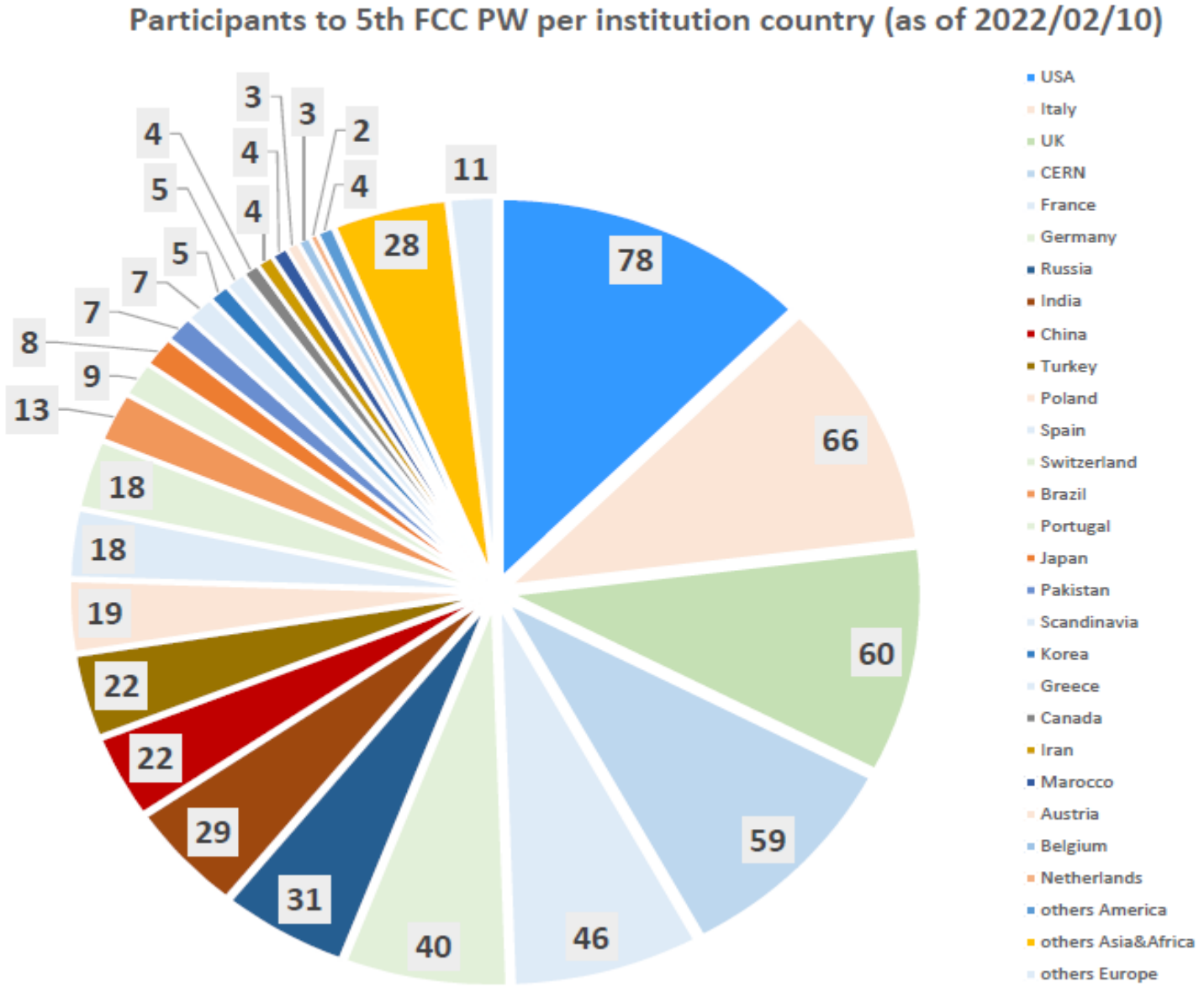
Can you list the persons involved at 15% FTE or more in PED activities in your country, **NOW OR IN THE NEXT TWO YEARS**

