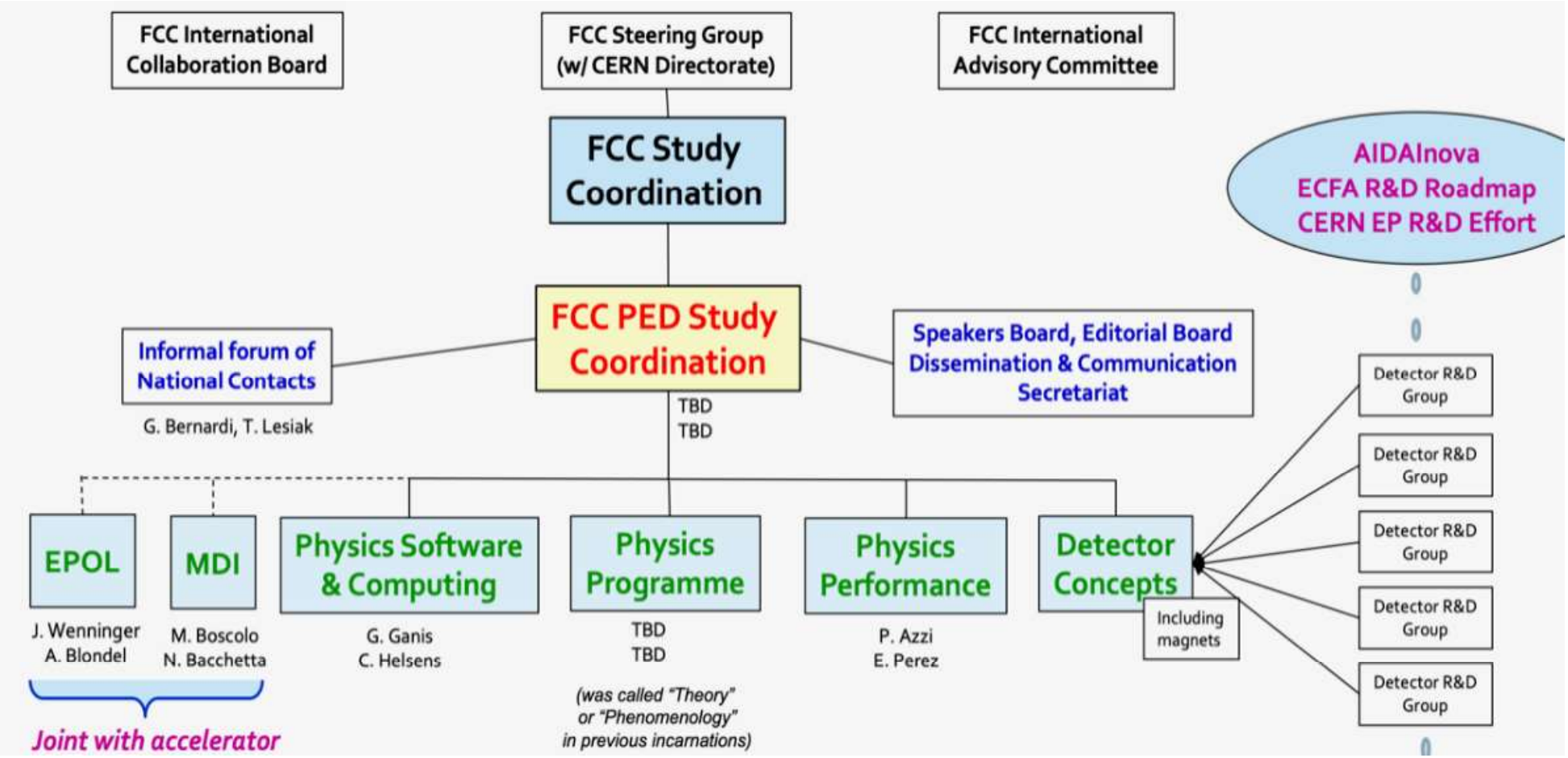
FCC-contacts – May 28th

- News
- Discussion R&D
- Agenda Jamboree 25 Juin
- Agenda FCC-France
- Tour de Table
- AOB

Organization still under scrutiny in view of June 2021 council



DG insisted that:
Physics performance and detector concepts for FCC-hh must be included.

Presently filling the TBDs (should not be a retired person, 40-55 preferred) and writing mandates. Patrick ,Michelangelo and Alain have been contacting people for the overall Physics Program – still in progress.

Output of last Scientific Council

Main conclusions:

Concerning the FCC-hh 'presence' DG's concern is mostly related to 'message' to council. However...

