Introduction

- Résumé de la journée du 13 Janvier et situation après Bad Honnef

- Objectifs de FCC-Phys

- Tour de Table

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

- Agenda de FCC-France

- Organisation locale

FCC-ee 4 IP study

Study layout with 4-fold symmetry

→ Layout to be decided soon (for local impact etc..)
→ final decision whether to actually implement 4 IPs to be made in due time.

→ The machine can operate with 4 IP but with 15% lower luminosity at each IP, hence total lumi would be 1.7 times higher than with 2 IP.

There is so much to do with the e+e- machine (Z, WW,ZH,tt,H) that we may well have more than 4 collaborations interested in the FCC-ee physics **with different detector emphasis**.

In order to proceed with a 4-fold implementation quite a bit remains to be done:

1. First thing: is 4-fold symmetry OK for the hadron collider?
2. Any particular requirements for location of RF throughout the life of the machine?
3. Simulation of 4 IP e+e- collider should be more complete: there are questions left concerning the beam-beam tune shift compensation and other effects.
4. Understand possible path (when and how) to fall back to 2 IPs if necessary.

ESG status post Bad Honnef

Statement from the European Strategy Group after the Bad Honnef drafting meeting (20-24 Jan. 2020)

- The drafting session of the European Strategy Group preparing the next European Particle Physics Strategy Update took place in Bad Honnef (Germany) between 21-25 January 2020. After a week of fruitful discussions involving senior figures of European and international particle physics, **convergence was achieved on recommendations** that will guide the future of the field.
- The drafting session marks a key stage of the strategy update process. The attendees of the Bad Honnef drafting session successfully carried out their ambitious task of identifying a set of priorities and recommendations. They built on the impressive progress made since the last update of the European Strategy for Particle Physics, in 2013, and the rich input received from the entire particle physics community in the current update process.
- The next step in this process will be to submit the document outlining the recommendations to the CERN Council. It **will be discussed by the Council in March** and submitted for final approval at an extraordinary Council Session on 25 May, in Budapest, Hungary. Once approved, it can be made public.

The European Strategy Group

(CERN Council 16 – 20 March 2020)

No official news from ESPP, some leaks

What can we hope for FCC ?

➔ We do not expect that the project will be approved yet.

We expect there will be :

1) A clear recommandation that CERN focuses on a new Circular Collider infrastructure (100km) leading to a TDR in ~5 years

-- TDR on infrastructure and accelerator(s), backed up with much more solid physics case and detector studies

-- no detector TDRs yet.

2) A recommandation to place R&D for High Field accelerator Magnets as top priority

Hopefully (important for funding our efforts!)

– explicit recommandation of FCC-ee (or FCC-INT or FCC-ee-hh-ep) as part of TDR

-- recommandation for strong theory effort in particular to back-up precision measurements

Draft will not be public before March 2020

News from Japan

Information from K. Oide:

- SCJ has announced their "Master Plan 2020": http://www.scj.go.jp/ja/info/kohyo/pdf/kohyo-24-t286-1.pdf
- It lists 146 projects in all fields including SuperKEKB, J-PARC, Hyper-K, KAGRA, and the ILC. **Among them, 31 projects are chosen as "important", which includes Hyper-K and J-PARC, but not the ILC.** So the ILC did not obtain the first priority. HL-LHC is listed in another category as "important".

And an interpretation from ILC colleagues

- Dear ILD colleagues,
- The Science Council of Japan has announced the 'Master Plan 2020' on large academic facilities (http://www.scj.go.jp/ja/info/kohyo/pdf/kohyo-24-t286-1.pdf :
- in Japanese). Even though the ILC did not go into the final short list, it was selected as one of the projects that went to the hearing stage indicating that the scientific merit of the ILC was recognized by the committee.
- This allows the ILC project to move to the next phase. For the political side, we trust that the Japanese government, including the MEXT minister, will take appropriate actions shortly. We will keep you updated.

The Hyper-Kamiokande project is officially approved
https://www.kek.jp/en/newsroom/2020/02/12/0930/

Hyper-Kamiokande (HK or Hyper-K) project is the world-leading international scientific research project hosted by Japan aiming to elucidate the origin of matter and the Grand Unified Theory of elementary particles. The project consists of the Hyper-K detector, which has an 8.4 times larger fiducial mass than its predecessor, Super-Kamiokande, equipped with newly developed high-sensitivity photosensors and a high-intensity neutrino beam produced by an upgraded J-PARC accelerator facility.

The supplementary budget for FY2019 which includes the first-year construction budget of 3.5 billion yen for the Hyper-Kamiokande project was approved by the Japanese Diet. The Hyper-K project has officially started. The operations will begin in 2027.