Slides

+	USA	78
+	Italy	66
+	UK	60
+	CERN	59
+	France	46
+	Germany	40
	Russia	31
	India	29
	China	22
+	Turkey	22
+	Poland	19
+	Spain	18
+	Switzerland	18
	Brazil	13
+	Portugal	9
	Japan	8
°	Pakistan	7
+++	Scandinavia	7
+	Korea	5
°	Greece	5
	Canada	4
	Iran	4
	Marocco	4
+	Austria	3
+	Belgium	3
	Netherlands	2
	others America	4
	others Asia&Africa	28
+	others Europe	11
	unidentified	17
	sum	625
	grand total 642	642

other Europe:

	Ireland	1
°	Israel	1
°	Slovenia	1
+	Czech	2
	Estonia	1
	Croatia	1
+	Serbia	1
	Bulgaria	1
	Belarus	1
	Romania	1



How is the FCC vs. other ee-colliders situation evolving in your country ?

Germany: Interest in FCC-ee is increasing relative to other e+e- colliders. FCC-ee seen most often as the context of PED-relevant work, more than ILC or CLIC.

UK: Established LC community involved in ILC & CLIC. Majority happy if either FCC-ee or ILC move forward and have a positive opinion towards both facilities. Agreement between FCC-ee and ILC communities, and reflected in UK roadmap, that joint detector R&D support should be sought for both initiatives.

Spain: Still strongly involved in LC activities. FCC activities and common ee activities within the ECFA PED initiative are being developed independently of the final collider choice. IFIC and CIEMAT →coordinated project covering all future ee collider activities (it includes ongoing FCC, ILC and ECFA PED activities).

Italy: Main interest is FCCee (CEPC as a backup option). No major involvement in CLIC or ILC.

France: FCC-ee priority is evolving positively relative to other e+e- colliders. ILC-France community is participating to FCC France workshops.

Poland: FCC dominant, CLIC activities still remain

Korea: Activities rather concentrated on the FCC project. For CEPC, physics & detector R&D are quite similar, so working with same direction. For ILC, Korean community's contributions have been important until middle of 2010's, but they are not so active now.

USA: FCC is among other actively discussed options most notable ILC, muon collider and C3.

Denmark, Sweden, Finland, Czechia, Austria, Belgium, Portugal, Switzerland, Turkey, Pakistan: only or most visible effort at the moment: FCC-ee

Norway, Slovenia, Serbia, Israel, Bulgaria, Hungary, Cyprus, Greece : No answers on this topic or no FCC activities yet

Overall positive evolution towards FCC, and this even before ECFA workshops are going full speed, Looks good !

Commitments and Activities related to PED

Korea: R&D Dual Read-out Calorimeter + Studies at Gangneung-Wonju National University, KAIST, KIAS, Korea University (Seoul)

USA: Group of ~20 US faculty are working with European colleagues to produce a 50 page FCC document for Snowmass.

Turkey: Particle Accelerators and Detectors Local Infrastructure and R&D Workshop, 27- 28 Nov 2021

Sweden: Continues FCC-ee LLP work

Denmark: Definition of and Coordinating role for Detector Concepts activity (0.3 FTE)

Poland: Scintillator detectors, Luminometers

Czechia: Group at Charles University is working on calorimeter (noble liquid technology) for FCC-ee

Austria: Austrian wide Workshop to ramp up activities

Belgium: Strange Jet Tagging at FCCee using CNNs (collaboration with DESY, UZH)

Portugal: Experiment: development of rad-hard plastic scintillators together with polymer research group focusing on FCC-hh. Calorimetry simulation for FCC-ee. Theory: virtual photon scattering in FCC-ee; precision α_S measurements in FCC-ee; jet substructure.

Spain: Involment in the PED coordination group and EW program improvement. Meeting of the Future Collider Network.

Germany: Contributions to physics studies at a small number of institutes; involvement in PED coordination and in setting up of detector concept pillar. Analysis activities at DESY, KIT, MPP. Pheno projects/theory involvement at several places. Significant detector R&D, often generic, but applicable also to FCC PED.

UK: Generic R&D for silicon-vertex/trackers, calorimetry+interest in DAQ and electronics for FCC. Physics studies for ee, eh, and hh. New interest in joining such efforts. Members of PED Coord. Group, also active in preparing EPJC articles and organization of FCC Physics Workshop.