1. FCC-hh is already included in the « Physics program » and can be easily integrated in detector concepts
2. FCCSW is already functional for FCC-hh
3. The FCC-hh detector concept exists and has been documented, but should continue updates to detector technology
4. some performance studies will probably be necessary to e.g. compare to high energy lepton colliders ($\mu\mu$, ee) which are under study as "plan B"

Concerning the roles in the study.

➔ DG happy with the proposed structure it is now up to PED to complete the list of conveners, starting with the Physics etc... and to propose/discuss them to/with the management

« 50/50 CERN/non-CERN » principle to be respected across-the board (suggestions from PED SG/CG are still welcome)

NB we are already way above this for all physics groups steering committee etc...

Very important to keep 'FCC-INT' (ee and hh) together.

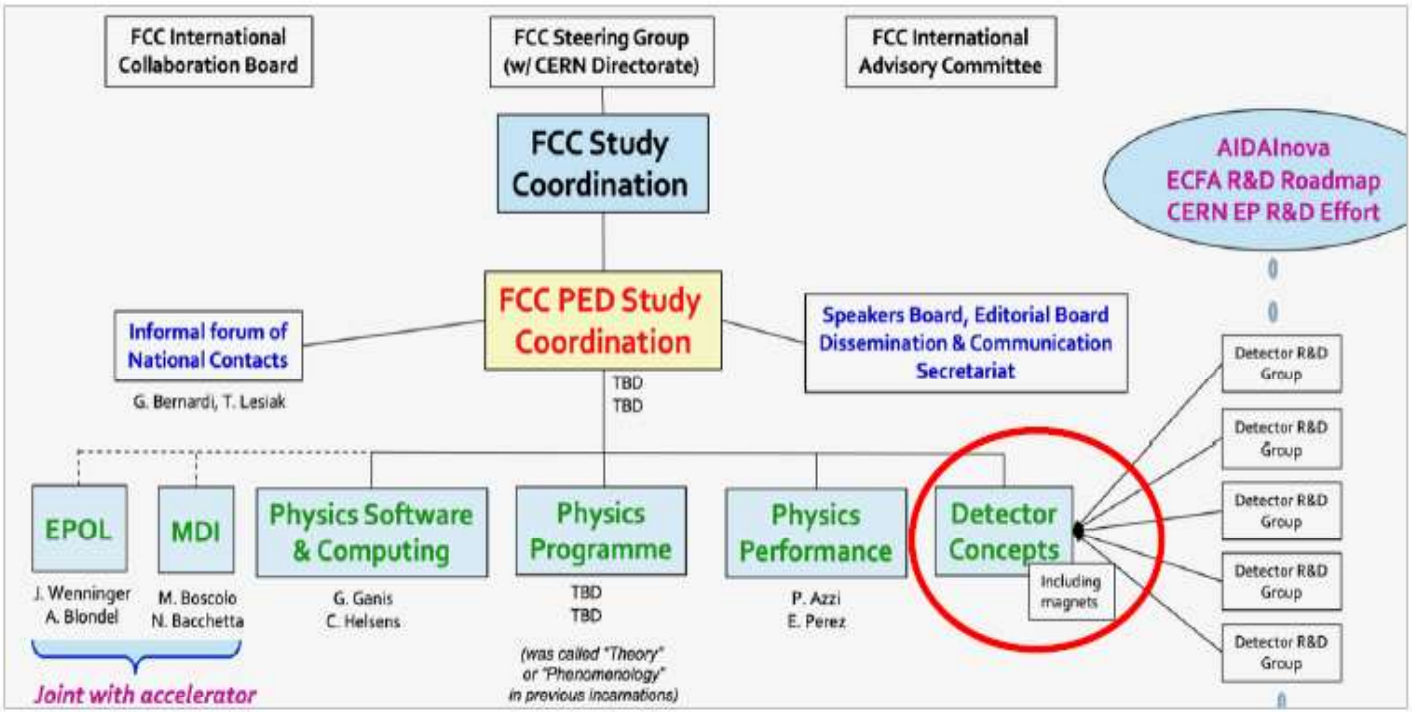
It is essential for the community and for the funding agencies to realize that they come together

FCC-ee is the only possible first step

Towards a detector concept working group

Towards an FCC effort on detector concepts

- *Ad-hoc task force to prepare a proposal for the organization and the mandate of an FCC-ee "detector concept" effort, within the FCC PED*
- Members:
  - Martin Aleksa
  - Nicola Bacchetta
  - Alain Blondel
  - Paula Collins
  - Mogens Dam (chair)
  - Gerado Ganis
  - Paolo Giacomelli
  - Patrick Janot
  - Emmanuel Perez
  - Werner Riegler (?)
  - Frank Simon
  - Guy Wilkinson



- From invitation letter (A.Blondel, P.Janot):
  - The task force is encouraged to consult outside our group
  - A first report will be expected after about a month

