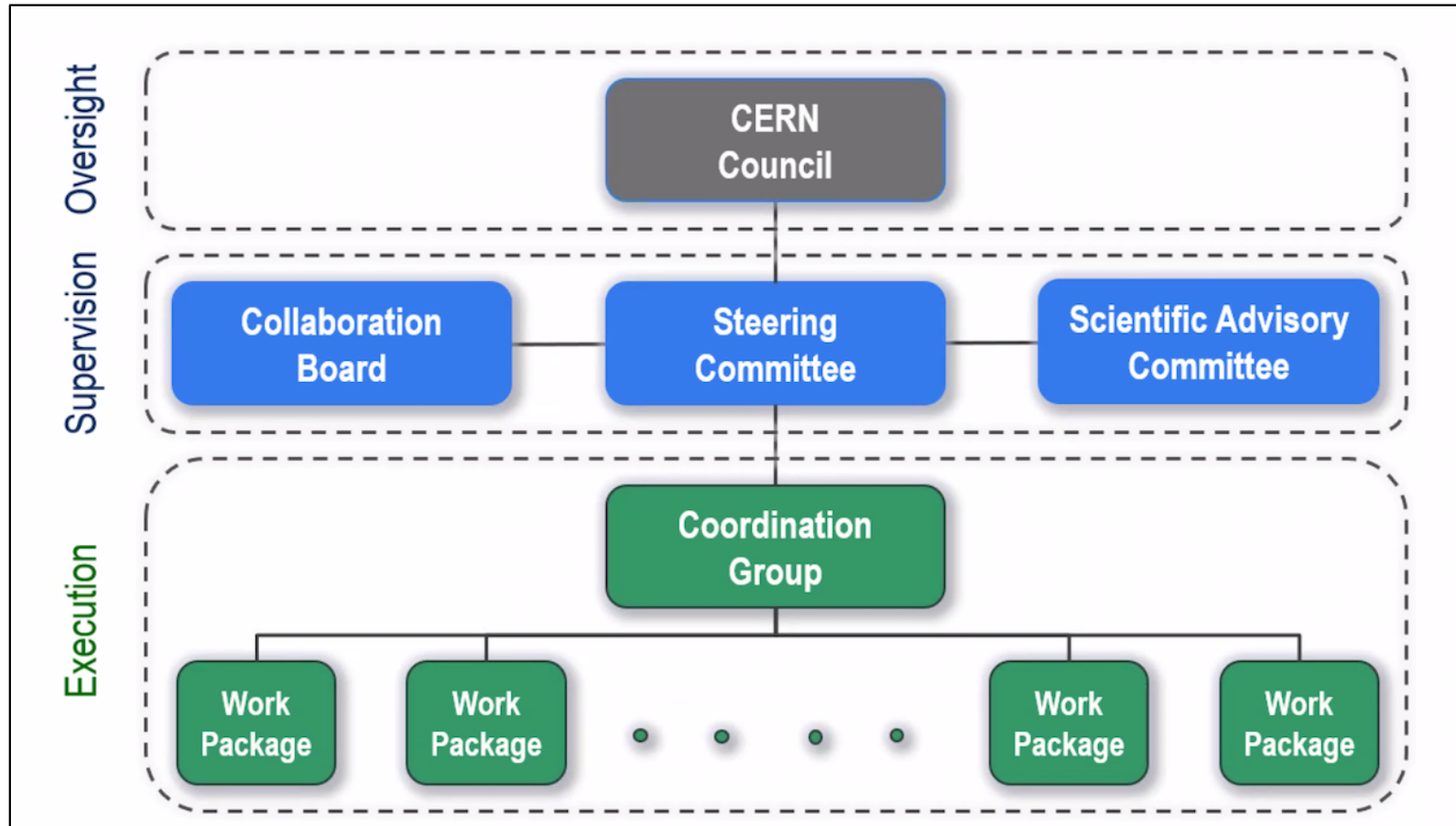




□ Outline

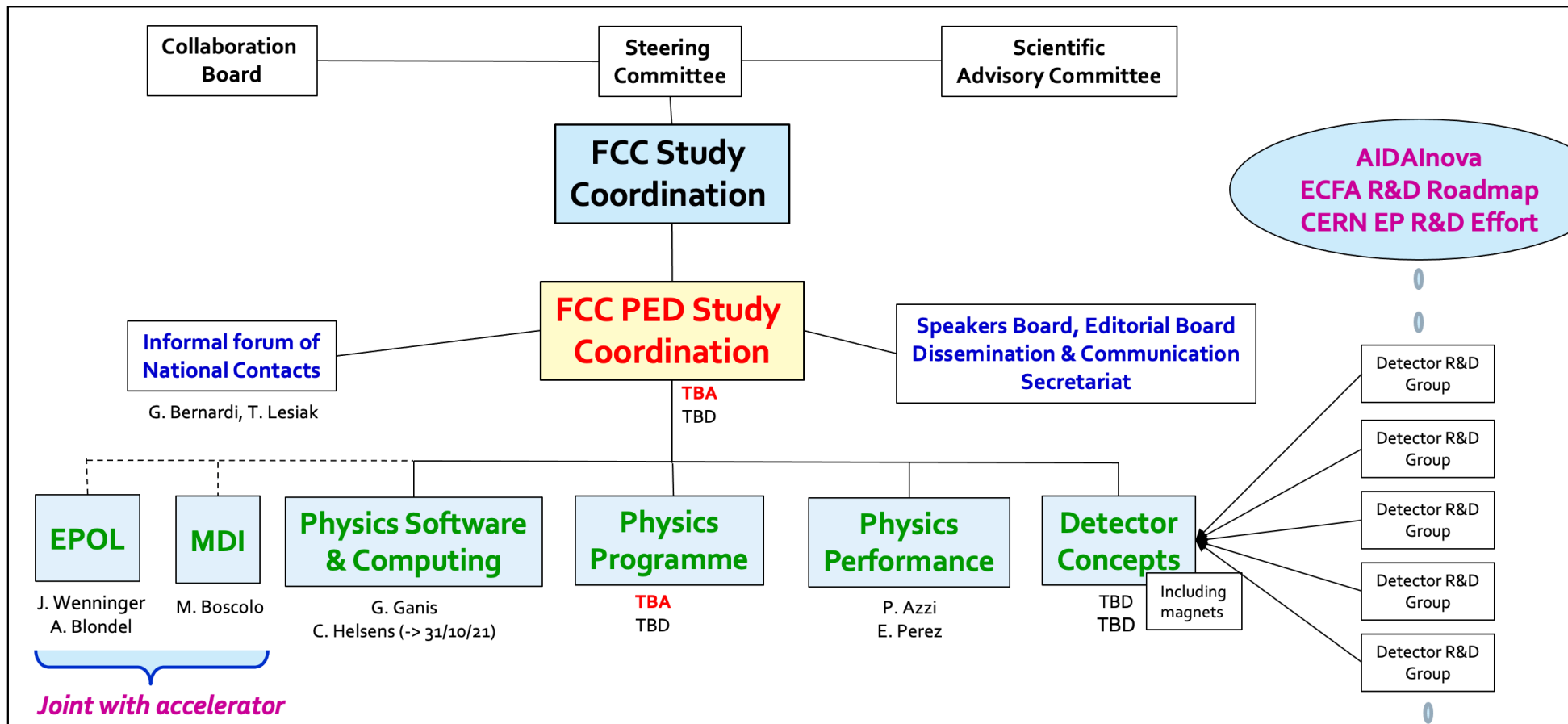
- ◆ Organization (cont'd)
- ◆ News from ECFA
- ◆ FCC Global Collaboration Working Group
- ◆ FCC Week
- ◆ Coming up

- **CERN Council to decide (14-18 June) about the FCC Study overall structure**



- ◆ **The Physics, Experiments, and Detectors (PED) study is one of the work packages**

- In FCC PED, TBD's are being filled – some TBD's upgraded to TBA's



- Cannot give names at this point – need official confirmation from FCC Study Coordination

- **A summary of the current structure / mandate / activities sent to J. Mnich**
 - ◆ JM OK with the PED Pillar structure, official approval to be made by the study organization
 - Summary of the structure and activities attached to the agenda
- **A more detailed draft of the Physics Programme mandate exists**
 - ◆ At least six working groups, covering the physics potential of the FCC integral project