Italy: 1) Physics studies, Simu & SW development; 2) MDI studies; 3) Silicon Detectors (Vertex and trackers) R&D; 4) Drift Chamber R&D; 5) MPGD for muon chambers and pre-shower; 6)Dual Readout Calorimetry R&D. Researchers/Engineers in 2021: 91 people for 15.7 FTE

France: Involvement in PED case studies (Higgs, QCD, HF, EW, BSM) (40 persons/9 FTE). Detector R&D: microvertex, TPC, ToF, Calorimetry, RPC, wireless conn.) initially for ILC, but now often moving towards FCC. Pheno/theory projects, ee and hh at several places (5 persons / 2FTE)

Suisse: Host country UniZH and UniGE have dedicated efforts. Physics studies and HW; at UniZH also in collaboration with VUB

CERN: All areas of PED are covered at CERN. About 8-10 FTEs, distributed over more than 15 members of staff, fellows and scientific associates

Finland, Norway, Slovenia, Serbia, Israel, Bulgaria, Pakistan, Hungary, Cyprus, Greece: Answers, but no FCC activities:

Resources for 2022 /2023

CERN: ~10 FTE distributed over more than 15 Staff members/fellows/associates

Italy: ~16 FTE 32 persons >15%, 91 people total

France: ~9 FTE 15 persons > 15% 40 people total + theory 2FTE / 5 persons

Germany: ~3? FTE 5 persons > 15% Not counting ILC people

UK: ~3? FTE 10 persons > 15% Not counting ILC people .

Poland: ~6 FTE 11 persons >15%

Korea: ~6 FTE 21 persons > 15% for Dual-Readout Calo R&D

USA: ~4 FTE ~20 people total involved in FCC for snowmass

Spain: ~1? FTE 2 persons > 15% Not counting ILC people

Portugal: ~2? FTE 4 persons > 15% 10 people total

Belgium: ~1? FTE 2 persons > 15%

Suisse: ~1 FTE 3 persons > 15%

Sweden: ~1 FTE 3 persons > 15% 5 people total

Denmark: ~0.5 FTE 2 persons > 15%

Czechia: ~1.0 FTE for R&D Calorimeter (noble liquid technology) for FCC-ee.

Turkey: : ~1.0 FTE in 2021

Austria, Finland, Norway, Slovenia, Serbia, Israel, Bulgaria, Pakistan, Hungary, Cyprus, Greece: Answers, but no FCC PED activities yet.

→ Numbers of FTE still relatively small, but increasing: currently ~65 FTE active in PED activities

FCC National or Regional workshops in 2022

Korea: Yes, national

USA: No, but several snowmass workshops in 2022

Turkey: Yes, national

Sweden, Denmark, Norway, Finland, Estonia: Considering another regional (NORDIC) workshop in 2022

Poland: Yes, and exploring a regional one.

Austria: Yes, national

Belgium: Exploring regional with Netherland

Portugal: Exploring regional with Spain

Spain: Meeting of the Future Collider Network

Germany: Yes, national, FC forum or FCC PED.

UK: Yes, national

Italy: Yes, national in 3/2022, exploring joint with France in 2023

France: Yes, national in 11/2022, exploring joint with Italy in 2023

Suisse: Yes, Spring 2022

→ Many national/regional workshops foreseen should allow to increase the personpower for FCC

PED End Goals

- Match detectors with the physics opportunities offered by the facility
  - Establish a coherent set of detector requirements from physics studies → **Physics Programme**
    - To fully benefit from statistics, variety of channels, new physics sensitivity → **Physics Performance**
  - Provide a coherent set of detector solutions (or path to solutions)
    - To maximally exploit the new collider layout compatibility with four interaction points → **Detector Concepts**
    - To deliver preliminary infrastructure requirements and cost estimates
  - Deliver the corresponding software and computing infrastructure → **Software & Computing**

- Ideally, by the end of the Feasibility Study, four full detector concepts (or more) can be ready, to be presented to the next strategy

But time is short

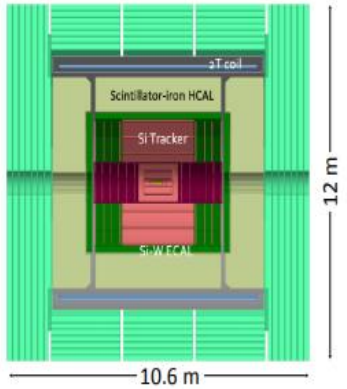
R&D session

On going R&D will lead to additional Detector concepts.
R&D Developments in Tracking and Calorimetry, many of these Projects having been encouraged by Linear Colliders, which can now also be adapted for Circular ones.