Towards a detector concept working group

1. Goals - what do we want to achieve ?

Present community with opportunity to develop and optimize detectors

Need for both geographical (via national contacts / initiatives) and topical growth

Make sure detector concepts are capable of delivering the detector requirements

Steer/inform Detector R&D in the direction of the requirements of FCC-ee

2. Deliverables ?

Define what should appear in the CDR+ at end 2024 – early 2025

Define ”what tools and by whom” should be provided as community support

3. Gathering the community around challenges

Invite community and potential leaders to participate in the challenge of implementing detector solutions that satisfy detector requirements using technology that either exists, or can be realistically developed over the next 10-15 years

Some points raised:

Stress double opportunity:

i) for detector ”inventors” to put into application their technologies

ii) for experiments to benefit from it

Even though main focus should be on ee, hh should not be forgotten / left out

Importance of key4HEP software (FCCSW)

detailed study and optimization of subdetectors

”plug-n-play” assembly of detector concepts from detector components

Physics organization

Physics programme:

a few decisions:

-- topics as proposed by Michelangelo agreed

-- ee--> H to remain a dedicated acc+exp task force
possibly unified with the EPOL group
(FZ agreed)

-- Question of overall Physics Program Coordinators to be tackled when considering proposals for names

-- Mandate to be elaborated (AB, PJ, MLM)
Status: first draft exists, under construction
FCC-hh studies have been integrated.

-- Interface with Physics Performance:
« benchmarks measurements »

WORKING GROUPS

WGs provide the forum to present recent results (pheno papers and ideas, progress with studies and analyses), stimulate and monitor new studies, promote "physics benchmarks" trigger "Case Study" activities

1. **EW physics,** covering:
   - precision EW at the Z peak and WW thresholds, including W mass
   - High energy EW: Diboson, difermion
   - precision theory calculations
   - Monte-Carlo generators and fitting formulae
2. **Higgs**, including ee->H, and including precision TH calculations, MCs and fitting formulae
3. **Flavour physics**:
   - heavy quarks
   - tau lepton
4. **BSM**:
   - Bring all BSM-related topics under the same WG. In particular:
   - indirect sensitivity, including model-specific global fits
   - direct BSM searches, including Feebly interacting particles, LLPs, light DM, ...
5. **QCD** (includes the dedicated precision theory calculations, MC generators, fitting formulae
6. **Top** (includes the dedicated precision theory calculations, MC generators, fitting formulae.

To address also
« FCC-hh beyond the Multi-Purpose detectors »
e.g. FCCb, FaserCC, injector program heavy ions, e-p etc...

ECFA Detectors Experiments and Physics Workshops

See previous news for goals of the ECFA workshops on D,E&P.

Three working groups

Group 1, Physics Potential: **Juan Alcaraz**, Jenny List, Fabio Maltoni and James Wells

Group 2, Physics Analysis Methods : **Patrizia Azzi,** Dirk Zerwas, Fulvio Piccinini

Group 3 Detectors (pending ECFA road map completion)

as announced last week:
Kick-off meeting on Friday 18 June 2021
online, 14:00 – 17:30 CERN time
https://indico.cern.ch/event/1033941/

ECFA Detector R&D Roadmap Process and Timeline

Next important steps:

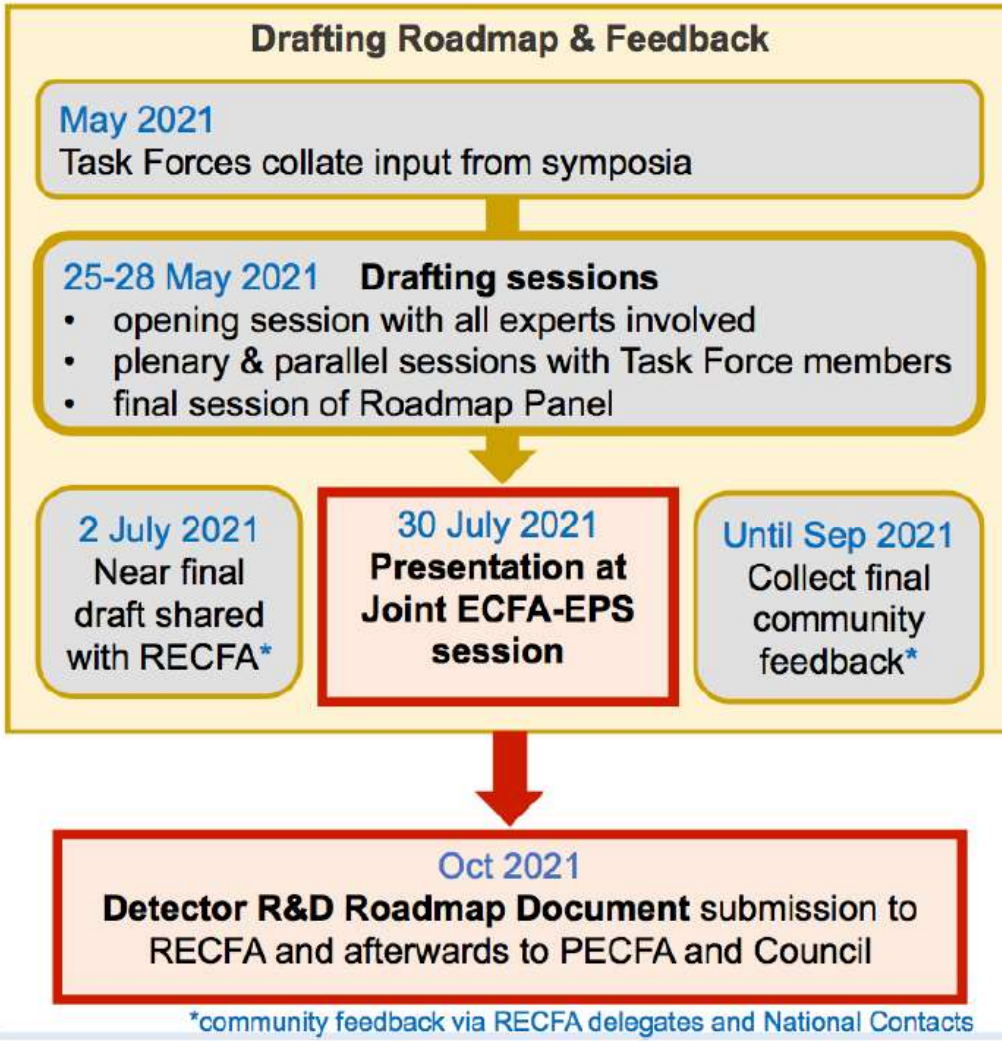
- Collate input from symposia, national contacts, ... in preparation for the **Drafting Sessions (dates fixed: 25 – 28 May)**

- Layout of the session under discussion right now

  (complex process: many future projects → prioritisation needed, large uncertainties on timeline)

  (i) Timeline of projects (start of operation)
  (ii) Time required for R&D
  (iii) Time required for detector construction

- **On (i) a common baseline with LDG is highly desirable**



to be approved by rECFA in November and by CERN council in December 2021

Status Report on FCC Global Collaboration

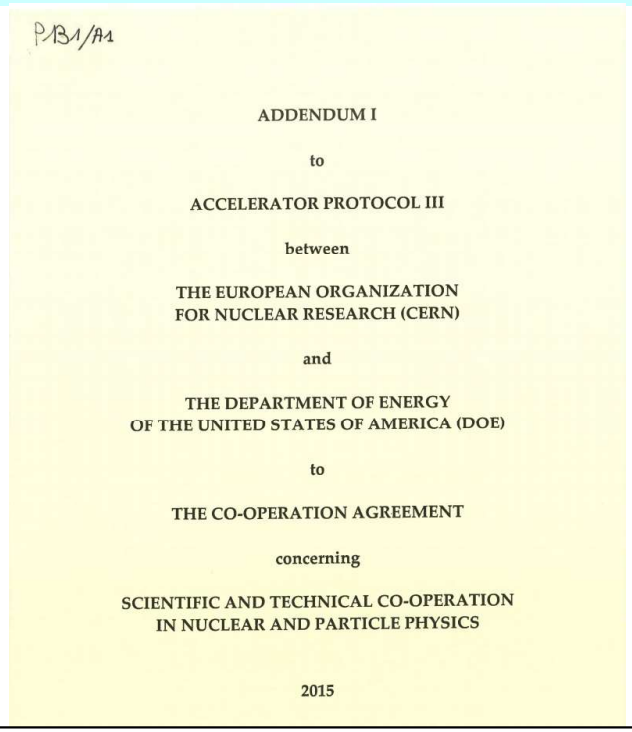
Emmanuel Tsesmelis

2nd Meeting of the FCC Global Collaboration Working Group
29 April 2021

3rd Meeting of the FCC Global Collaboration Working Group
25 May 2021

+M. Benedikt (CERN), F. Zimmermann (CERN), FCC study leader and deputy;
- A. Blondel (IN2P3&Geneva), P. Janot (CERN), current FCC PED coordinators;
- J. Ellis (Kings College London), P. Charitos (CERN) from the FCC Coordination group;
- G. Bernardi (IN2P3), T. Lesiak (Krakow) (dep. M. Chrzaszcz), conveners of the FCC-PED Informal Forum of National Contacts.