1. EW physics (including precision measurements from both the ee and pp runs, and large Q2 observables from pp measurements)
2. Higgs physics
3. Top quark physics
4. Heavy Flavour physics (charm, bottom, tau)
5. QCD
6. BSM (indirect probes via precision measurements as well as direct searches of new particles and interactions)

- Brings together experimentalists and theorists
 - ➔ Covers phenomenological studies, event generation tools, fitting formulae and EFT formalism
 - ➔ Identify "benchmark measurements" towards which detector requirements, operation model, or theoretical calculations should be optimized and evaluated

Close connection with Physics Performance group and its case studies

- **A mandate for the Detector Concepts group has been drafted in April/May**
 - ◆ **As an outcome of the work of an ad-hoc task force chaired by Mogens Dam**
 - **Mandate proposal attached to the agenda – Extracts:**
 - In collaboration with the Physics Performance group, promote the use of FCCSW for subdetector geometrical description, simulation, local reconstruction; integrate subdetectors into detector concepts; simulate and evaluate their performance; towards detector concept proposals compatible with the detector requirements
 - Function as a forum, where progress, ideas, and results from individual R&D efforts and test-beam activities are presented, discussed and reviewed in view of the FCC-ee detector requirements and physics; in particular, follow technological developments that could lead to new physics opportunities
 - Establish links with and give necessary inputs to R&D groups; Monitor and act upon the ECFA R&D roadmap, and ECFA “Higgs and EW factories” Detector WG.
 - Documentation in the Feasibility Study Report (FSR), including descriptions of how the detector requirements can be matched by detector solutions; the technical and financial feasibility of the concepts; the R&D efforts and resources still requires to achieve the detector requirements.
 - ◆ **Next task-force meeting Tuesday 1 June, 3pm**
 - **To make a shortlist of possible Detector Concepts group coordinators**

Members:

- Martin Aleksa
- Nicola Bacchetta
- Alain Blondel
- Paula Collins
- Mogens Dam (chair)
- Gerado Ganis
- Paolo Giacomelli
- Patrick Janot
- Emmanuel Perez
- Frank Simon
- Guy Wilkinson

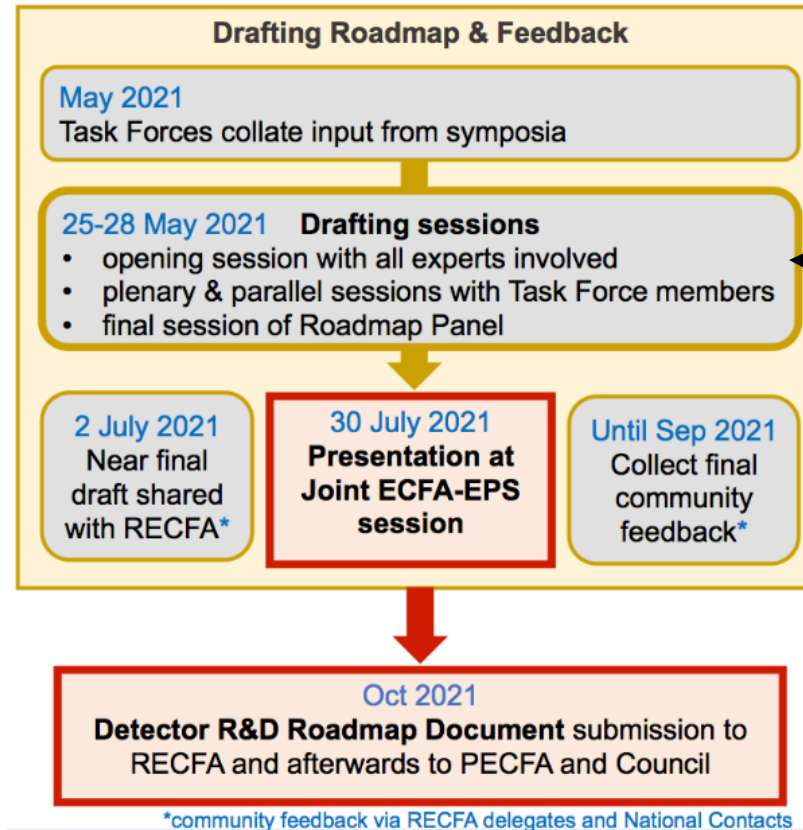
- **ECFA Workshops on Physics, Experiments and Detectors at Higgs and EW factories**
 - ◆ **Three working groups**
 - **Group 1: Physics potential (Juan Alcaraz, Jenny List, Fabio Maltoni, James Wells)**
 - **Group 2: Physics analysis methods (Patrizia Azzi, Dirk Zerwas, Fulvio Piccinini)**
 - **Group 3: Detectors**
 - Organization pending completion of ECFA Detector R&D Roadmap
 - ◆ **Kick-off meeting scheduled on 18 June 2021, 14:00 – 17:30 CERN time**
 - **Agenda at <https://indico.cern.ch/event/1033941/>**
 - Current status of challenges (experimental, theoretical, global interpretation)
 - Current status of physics analysis methods (event generators, physics performance, detector simulation, software)
 - A vision of the way ahead
 - **Meeting will be held online only, don't forget to register.**