CDR: 2 Detector concepts

"Proof of principle concepts"
• Not necessarily matching (all) detector requirements, which are still being spelled out

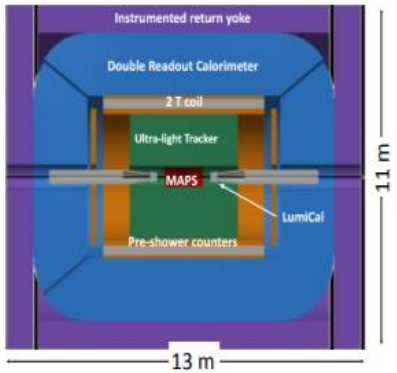
CLD



- Based on CLICdet detector design; profits from technology developments carried out for LCs
  - All silicon vertex detector and tracker
  - 3D-imaging highly-granular calorimeter system
  - Coil *outside* calorimeter system
  - Muon system made of RPC layers embedded in the iron yoke

https://arxiv.org/abs/1911.12230, https://arxiv.org/abs/1905.02520

IDEA



- New, innovative, possibly more cost-effective concept
  - Silicon vertex detector
  - Short-drift, ultra-light wire chamber
  - Dual-readout calorimeter
  - Thin and light solenoid coil *inside* calorimeter system
  - Muon system made of 3 layers of µRWell detectors in the return yoke

https://pos.sissa.it/390/

R&D projects

Président de session: Jessica Leveque (LAPP)

14:00 **CMOS status**
Orateur: auguste besson (Institut Pluridisciplinaire Hubert Curien)
FCC_2021_12_Anne...

14:20 **DICE status**
Orateur: Marlon Barbero (CPPM)
20211201_FCC_DIC...

14:40 **Update of R&D on fast detector for ToF using Micromegas**
Orateur: Thomas Papaevangelou (CEA Saclay)
PICOSECMM_FCC-F...

15:00 **Calice for FCC**
Orateur: Vincent Boudry (LLR - CNRS, École polytechnique/IPP Paris)
2021-12-01_CALICE...

15:20 **Powder-O Calorimetry**
Orateur: Jacques Lefrançois (IJCLab)
Annecy_5.pptx

11:40 **LAr Calorimeter for FCC-ee**
Orateur: Nicolas Morange ({CNRS}UMR9012)
LAr-FCC-Workshop....

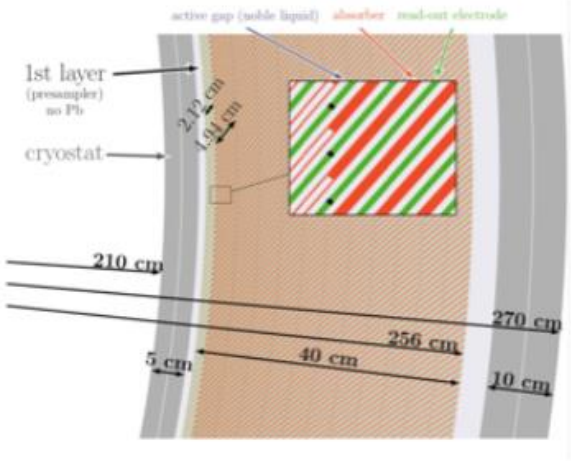
16:05 **Combining dual-readout crystals and fibers in a hybrid calorimeter for the IDE**
Orateur: Marco Toliman Lucchini (INFN & University of Milano-Bicocca)

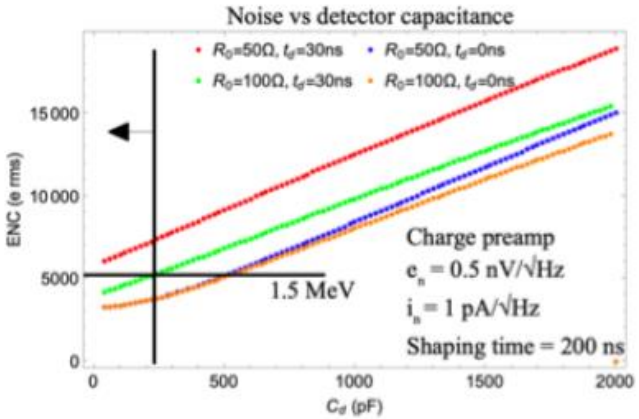
Pouvons nous préparer dans notre communauté un ou plusieurs Detector Concepts ?

