

J. Andrea, **G. Bernardi**, A. Besson, V. Boudry S. Gascon, T. Guillemin, F. Malek,
S. Monteil, N. Morange, S. Muanza, L. Poggioli, R. Salerno, J. Stark

IRFU Saclay (pour compléter le cadre)

CPPM Marseille

IJCLab Orsay

IPHC Strasbourg

IP2I Lyon

LAPP Annecy

LPC Clermont

LLR Palaiseau

LPNHE Paris

LPSC Grenoble

L2IT Toulouse

People involved

Activities, Goals

Physics interest

Algorithms interest,
subdetector interest

Future R & D ?

Previous Lab involvement
in Future Collider R&D

FCC and the European Strategy

Main points:

- Higgs Factory is highest priority, location not specified, only FCC-ee and ILC mentioned
- way towards high energies with FCC-hh is the long term plan, and it will be at CERN.
This is materialized by recommendation of strong R&D on High Field magnets
- clear recommendation for the Technical and Financial Feasibility Study of FCCS
→ go ahead towards TDR's for FCC-ee and hh

Europe, together with its international partners, should investigate the technical and financial feasibility of a future hadron collider at CERN with a centre-of-mass energy of at least 100 TeV and with an electron-positron Higgs and electroweak factory as a possible first stage.

Such a feasibility study of the colliders and related infrastructure should be established as a global endeavour and be completed on the timescale of the next Strategy update.

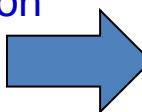
The timely realisation of the electron-positron ILC in Japan would be compatible with this strategy and, in that case, the European particle physics community would wish to collaborate.

→ FCC-ee et ILC peuvent travailler de manière plus rapprochée, en particulier en Europe

- En attente d'un budget FCC-dédié au CERN (120 MCHF 2021/2025, dont 17MCHF en 2021) CLIC serait réduit à 30MCHF (2021-2025)

How do we work in FCC-France ?

- The FCC-contacts meet every month to share the progress made in each lab, and to prepare common actions. Public web page, with all presentations
- We have established good contact with the theory community (see next slide).
- We are involved in the central FCC organization (Steering, physics group conveners) & Snowmass
- We are getting involved in several «case studies» which are collaborative efforts to make progress on specific physics points, and to derive the corresponding detector constraints.
- We organize FCC-France workshops (with many invitations to our foreign colleagues) at least once a year:
the 1st FCC-F workshop, on-line, had 138 Registered participants. Questions and Round Table were useful to build a link
- Next FCC-F workshop will take place mostly in person in Annecy in January 2021



indico IN2P3

Accueil Crée un événement ▾ Mon profil

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FCC

Future Circular Collider

septembre 2020

21 sept. Reunion FCC-contacts

juillet 2020

21 juil. Reunion FCC-contacts

juin 2020

26 juin Reunion FCC-contacts

mai 2020

27 mai Reunion FCC-contacts

14 mai - 15 mai Workshop FCC-France

avril 2020

17 avr. Reunion FCC-contacts

mars 2020

27 mars Reunion FCC-contacts

06 mars Reunion FCC-contacts

février 2020

07 févr. Reunion FCC-contacts

Theory/Pheno status in FCC-France

Interested people: 24

Asmaa Abada (IJCLab), Alexandre Arbey (IP2I), Damir Becirevic (IJCLab), Geneviève Bélanger (LAPTH), Karim Benakli (LPTHE), Aoife Bharucha (CPT Marseille), Felix Brümmer (LUPM), Giacomo Cacciapaglia (IP2I), Jérôme Charles (CPT Marseille), Eric Conte (IPHC), Aldo Deandrea (IP2I), Michele Frigerio (L2C), Benjamin Fuks (LPTHE), Mark Goodsell (LPTHE), Diego Guadagnoli (LAPTH), Björn Herrmann (LAPTH), Marc Knecht (CPT Marseille), Sabine Kraml (LPSC), Nazila Mahmoudi (IP2I), Filippo Sala (LPTHE), Ingo Schienbein (LPSC), Hua-Sheng Shao (LPTHE), Ana Teixeira (LPC), Savvas Zafeiropoulos (CPT Marseille)

Institutes: 10

CPT Marseille (4), IJCLab Paris Saclay (2), IP2I Lyon (4), IPHC (1), L2C Montpellier(1), LAPTH (3), LPC (1), LPSC Grenoble (2), LPTHE Paris (5), LUPM Montpellier (1).