United States



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ADDENDUM I

to

ACCELERATOR PROTOCOL III

between

THE EUROPEAN ORGANIZATION
FOR NUCLEAR RESEARCH (CERN)

and

THE DEPARTMENT OF ENERGY
OF THE UNITED STATES OF AMERICA (DOE)

to

THE CO-OPERATION AGREEMENT

concerning

SCIENTIFIC AND TECHNICAL CO-OPERATION
IN NUCLEAR AND PARTICLE PHYSICS

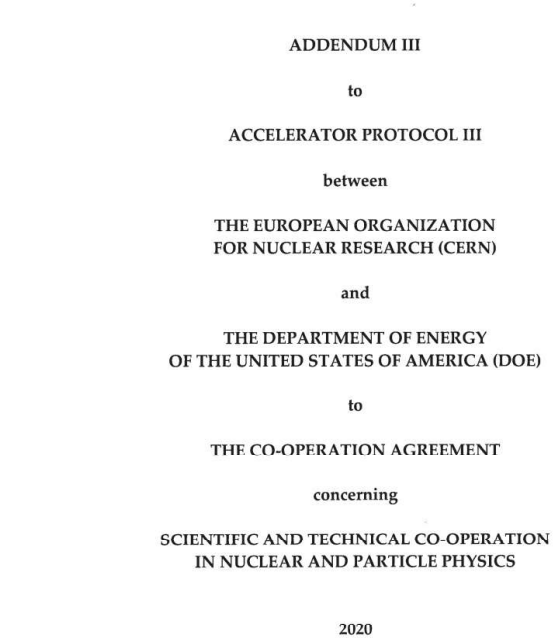
2015

18 December 2015
with U.S. Department of Energy

Participants - Institutes, laboratories, universities and their funding agencies, including CERN and U.S. DOE, and other signatories of MoU and CERN as Host Lab.

MoU estabishing common understanding among participants for execution of FCC Study.

U.S. becomes participant in FCC Study.



ADDENDUM III

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IN NUCLEAR AND PARTICLE PHYSICS

2020

December 2020
with U.S. Department of Energy

Defines framework under which DOE and U.S. universities, national labs and other organisations shall participate in FCC Feasibility Study.

- Near- to medium-term (3-10 yrs)
  - Concept optimisation, beam physics studies, key technology R&D
- Longer-term (5-20 yrs)
  - High-field magnet R&D, civil engineering techniques, identification of in-kind contributions
- *Formalise participation of LBNL (FCC-hh high-field magnets) and SLAC (FCC-ee SCRF) with conclusion of FCC Addenda.*

1st FCC Nordic day

Monday 22 Mar 2021, 14:00 → 18:05 Europe/Stockholm

Alexander Read (University of Oslo), Katri Huitu (University of Helsinki), Mogens Dam (Københavns Universitet Niels Bohr Institute), Rebeca Gonzalez Suarez (Uppsala University)

Description

The First FCC Nordic day will happen online on Monday, 22 of March 2021, geared toward the high energy physics communities of the Nordic countries.

The meeting will give an overview of the status, plans, and different possibilities that the FCC offers, in light of the recent update of the European Strategy for Particle Physics.

In the second part of the meeting, the focus will shift to activities that are already underway in the Nordic countries, as well as plans, and possible ideas.

Nordic HEP Community

Held FCC Kick-off Meeting on 22 March 2021 to inform and organise Nordic HEP community for FCC collaboration

Detailed information available at https://indico.uu.se/event/872/

All CERN Member States and signatories of FCC MoU

Follow-up meeting with organisers scheduled for 3 May

Keen to collaborate with Baltic countries

- Estonia (Associate Member State in the pre-stage to Membership)
- Latvia (expected Associate Member State in 2021)
- Lithuania (Associate Member State since 2018)
- Propose discussions with Norway (not signatory of FCC MoU)

Engagement with other Countries (I)

Lithuania

CERN Associate Member State

Currently, have not signed FCC MoU and do not have FCC National Contact

Annual Meeting of Joint CERN-Lithuania Committee

Lithuania expressed interest in participating in FCC Feasibility Study

Appointment of an FCC National Contact will be made.

United Kingdom

University of Liverpool (with research group at Cockroft Institute)

Deliverable of physics workshop to capture physics research opportunities

Aiming for January 2022 with about 200 participants

week of 7-11 February 2022

need to coordinate Liverpool group with PED members Leonidopoulos and Wilkinson

also discussed collaboration with INDIA,
-- in planning process
-- several contacts were identified
-- and possibility to organise 'FCC events seminars etc...