Summary of Detector R&D Roadmap Process (cont.)

- Since this is an ECFA document, it is important to involve the (R)ECFA members
- Following our discussion in the last RECFA meeting, the Roadmap Panel has agreed that RECFA delegates together with the appointed National Contacts collect the feedback from their community

Probably the best way forward is to share the draft with the relevant detector experts in your country / lab

- RECFA delegates + National Contacts will collect and condense feedback → to RECFA (all)
(This includes as well APPEC and NuPECC)
- Evaluation and decision taking by a **RECFA Panel** together with delegates from Roadmap Panel (also important in case of conflicts between projects / countries)
- **Final discussion in dedicated RECFA meeting in July, followed by a report and discussion in a Plenary ECFA meeting**



Interesting round-up of the nine task-force meetings. Rather smooth session.

<https://indico.cern.ch/event/1037113/>

09:00 → 09:15 **Opening**

Speaker: Philip Patrick Allport (University of Birmingham (UK))

Introduction_Draftin...

09:15 → 10:45 **Plenary I with Input of each Task Force**

09:15 **Task Force 8: Integration**

Speakers: Frank Hartmann (KIT - Karlsruhe Institute of Technology (DE)), Wern

TF8_25052021.pdf

09:45 **Task Force 7: Electronics and On-detector Processing**

Speakers: Prof. Dave Newbold (STFC Rutherford Appleton Laboratory (GB)), Fi

tf7_intro.pdf

10:15 **Task Force 9: Training**

Speakers: Erika Garutti (University of Hamburg), Johann Collot (university Gr

EG-ECFA-TF9-Sum...

10:45 → 11:15

Break

11:15 → 12:45 **Plenary II with Input of each TF: Plenary II with Input of each Task Force**

11:15 **Task Force 6: Calorimetry**

Speakers: Roberto Ferrari (INFN Pavia (IT)), Roman Poeschl (Université Pari

talk-TF6-250521.pdf

11:45 **Task Force 4: Photon Detectors and Particle Identification Det**

Speakers: Neville Harnew (University of Oxford (GB)), Peter Krizan (Universt

Krizan-Harnew-TF4...

12:15 **Task Force 3: Solid State Detectors**

Speakers: Giulio Pellegrini (Universidad de Valencia (ES)), Nicolo Cartiglia (

Drafting_TF3.pdf

14:00 → 16:00 **Plenary III with Input of each Task Force**

14:00 **Task Force 1: Gaseous Detectors**

Speakers: Anna Colaleo (Universita e INFN, Bari (IT)), Leszek Ropelewski (CERN)

TF1 Draft Session I...

14:30 **Task Force 2: Liquid Detectors**

Speakers: Jocelyn Monroe (RHUL), Roxanne Guenette (Harvard University)

ECFA_TF2_Plenary...

15:00 **Task Force 5: Quantum and Emerging Technologies**

Speakers: Marcel Demarteau (Fermilab), Michael Doser (CERN)

TF5_ECFA_May25.p...

