5th FCC Physics workshop Scientific Programme Committee (SPC)

7–11 February, 2022
Liverpool, UK
In-person + online

(Capacity: up to ~400 people)

https://indico.cern.ch/event/1066234/

previous FCC Physics workshops on this thread:
https://indico.cern.ch/category/5225/

https://en.wikipedia.org/wiki/Liverpool#/media/File:Liverpool-Montage.jpg

Scientific Programme Committee (as of 2021-08-16)

- Juan Alcaraz Maestre (Madrid, CIEMAT)
- Martin Aleksa (CERN)
- Patrizia Azzi (INFN Padua)
- Joao Guimaraes da Costa (Beijing, IHEP)
- Gregorio Bernardi (LPNHE)
- Manuela Boscolo (INFN Frascati)
- Monica D'Onofrio (Liverpool)
- Mogens Dam (NBI)
- Gerardo Ganis (CERN)
- Janusz Gluza (Silesia)
- Christophe Grojean (DESY/Berlin)
- Gino Isidori (Zurich)
- Patrick Janot (CERN)
- Christos Leonidopoulos (Edinburgh)
- Michelangelo Mangano (CERN)
- Matthew Mccullough (CERN)
- Andrew Mehta (Liverpool)
- Mihoko Nojiri (KEK)
- Emmanuel Francois Perez (CERN)
- Matthew Reece (Harvard)
- Liantao Wang (Chicago)
- Carsten Welsch (Liverpool)
- Guy Wilkinson (Oxford)
- Alain Blondel (LPNHE/Geneva, co-chair)
- Gavin Salam (Oxford, co-chair)

June 2021: essential news for FCC

-- June 2021 The FCC Feasibility Study (2021-2025) organization was proposed to CERN council, approved unanimously

MTP: 100MCHF/5yrs

-- Council documents :

- Organisational structure of the FCC feasibility study
http://cds.cern.ch/record/2774006/files/English.pdf
- Main deliverables and timeline of the FCC feasibility study
http://cds.cern.ch/record/2774007/files/English.pdf

NB aim is not a TDR-like cost estimate, but a committed cost & resource plan!

-- Financial study: " The focus will be on the tunnel and the first-stage collider (FCC-ee)"
-- Design of FCC-ee and FCC-hh, and their injectors, key technologies, technical infrastructure
-- MDI and Ecm calibration for FCC-ee
-- The physics case and detector concepts will be consolidated for both colliders (FCC-ee and FCC-hh).
-- intermediate review mid 2023, delivery of Feasibility Study Report (FSR) end 2025, (first collisions 2040+)
-- Stress the importance of communication towards
scientific community, governments and funding agencies, industries and general public
-- work has started on placement in Geneva area (France and Switzerland)
→ reduce number of surface points to 8
→ layout consistent with later choice of 2 or 4IP for the e^+e^- collider
-- in parallel, high field magnet R&D for FCC-hh will be carried out with high priority