Engagement with other Countries (II)

Mexico

CERN NMS with International Cooperation Agreement (1998)
Participating Institutes of FCC Collaboration

BUAP, Puebla, *CINVESTAV*, Mexico D.F., *UADY*, Mérida (One Addendum; March 2021)

Electron-cloud simulations for FCC-ee (build up in quadrupole fields)

UCOL, Colima, *UGTO*, Guanajuato (Two Addenda; 2015 and 2019)

FCC-ee - dynamic aperture studies, monochromatisation scheme, electron cloud simulations
FCC-hh – synchrotron radiation flux simulations, electron cloud simulations

Meeting held with University of Sinaloa - Expressed interest to join FCC Feasibility Study

Willing to help organise Mexico-wide meeting / seminar for FCC presentation

Canada

CERN NMS with International Cooperation Agreement (1996)
• University of Saskatchewan & Canadian Light Source are participating institutes of the FCC Collaboration (signed MoU in 2018)
• Expressed interest to work on injection lattice design (M. Boland through Ph.D. / MSc. students) •

Pakistan

CERN Associate Member State
• Annual Meeting of the Joint CERN-Pakistan Committee (19 May 2021)
• Pakistan expressed interest in participating in FCC Feasibility Study • Discuss conclusion of FCC MoU

FCC group at CERN for users

- A new Users group was created in CERN-EP for FCC "EP-UFC"

Spokesperson Michael Benedikt; Deputy Frank Zimmermann ;
Contact person Patrick Janot secretariat: fcc.secretariat@cern.ch
➔ *Julie Hadre is still our secretary*

External teams (and team account etc.) can be created affiliated to EP-UFC
can be registered user with FCC as CERN experiment.

→ *need to sign MOU* and an addendum.
NB addendum is not necessary to just register a student for the summer, to benefit from computer account etc... EXTERNAL registration is enough.

In all cases contact first the FCC secretariat

A discussion for a Future Collider Unit at CERN under Research director (J. Mnich) will come later whenever there will be STAFFs and FELLOWs.

FCC Week 28 June - 2 July 2021

Version: 0.8 Date: 15.04.2021

FCC Week 2021 Programme

Day	Monday 28 June	Tuesday 29 June		Wednesday 30 June		Thursday 1 July		Friday 2 July	Day
Time	Plenary	Parallel 1	Parallel 2	Parallel 1	Parallel 2	Parallel 1	Parallel 2	Plenary	Time
08:30-09:00									08:30-09:00
09:00-09:30	Opening	Technology R&D	FCCIS WP3 (Integrate Europe)	FCC SRF	FCC-hh ACC	FCC-ee ACC/FCCIS WP2 (E-cloud)	FCC I&O	Summaries	09:00-09:30
09:30-10:00									09:30-10:00
10:00-10:30									10:00-10:30
10:30-11:00									10:30-11:00
11:00-11:30	FCC feasibility phase	FCC-ee ACC/FCCIS WP2 (parameters, layouts, overview)	FCCIS WP4 (Socio-economic benefit model & regional impact)	FCC-ee ACC/FCCIS WP2 (Injection)	EASITrain	FCC-ee ACC/FCCIS WP2 (IR and MDI)	FCC I&O	Summaries	11:00-11:30
11:30-12:00									11:30-12:00
12:00-12:30									12:00-12:30
12:30-13:00									12:30-13:00
13:00-13:30		FCC SRF					FCC SRF		13:00-13:30
13:30-14:00									13:30-14:00
14:00-14:30	PE&D		FCCIS WP5 (Overleaf)	FCC eh	FCC CE	FCC-ee ACC (Other applications & upgrades)			14:00-14:30
14:30-15:00									14:30-15:00
15:00-15:30									15:00-15:30
15:30-16:00									15:30-16:00
16:00-16:30	PE&D	FCC-ee ACC/FCCIS WP2 (optics, correction, dynamic aperture)	PE&D	FCC-ee ACC/FCCIS WP2 (Impedance & collective)	FCCIS WP5 (Project communication strategy)	Technology R&D	PE&D		16:00-16:30
16:30-17:00									16:30-17:00
17:00-17:30									17:00-17:30
17:30-18:00									17:30-18:00
18:00-18:30			FCC ISC	FCC IAB	EASITrain ECC and SSB	FCCIS Executive Board	FCC ISB and FCCIS GA		18:00-18:30
18:30-19:00									18:30-19:00
19:00-19:30									19:00-19:30

FCC Week 2021 – Monday 28 June

Monday morning plenaries	
Opening (15 min)	Fabiola Gianotti
ESU implementation of High-Priority Future Initiatives (30 min)	Chair of the SPC
Roadmap for the FCC Feasibility Study (30 min)	FCC Study Leader
High field magnet plan (30 min)	HFM Project Leader
Requirements on the accelerator from the physics programme (30 min)	NN(AB)
Update on Snowmass process & US perspectives incl. EIC (30 min)	