Microvertex
Tracking
Calorimétrie
Muons

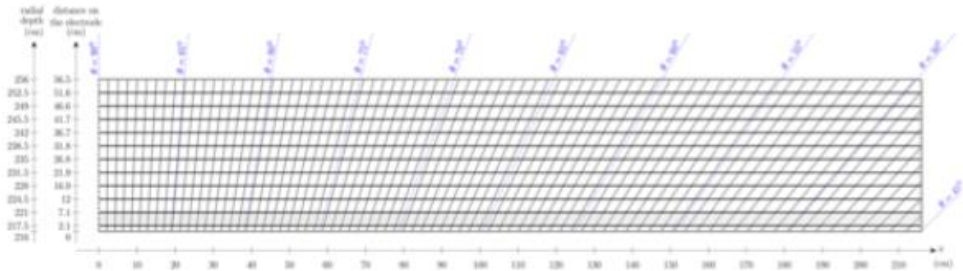
NEW!! Detector Concept with LAr ECAL taking shape

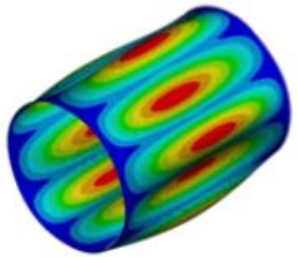
Brieuc François





MIP signal over noise > 5, per cell, can be achieved!



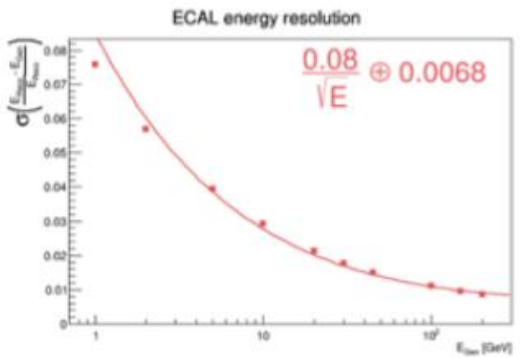


Lightweight cryostat

Tau identification migration matrix

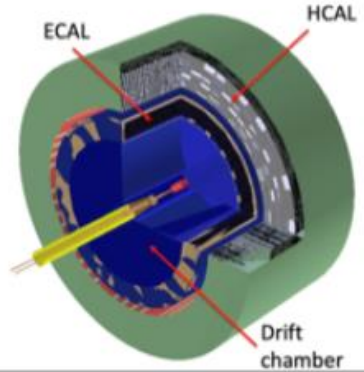
Recon → / Gen ↓	$\pi^\pm\nu$	$\pi^\pm\pi^0\nu$	$\pi^\pm 2\pi^0\nu$	$\pi^\pm 3\pi^0\nu$	$\pi^\pm 4\pi^0\nu$
$\pi^\pm\nu$	**0.9560**	0.0425	0.0010	0.0003	0.0002
$\pi^\pm\pi^0\nu$	0.0374	**0.9020**	0.0586	0.0016	0.0002
$\pi^\pm 2\pi^0\nu$	0.0090	0.1277	**0.7802**	0.0808	0.0022
$\pi^\pm 3\pi^0\nu$	0.0036	0.0372	0.2679	**0.5972**	0.0910

Full simulation. Cut based analysis;
Simplified geometry (2x2x4 cm³ cells)