	FCCee	+ FCChh	+FCCeh	+H ions	Total
BSM	1	9	5	1	16
SUSY		2			2
Compositeness		2			2
Dark Matter		4			4
Higgs		3	3	1	7
EW precision	2	1	2	1	6
QCD		2	1		3
Flavour (B + top)	2	2	2		6
EFT			1		1

- The interest in the Theory community is very strong!
- Several people already offered to give a talk at the next FCC-France meeting: a theory session would be useful.
- Most work done relevant for FCC-hh.
- Efforts are on-going on FCC-ee (Tera-Z and various energies)

Some General Messages from the First FCC-F Workshop

The French FCC community is in an «Exploration» phase (2019-2021)

- The IN2P3 and IRFU physicists working or starting to work on FCC are getting numerous.
Sharing time with Run3/HL-LHC is a challenge but also an opportunity to increase our knowledge
- Expand the current effort to build strong links with the theoretical community which is motivated and very needed for the physics which can be achieved at FCC-ee
- Further refine the detector requirements, mostly through simulation, fast and detailed.
→ need to get more involved in the FCC software effort
- Work on the conceptual development of detectors, along the CLD & IDEA models but also beyond, in particular since the project would benefit a lot from 4 detectors.

The Round table (which included 2 ILC-France, 3 FCC-France + D. Bortoletto, P. Giacomelli and C. Helsens)

“Can FCC(-France) benefit from the ILC(-France) expertise” was successful

- Build on acquired expertise. From ILC R&D, develop a few strong lines of R&D
- Try to develop new ideas and also work on generic R&D at this stage
- Collaborate closely between all the ee projects
- Must follow up after the release of the European Strategy

The Future may arrive faster than we think !

- The «Focus & Consolidation» phases are around the corner: (~2022)
- We may have to soon focus on only a few options to get a strong French contribution
- The size of the community will shape the French contributions: how many (sub-)detectors ?
- Proto experiments/collaborations are expected by 2025/26

IRFU CEA-Saclay (contact R. Aleksan)

Physicists involved : R.Aleksan (FCC), F. Couderc (CMS), E. Locci (CMS), S. Ganjour (CMS), P. Schwemling (ATLAS), B. Tuchming (D0)

Physicists involved in other e+e- FC : P. Attie, M. Besancon, P. Colas, S. Ganjour, M. Titov

Activities, Goals :

- Physics studies
- Accelerator design
- R&D on Tracking : technology, simulation and impact on physics

Physics interest :

- EW physics (W mass (thesis), Z couplings to ν_e)
- B Physics (CP violation)

Algorithms interest, subdetector interest :

Tracking Detector resolution

R&D :

- TPC (readout and Ion Backflow)
- Wireless detector data transmission

IRFU is involved in the TPC R&D for ILC and is contributing in detector, readout, test-beam.

Recent evolution : From now on, joint meetings FCC/ILC/mu-colliders

CPPM Marseille (contact S. Muanza)

People involved (committed to start working before end of 2020)

S. Muanza (DR), M. Barbero (PU), P. Pangaud (IR), A. Habib (IR), M. Menouni (IR)

Activities, Goals etc...

Physics fast simulation

Discussions to prepare R&D on pixel detector

Physics interest,

MC Generators

Search for heavy charged Higgs boson decaying into $W(-> l\nu) + Z/h(->bb)$

Optimisation of b-tagging performance (TBC, long term)

Algorithms interest, subdetector interest

B-Tagging (TBC, long term)

Pixel detector, readout electronics (monolithic sensors, μ -electronics design small feature size)

Future R & D

R&D on Depleted CMOS sensors for FCC-ee

Possible interests in mechanics:

Micro-channel cooling

Sensor metrology (even under cryogenic conditions)

Precise and automated positioning and assembly

CPPM Marseille (contact S. Muanza)