Monday afternoon plenaries **PROPOSAL**	
Physics at FCC (30 min)	Matthew Reece
The structure and targets of the Physics programme pillar of the FCC feasibility study (30 min)	NN (Janot)
Targets, milestones and progress of the Physics Performance	(Azzi/Perez) 25+5)
Software for 'Higgs and Electroweak Factories' (incl. specifics of FCC-ee computing)	(Ganis) (25+5)
Detector challenges, towards detector conceptsat FCC-ee	(Mogens) (25+5)
The status of international cooperation on PED studies (15+15 +5 min)	Tsesmelis, Bernardi/Lesiak/Chrzaszcz

FCC Week 2021 – PPC session

-

proposal for PPC session (Emmanuel/Patrizia) Tuesday /Thursday 90' each.
- Higgs mass and sigma(ZH) from the recoil mass (Ang/Greg/Sylvie/Valentina/Markus)
- Bc to tau nu (Clement/Donal)

at least one of the following studies should be advanced enough to lead to a talk:
- searches for new scalars (Markus/Justin)
- b- and c-tagging and the Hcc coupling (Loukas/Michele)
- top electroweak couplings (Julie / Jorgen)

There will be a summary of the Physics Performance activities in one plenary session.

insist on the 'case study' character → leading to detector requirements

Software proposal: (Gerri) 45'?
- Key4hep: status and plans, 20+5' (speaker: V Volkl; reserves: T Mandlener, A Sailer)
- FCCSW: status and (users) workflows, 15+5' (speaker: G Ganis; reserve: V Volkl)
- FCCAnalysis: tools and algorithms for analysis, 10+5' (speaker: C Helsens)

+ ask Christos/Matthew one or two highlights from the Physics meetings.

Physics (PED) Workshop in February in Liverpool

1) Proposal for now: 7-11 February
(unless CMS week is at that time)

2) Format: In person, Virtual, Hybrid [our proposal is to aim for a hybrid event]
(in person with possibility to connect).
please try to make accommodation affordable!

3) Type & Number of sessions: Plenary and/or Parallel

4) Online poster session

5) Expected number of participants: 2 to 300

6) Social event?

- **Discussion on Calorimetry postponed to next meeting (Vendredi 11/6)**
  Possibilité d'inviter un autre member de votre Labo (Phys, IR ou DT).

- Introduction Roman Poeschl

- 2-3 slides / par type de calorimétrie, pour rappeler status et groupes interessés

- Discussion

- Synthèse ?

- **Start of Detailed Presentations on microvertex R&D at next meeting, as well.**

Jamboree du 25 Juin

- Ouvert à tous les membres de nos équipes
- Impliquer les étudiants et stagiaires
- Préparer FCC-France de novembre

Physics Benchmark studies

https://indico.cern.ch/event/951830 Snowmass LOI's
List of Benchmark case studies and abstracts in one file

Labo	Case study	titre	Total
APC	11 12	Higgs boson coupling measurements to charm quarks at FCC-ee The total $e^+e^- \rightarrow ZH$ cross section σ_{HZ}	
CPPM			
IJC Lab			
IPHC	19	Top quark physics @ FCC-ee	
IP2I			
LAPP			
LLR	12 15	The total $e^+e^- \rightarrow ZH$ cross section σ_{HZ} The Higgs boson total decay width Γ_H	
LPNHE	5 5bis	Perspectives for high-precision $\alpha_S(m_Z^2)$ determinations FCC-ee High-precision αS(m2Z) from $e+e- \rightarrow$ hadrons data below the Z peak	
LPC			
LPSC			
L2IT			
FCC-IN2P3			

- études d'impacts de choix de géométrie du tracker et de budget de matière sur la résolution du tracking (IPHC)

- exigences en performance pour un trajectometre (IP2I)

  --"Etudes des performances de reconstruction de traces (résolution en impulsion , paramètres d'impact...) en fonction du design des détecteurs internes de traces. " Aymeric FRANCIA (encadrante Gaelle BOUDOUL)

- construction d'un modèle effectif, avec un singlet scalaire, pour modéliser des scalaires composites légers (IP2I)

  "Physique de précision sur les modèles de Higgs composite au FCC-ee: Construction d'un modèle effectif, avec un singlet scalaire, pour modéliser des scalaires composites légers" Andres PINTO (encadrant Giacomo CACCIAPAGLIA)

- ~~Top quark physics @ FCC-ee (IPHC)~~

- Higgs boson coupling measurements to charm quarks at FCC-ee (APC)

- The total $e^+e^- \rightarrow ZH$ cross section σ_{HZ} (APC,IJCLab,LLR)

- The Higgs boson total decay width Γ_H (LLR)

- Perspectives for high-precision $\alpha_S(m_Z^2)$ determinations FCC-ee (LPNHE)