Detector Concept

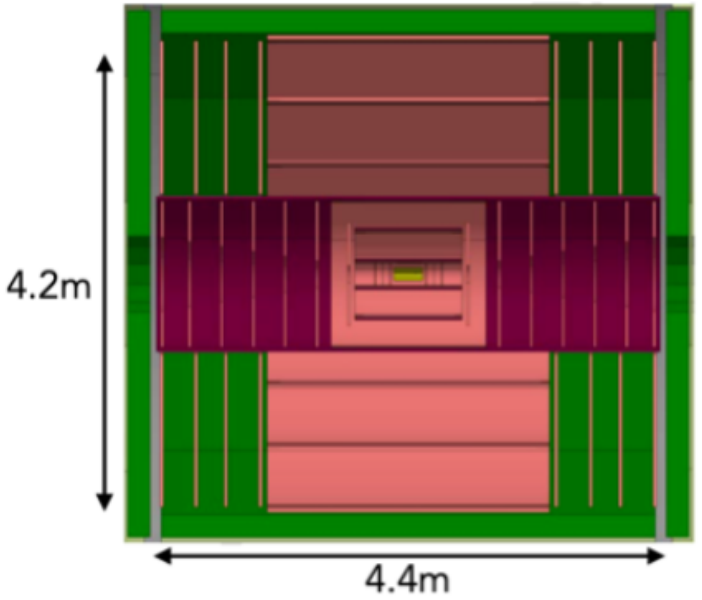
- Vertex Detector:
  - MAPS or DMAPS possibly with timing layer (LGAD)
- Drift Chamber (±2.5m active?) – TPC?
- Silicon Wrapper + ToF:
  - MAPS or DMAPS possibly with timing layer (LGAD)
- Solenoid B=2T, sharing cryostat with ECAL
- High Granularity ECAL:
  - Noble liquid + Pb or W
- High Granularity HCAL / Iron Yoke:
  - Scintillator + Iron
    - SiPMs directly on Scintillator or
    - TileCal: WS fibres, SiPMs outside
- Muon Tagger:
  - Drift chambers, RPC, MicroMegas