Very relevant to FCC-ee:

- Calorimeters: noted difference between LC and CC
also noted mechanical precision for lumi ($\sim 1\mu\text{m}$ for FCC-ee)
- silicon tracker → R&D for light and robust low power electr.
- Gas detectors (only IDEA DC considered)
- Mechanical integration (no mech. alignment considered in WP8)
- Many new ideas for PID

PLEASE READ & SIGNAL SOON IF YOU FIND OMISSIONS / SHORTCOMINGS

- TF6 Symposium allowed for paving the way for defining the roadmap for future calorimeter R&D
- Broadly three time scales
 - Short term: HL-LHC after LS4
 - Medium term: electron-positron colliders
 - Linear and circular machines have commonalities but also significant differences
 - Long term: hadron collider and/or Muon Colliders
 - Extreme environment at future hadron colliders requires strategic approach now
 - High rates and radiation, particle and jet energies \gg HL-LHC
- Important message I: Calorimeters require system approach from day one on
 - Tight collaboration between physicists, engineers and industry
- Important message II: In future calorimeters energy resolution may not be the key metric
 - Although there are of course still a number of applications that require extremely good energy resolution
- High granularity for Particle Flow is clearly a driver of future R&D
- Technologies such as Dual Readout have to address integration aspects
- Integration of timing into calorimeters is one of the big tasks in future R&D
 - This requires as Step 0 to understand what level of precision is needed for which application
- Changes in readout architectures need to be followed up and integrated into our planning

Mechanical precision for ECAL?

- **Last meeting took place on 26 May (Chair: Emmanuel Tsesmelis)**
 - ◆ **United States**
 - Addendum signed with DoE in December 2020
 - Soon to formalise strong participation and support from LBNL (FCC-hh high-field magnets) and SLAC (coordination of the FCC-ee Accelerator work package)
 - ◆ **Nordic Countries had their first “FCC Nordic Day” in March 2021**
 - Agreed to engage more with technical/engineering universities and departments
 - Keen to collaborate with Baltic countries (Estonia, Latvia, Lithuania)
 - Poland may be interested in joining
 - Discussions will start with Norway (not signatory of a FCC MoU)
 - ◆ **Engagement with other countries who expressed interest being prepared**
 - Canada, Pakistan, India, Mexico ...

□ United Kingdom

◆ University of Liverpool (with research group at Cockroft institute)

- Deliverable of Physics Workshop to capture physics research opportunity

- Aiming for February 2022 (proposal: 7-11 February)

- Format: in person, virtual, hybrid (= in person with possibility to connect)

- possibility of launching a survey to understand how many people interested to come physically to Liverpool

- Local Organizing Committee, Programme Committee, International Advisory Committee to be formed

□ Miscellaneous

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

- Spokesperson M. Benedikt; Deputy F. Zimmermann; Contact person PJ.

- External user teams can now register with FCC as CERN experiment

- With MoU and addendum (latest version included to the agenda)

- In all cases, contact first the FCC secretariat <mailto:fcc.secretariat@cern.ch>

◆ The position of some (important) delegations about the FCC is starting to evolve

- Towards FCC = FCC-ee first with FCC-hh as a later option (financially less challenging)

- We have to try and convince all our delegates (and the ECFA chairperson)

□ **28 June - 2 July 2021: Register at <https://indico.cern.ch/event/995850/>**

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 3	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)	SRF Technologies	FCC-hh accelerator		FCC-ee IR and MDI	Technical Infrastructures	Summaries	09:00-09:30					
09:30-10:00															
10:00-10:30															
10:30-11:00										10:30-11:00					
11:00-11:30	FCC feasibility phase	FCC-ee parameters, layout, overview, with booster	FCCIS WP4 (Impact & Sustainability)	FCC-ee electron cloud & vacuum	Physics, Experiments & Detectors	EASITrain	FCC-ee impedance & collective effects	Technical Infrastructures	Summaries	11:00-11:30					
11:30-12:00															
12:00-12:30															
12:30-13:00										12:30-13:00					
13:00-13:30		SRF: Direction for R&D						SRF Technologies		13:00-13:30					
13:30-14:00										13:30-14:00					
14:00-14:30	Physics, Experiments & Detectors			FCCIS WP5 (Leverage & Engage)	FCC-eh	Civil Engineering			FCC-ee 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	Physics, Experiments & Detectors	FCC-ee optics, correction, beam stay-clear, dynamic aperture, collimation	Physics, Experiments & Detectors	FCC-ee injector complex	FCCIS WP5 (Leverage & Engage)		Technology R&D	Physics, Experiments & Detectors		16:00-16:30					
16:30-17:00															16:30-17:00
17:00-17:30															