- High-precision αS(m2Z) from e+e− → hadrons data below the Z peak (LPNHE)

3rd FCC-France : November 30 Mardi→Jeudi à Annecy

Rappel agenda Mai (1er jour)

09:00 **Status & Goals** — *Gregorio Bernardi*
Video only 09:00 - 10:40

coffee break
Video only 10:40 - 10:55

11:00 **Detectors Projects for e+e- Circular Colliders ····· Physics @ FCC-hh** — *Roy Aleksan*
Video only 10:55 - 13:10

12:00
13:00 **Lunch break**

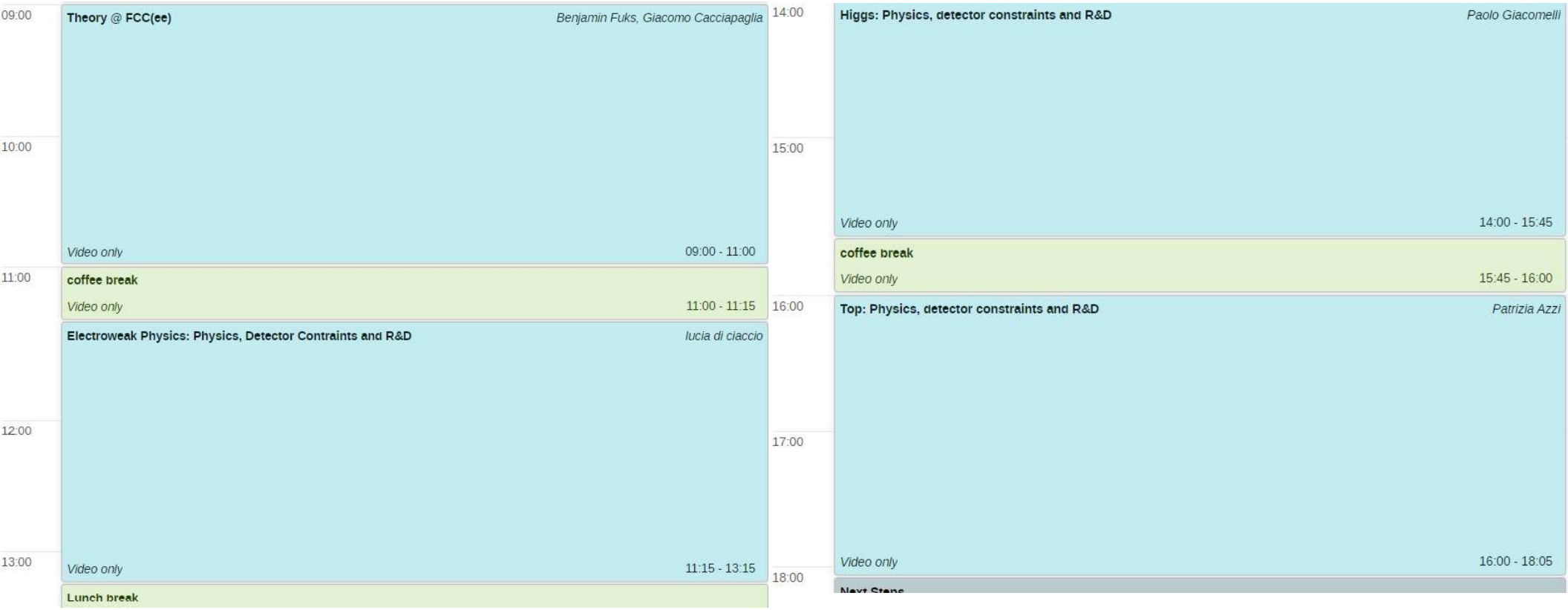
14:00 **Accelerator session: Accelerator session** — *Angeles Faus-Golfe, Pierre Vedrine*
Video only 14:00 - 16:00

15:00
16:00 **coffee break**
Video only 16:00 - 16:15

Heavy Flavour and QCD: Physics, Detector Contraints and R&D — *Marie-Hélène Schune*
17:00
18:00 *Video only* 16:15 - 18:15

3rd FCC-France : November 30 Mardi→Jeudi à Annecy

Rappel agenda Mai (2eme Jour)



- Pour Novembre, nous aurons du Mardi au Jeudi, 3 jours max.
- ILC ?
- Sessions supplémentaires ?

Tour de Table / Case studies / R&D / Stages

IRFU	Saclay
APC	Paris
CPPM	Marseille
IJCLab	Orsay
IPHC	Strasbourg
IP2I	Lyon
LAPP	Annecy
LPC	Clermont
LLR	Palaiseau
LPNHE	Paris
LPSC	Grenoble
L2IT	Toulouse

Next meeting: Vendredi 11 Juin **14h30** R&D

Vendredi 25 Juin **14h30** Jamboree