+100MCHF/5yrs

These events bring both FCC-ee and FCC-hh one step closer to reality

FCC

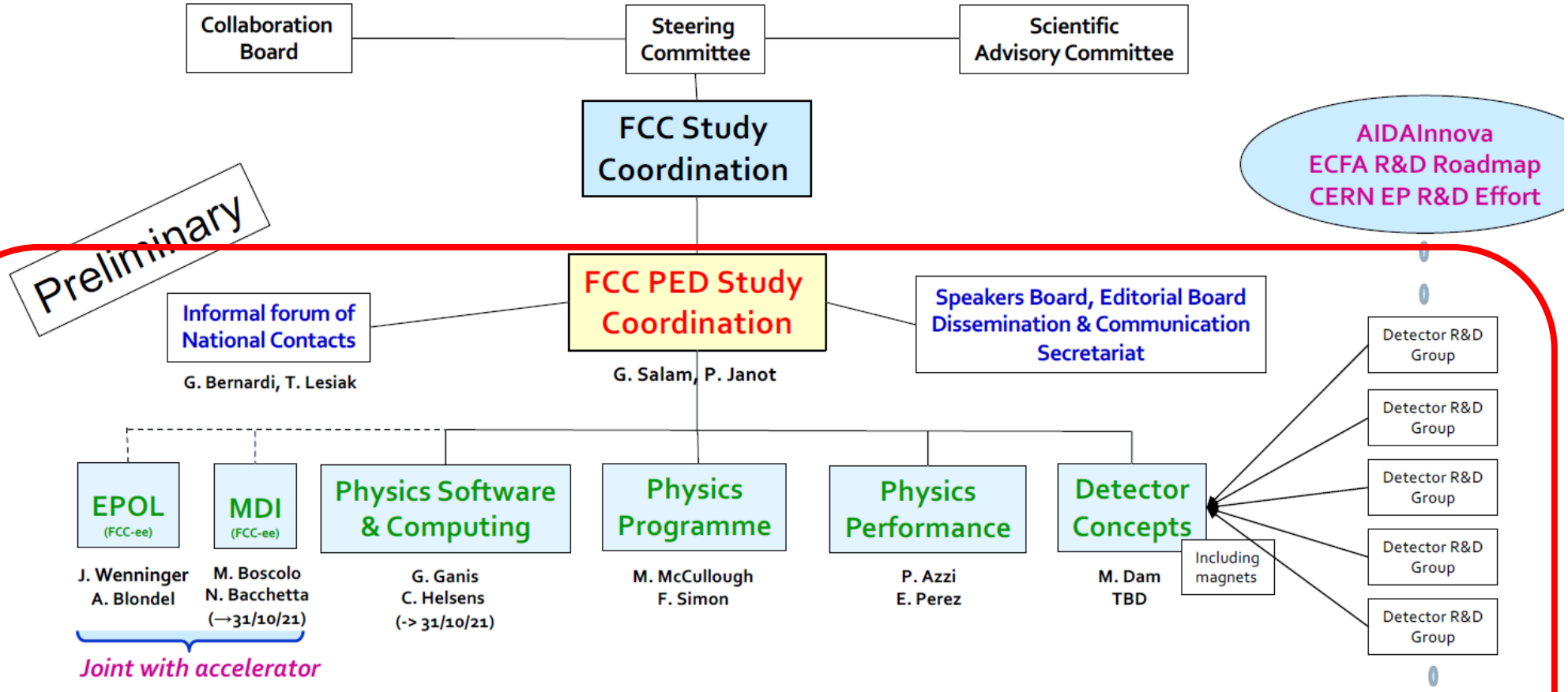
The PED objectives in the FCC-FS

- The work for particle physicists in the feasibility study is clearly cut out
  - Design the experimental setup and prepare the theoretical tools for FCC-ee
    - To be able, demonstrably, to fully exploit the FCC-ee capabilities
    - To prepare the ground towards detector operation and data analysis in 2040
  - Maintain, revisit, and update the FCC-hh detector concept and physics case
    - According to the scientific landscape evolution, and the HL-LHC upgrade experience

- The FCC-ee challenges arise from the richness of the program
  - Match the experimental and theoretical accuracy to the statistical precision
  - Match the detector configuration with the variety of channels and discovery cases
  - Match the computing infrastructure to the incredible statistics expected at the Z pole
  - Match the common physics software to the needs of up to four experiments

- Worldwide community building is the necessary backbone of the whole enterprise !

The PED Pillar Organisation - preliminary



The Workshop reports on the work of all these people:
deliverables, milestones, working groups, (sub) work package conveners, progress and plans

FCC

Including substructure!

Physics Programme

- Six working groups (with at least one experimentalist and one theorist conveners, tbd)
  - Focus on the phenomenological aspects of the integrated FCC programme
    1. Precision Electroweak Physics
       - ➔ Z peak and WW threshold (ee)
       - ➔ High-energy diboson and difermion (hh)
    2. Higgs physics
    3. Flavour (c, b, τ) physics
    4. BSM Physics
       - ➔ Indirect sensitivity from precision measurements (ee and hh)
       - ➔ Direct BSM searches at the smallest couplings (ee and hh) and highest masses (hh)
    5. QCD
    6. Top physics
  - To be considered in addition
    - Physics at FCC-hh with dedicated experiments (FCC-b, FCC-Alice, …)

Preliminary

FCC

Main aims for today:

-- First set of Goals for the 5th FCC Physics Workshop (to be discussed today)

Reflect the status and achievements of FCC PED studies

Establish bridges e.g. joint tutorial on Software / Physics performance / Case Study.

Initiate or kick-off new activities that will not yet be started

Reach out to new communities

-- UK HEP community at large (not 'just colliders'?) exp&th

-- Other Higgs factories and collider projects

LHC, ILC/CLIC/CEPC, also SuperKEKb, neutrino, Astro-Cosmo etc.

-- other communities (US, India, Japan, Russia, Korea, etc.)

Communicate

-- Collect information on the above in order to establish approximate content of plenaries and parallel sessions

-- set a list of actions and next meeting

Monday Sep 6, 2021, 2:20 PM → 5:25 PM Europe/Zurich

Alain Blondel (Universite de Geneve (CH)) , Gavin Salam (University of Oxford)

Videoconference

FCC PE&D workshop 5: Scientific Program Committee — Please log in

3:00 PM → 3:10 PM **Introduction presentation of the workshop expected status of PED in February** ¶ — 10m

Speakers: Alain Blondel (Universite de Geneve (CH)) , Patrick Janot (CERN)

3:10 PM → 3:20 PM **Local Organizing Committee report** — 10m

Speaker: Gavin Salam (University of Oxford)

3:20 PM → 3:25 PM **IPAC** — 5m

Speaker: Alain Blondel (Universite de Geneve (CH))

3:30 PM → 3:55 PM **first ideas of contributions and parallel sessions from PED WGs** — 25m

3:55 PM → 4:05 PM **keynote speakers** — 10m

Speaker: Alain Blondel (Universite de Geneve (CH))

4:05 PM → 4:15 PM **other contributions** — 10m

4:15 PM → 4:25 PM **first discussion on parallel WG sessions** — 10m

4:25 PM → 4:30 PM **actions and next meeting** — 5m

4:30 PM → 5:00 PM **around the table questions** — 30m