FCC Week plenaries



FCC Week 2021 – Opening Day Plenaries – Monday 28 June morning

Monday morning plenaries 09h00 – 12h00

Name in parenthesis will either give the talk or propose a speaker

Opening, CERN vision and plans until 2025 (30 min)	Fabiola Gianotti
Roadmap for the FCC Feasibility Study (30 min)	Michael Benedikt
Roadmap for high-field magnet R&D (30 min)	ask Soren Prestemon
ESU: status of implementation of high-priority Accelerator R&D initiatives (30 min)	ask Dave Newbold
ECFA roadmap for detector technology and plans for Higgs factory WG (30 min)	ask Karl Jakobs
Requirements on the accelerator from the physics programme (30 min)	NN (Blondel)



FCC Week 2021 – Opening Day Plenaries – Monday 28 June afternoon

Monday afternoon plenaries 14h00 – 17h30

Names in parenthesis will either give the talk or propose a speaker

Physics at FCC (30 min)	Matthew Reece
The structure and targets of the PED pillar of the FCC feasibility study (25+5)	tbd (Janot)
Targets, milestones and progress of Physics Performance (25+5)	tbd (Azzi/Perez)
What software for future Higgs and EW factories? (25+5)	G. Ganis
Detector challenges, towards detector concepts at FCC-ee (25+5)	tbd (Dam)
The status of international cooperation on FCC PED studies (15+15 +5) The FCC-PED Informal Forum of National Contacts	Emmanuel Tsemelis NN (Bernardi/Lesiak/Chrzaszcz)
Update on Snowmass process & US perspectives incl. EIC (30 min)	tbd

- **Late afternoon (Monday, Tuesday, or Thursday): Webinar at ~6pm**

Introduce the feasibility study for the FCC, explore the facility's immense scientific potential and address associated dimensions including placement studies, sustainable machine design, and the key technological challenges

Webinar (moderator: Matthew Chalmers)

FCC implementation plan - Motivations and objectives	M. Benedikt (tbc)
FCC physics opportunities – Boosting precision/energy frontiers	tbd (exp or th.)
From LEP/LHC to the FCCs: A tale of innovation and collaboration	tbd
Q&A session with the audience	

- ◆ **8-10 minutes presentations**

- **Followed by 30' discussion**

→ **Not meant to be a comprehensive scientific seminar but really to bring out the main points and, more importantly, to excite people about the project.**

□ Tuesday afternoon PED session (11:00 – 12:30): Proposal

Physics Performance Highlights

$B_c \rightarrow \tau \nu$	(Clement/Donal)
Higgs mass and $\sigma(\text{ZH})$ from the recoil mass	tbd
b- and c-tagging and the Hcc coupling	Michele Selvaggi

- ◆ Proposal: Talks of 25 minutes each
 - Session organized by Patrizia and Emmanuel

□ Wednesday morning PED session (11:00 – 12:30): Proposal

Software and Physics Highlights

Key4hep: status and plans	F. Gaede (tbc)
FCCSW: status and (users) workflows	V. Volkl
FCCAnalysis: tools and algorithms for analysis,	C Helsens
Right-Handed neutrinos @ FCC	NN (Christos/Matthew)
Second highlight talk on physics @ FCC 20+5	NN (Christos/Matthew)

◆ Proposal: talks of 15 minutes each

- In charge of talks 1,2,3: G. Ganis and C. Helsens
- In charge of talks 4,5: M. McCullough and C. Leonidopoulos

□ Thursday afternoon session (16:00 – 17:30): Proposal

Detector Highlights

Tracking and PID	NN
Calorimetry	NN
A new concept for a RICH detector @ FCC-ee	R. Forty

◆ Proposal: talks of 25 minutes each

- In charge of this session: A. Blondel and M. Dam.

□ Friday Morning: Summary presentation for PED (NN)

- **Review of FCC placement studies (7-8 June 2021), to comment and advise on:**
 - ◆ Methodology applied for the placement studies
 - ◆ Boundary conditions and constraints
 - ◆ Impact on physics and machine performance
 - ◆ Development of a preferred scenario
 - ◆ Further planning and next steps
 - Alain and myself have been invited to the presentation session.