News from the US

Important US input to ESPP:

-- *committment* expressed for CERN and FCC if supported by ESPP

-- *strong interest* for an ILC hosted in Japan.

Greg

3d FCC Physics and Experiments Workshop:

13-17 January https://indico.cern.ch/event/838435/

*) **Work**: **251** (registered) participants for **115 presentations**
+ FCC software tutorial https://hep-fcc.github.io/fcc-tutorials/

Higgs highlights

1. **e+e- → H at 125 GeV**
   talks by David D'Enterria and Alan Valdivia
   ➔ absolutely unique measurement from FCC-ee
   → follow up with dedicated working group

2. **e+e- → HZ and Hvv , pp→ ttH**
   -- sensitivity to H self coupling from 240 + 365 GeV cross-section measurement
   -- improvement in model-independence of measurements because of Z pole EWPO's
   -- importance of top quark measurements at HL-LHC and FCC-ee

3. **BIG NEWS for FCC-hh** (Selvaggi)
   from double Higgs study → HIGGS SELF-COUPLING WITH 2% (STAT) PRECISION)
   this means that the 9% precision of full CLIC could be achieved in 3 (2-5) years of FCC-running

FCC main goals for 2020 - 2026

Overall goal:

- **Perform all necessary steps and studies to enable a definitive project decision by 2025/26, at the anticipated date for the next ESU, and a subsequent start of civil engineering construction by 2028/29.**

This requires successful completion of the following four main activities:

- **Develop and establish a governance model for project construction and operation**
- **Develop and establish a financing strategy, including in-kind contributions**
- **Prepare and successfully complete all required project preparatory and administrative processes with the host states (debat public, EIA, etc.)**
- **Perform site investigations to enable CE planning and to prepare CE tendering..**

In parallel development preparation of TDRs and physics/experiment studies:

- **Machine designs and main technology R&D lines**
- **Establish user communities, work towards proto experiment collaboration by 2025/26.**

M. Benedikt

➔ establish a list of benchmark processes on which to compare detector solutions
ex: σ ee$\rightarrow$HZ, H$\rightarrow$ bb,cc,gg, R_l, R_b, m_W, tau: lifetime, mass, polarization etc.
CASE STUDIES, FCC-ee Physics coordination (21-11-2019 + rev. 29-01-2020)
(names are those who suggested the case study)

CASE STUDIES

1. muon momentum resolution (and scale stability) Patrick/Alain
2. charm tagging performance (development and optimization) Markus, Patrizia and Freya (Higgs, also Z,W,t)
3. tracking and vertexing of displaced particles Markus, Patrizia and Freya (Higgs, also Z,W,t)
4. photon identification in tau decays ; separation/identification of tau decay channels Markus/Mogens (Higgs, Z, also W, t)
5. time resolution of the ecal / do we need a timing layer for displaced photons detection? Maurizio
6. angular acceptance definition for <<10-5 precision measurement of R_l at the Z pole Alain (see also W)
7. Four-momentum reconstruction of e+ e- scattered at very low angles after beam optics deflection, and detected in "Roman Pots" type of detectors. David d'Enterria
8. acceptance for <<10-4 precision measurement of sigmaWW at threshold (and related delta MW = 300 KeV) Paolo/Elizabeth
9. e/mu/tau lepton identification performances (W, also Z and tau decays) Paolo/Elizabeth
10. quark flavor tagging performances in hadronic W decays Paolo/Elizabeth
11. Angular resolution/biases of reconstructed jets and leptons Paolo/Elizabeth
12. efficiency/acceptance for low energy particles Paolo/Elizabeth
13. Isolated photon eff/acceptance Paolo/Elizabeth
14. Identification of exclusive and semi-exclusive B hadron decays Roberto
15. Missing energy resolution (calorimeter) Stéphane
16. p / K / pi identification performance Stéphane

16b. p / K / pi identification implementation studies G. Wilkinson et al.

17. Identification of semi-leptonic b and c hadron decays Roberto
19. MDI and Beam Backgrounds Manuela & Nicola
20. Feasibility of Hee measurement D. d'Enterria
21. summary of detector benchmark processes
22. Low energy QCD event shape studies vs radiative returns

End of news

Tour de Table

IRFU Saclay

CPPM Marseille
IJCLab Orsay
IPHC Strasbourg
LAPP Annecy
LLR Palaiseau
LPNHE Paris
LPSC Grenoble
IP2I Lyon
L2IT Toulouse

Projet microvertex
Projet Calice