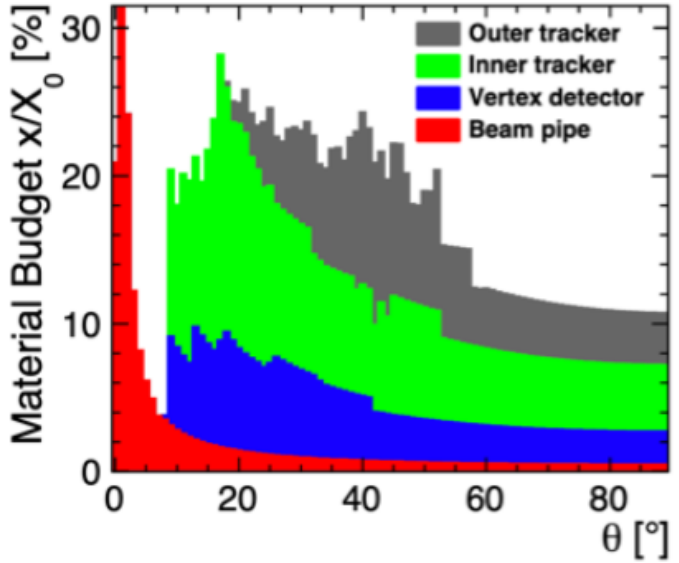


Tracking

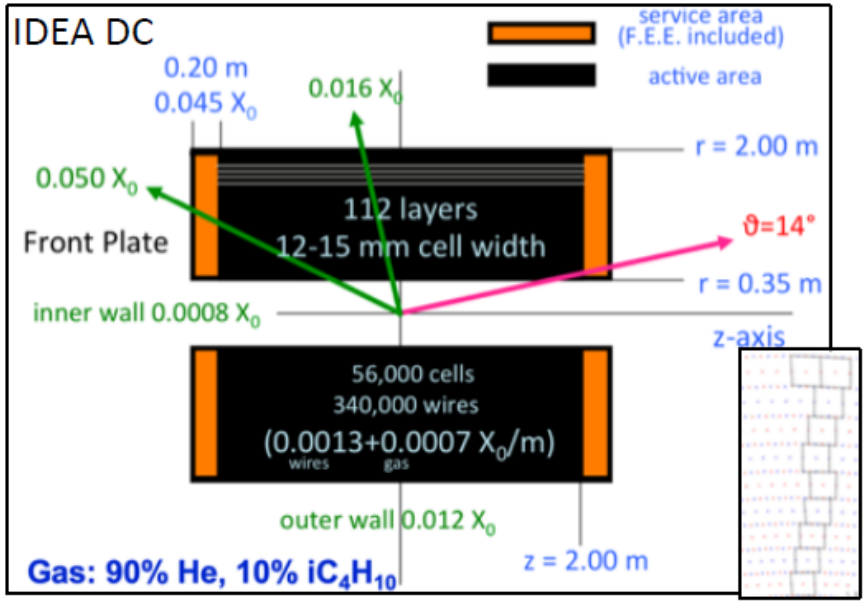
Two solutions under study

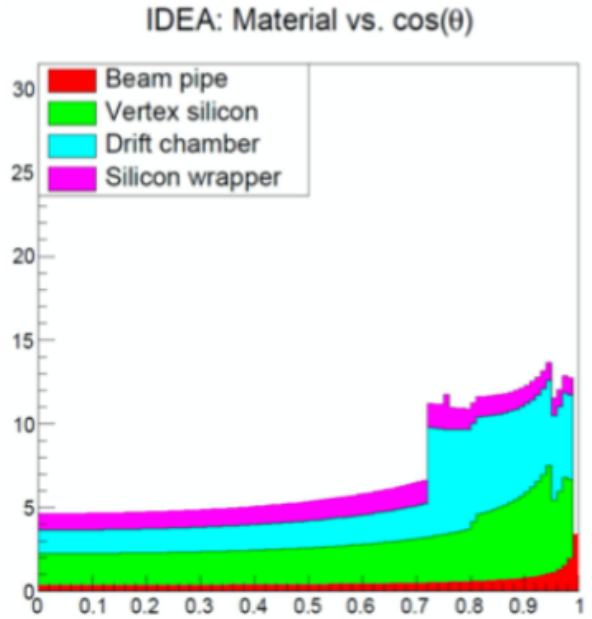
- CLD: All silicon pixel (innermost) + strips
  - Inner: 3 (7) barrel (fwd) layers (1% X_0 each)
  - Outer: 3 (4) barrel (fwd) layers (1% X_0 each)
  - Separated by support tube (2.5% X_0)





- IDEA: Extremely transparent Drift Chamber
  - GAS: 90% He – 10% iC_4H_{10}
  - Radius 0.35 – 2.00 m
  - Total thickness: 1.6% of X_0 at 90°
    - Tungsten wires dominant contribution
  - Full system includes Si VXT and Si "wrapper"





What about a TPC?

- Very high physics rate (70 kHz)
- B field limited to 2 Tesla
- Considered for CEPC, but having difficulties…

Calorimetry

- Several technologies being considered

Technology	ECAL	HCAL
CLD / CALICE-like	W/Si W/scint + SiPM	Steel/scint + SiPM Steel/glass RPC
IDEA / Dual Readout	Brass (lead, iron) / parallel scint + PMMA ($\check{C}$) fibres, SiPM	
Noble Liquid	Fine grained LAr (LKr) / Pb (W)	CALICE-like ?
Crystals	Finely segmented crystals (possibly DR)	Dual Readout fiber

Detector Concept Working Group Goals & Plans

Overall goals:

- Demonstrate that detectors can be built to fully exploit the FCC physics opportunities
  - Optimize the compatibility of the detector concepts with operation at the FCC-ee, with the Machine-Detector Interface layout (MDI), and with the timing and background conditions
  - Show that performance requirements can be met with existing or emerging technologies and realistic integration concepts
- Provide guidance for coherent detector R&D efforts to address FCC detector requirements
  - And to support their funding requests

Short term plan:

- Arrange monthly meetings from March onwards
- A dedicated workshop (summer 2022) is in preparation

A Detector Concept eventually includes:

- Assembly of sub-detectors including magnet system
- Systems for data acquisition, processing, powering and cooling based on estimate of data rates and size
- Software implementation of detector allowing performance evaluation
- Overview of services, consumables, power consumption, and ecological impact;
- Evaluation of construction and operating costs.

- FCC-ee has an enormous physics potential
  - Unprecedented factory for Z, W and Higgs bosons; for top, beauty, and charm quarks; and for tau leptons
  - Possibly also factory for BSM particles !!
- Instrumentation to fully exploit the physics potential is challenging and exciting
  - FCC-ee can host (up to) four experimental collaborations
  - Full exploitation of physics programme possible via one or more dedicated experiments
    - e.g. heavy flavour
- For next ESUPP, need to demonstrate that experimental challenge can be met by several (four?) Detector Concepts
- Detector Concepts working group now starting its work to support this activity
  - Provide guidance for coherent detector R&D efforts to address FCC detector requirements
  - Establish forum, where progress, ideas, and results from individual R&D efforts and test-beam activities are presented, discussed and reviewed