Context

Some interest by ATLAS colleagues, but they are overbooked

No expressions of interest by LHCb and Belle 2 colleagues so far

Some interest in electronics and mechanics services

DIALOG 2021

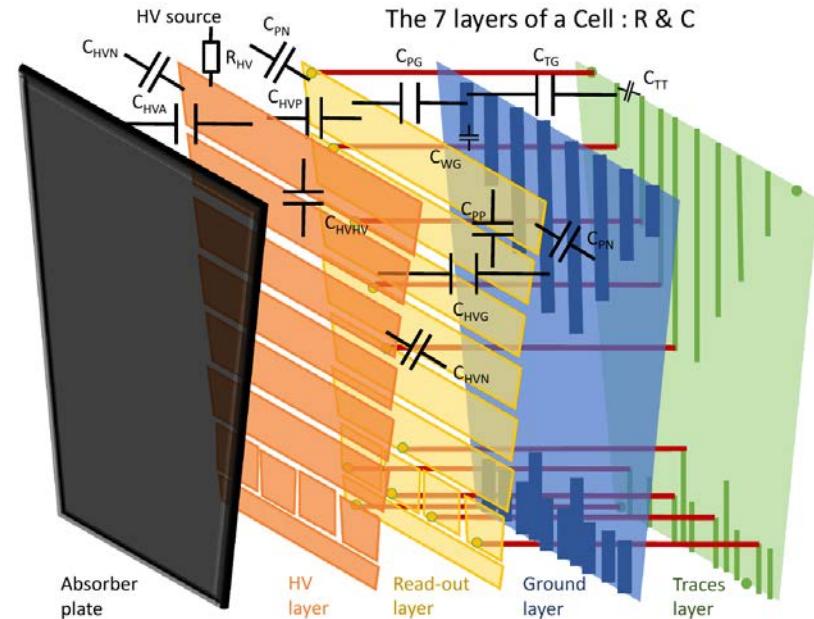
Requested 6k€ (travels), under the ATLAS-CPPM request

Including one M2 research trainingship

Calorimètre LAr à haute granularité

GranuLAr :

- Exploration de la technologie Argon Liquide pour un calo (EM) pour FCC-ee
- ~10 fois plus de cellules que le calo ATLAS
- Verrous technologiques à faire tomber
- => Projet ANR avec LAPP et Omega, en attente des résultats



Implications actuelles :

- N. Morange (0.10), D. Fournier (0.05), R. Chiche (0.10)
 - Plus de chercheurs s'impliqueront si l'ANR est acceptée
- Investigation de PCB multicouches pour la lecture des cellules
 - Compréhension du schéma électrique équivalent, et exploration des logiciels de modélisation / calculs

Concept Powder-O

Powder-O:

- Exploration d'un concept de calorimètre avec des fibres scintillantes immergées dans une poudre (version 'solide' de Liquid-O)

Implications actuelles :

- M-H. Schune (0.10), J. Lefrançois (0.05), G. Hull (0.05), S. Barsuk (0.05)
 - Discussions et réalisations techniques : E. Guérard , D. Reynet, C. Bourgeois, V. Chaumat
- Banc test mis en place

Intérêts de physique :

Y. Amhis par des études sur $B_c \rightarrow \tau\nu$

Demandes DIALOG : 3 k€

- 2 k€ missions
- 1 k€ petit équipement pour banc test



Phase de discussion et d'exploration au sein du laboratoire.

- Volonté de s'adosser aux expertises existantes, principalement sur la trajectographie (groupe Picsel, plateforme C4PI, CMS-tracker) et les mesures de précisions (Higgs, top, saveur).
- **Contributeurs :**
 - **FCC** : Ziad El Bitar, Jeremy Andrea,
 - **R&D générique** : Jérôme Baudot, Auguste Besson, Ziad El Bitar.
 - **Fil de discussion dans le laboratoire** : Eric Conte, Giulio Dujany.

Activités :

- **R&D CMOS pour usine à Higgs (Picsel/C4PI)** : exemple => exploration de la techno 65 nm première soumission conjointe avec CERN (EP R&D WP1.2 et ALICE, oct. 20), adapté pour les tests en faisceau
- **Contributions aux meetings FCC-France et workshops internationaux** (présentations, coordinations de session),
- **Contributions aux prospectives sur le top** : études génératrices, snowmass (en charge case studies « physique du top ») et analyses correspondantes.

Snowmass2021 - Letter of Interest

Top quark physics at FCC-ee

Thematic Areas:

- (EF03) EW Physics: Heavy flavor and top quark physics
- (EF04) EW Physics: EW Precision Physics and constraining new physics

Contact Information:

Jeremy Andrea, IPHC, Strasbourg, jandrea@cern.ch

Authors: J. Andrea ¹, P. Azzi ², B. Fuks ³

Perspectives :

- **Contributions à l'élaboration du cahier des charges du trajectographe,**
 - Software, géométrie du détecteur, etc.
- **Études de physique** (top, Higgs, saveur) et optimisation de détecteurs,
- **Réflexion sur montage de projets ANR, ERC ?**

Demande 2021 :

- **5 k€ missions et stage M2** (études de performance de la trajectographie pour différentes géométries de détecteur).

IP2I Lyon: Résumé des Activités (contact S. Gascon-Shotkin)

Physiciens permanents se consacrant à au moins 10% au FCC avant fin 2020:

Gerald Grenier, Imad Laktineh, Laurent Mirabito (CMS+CALICE/FLC), Gaëlle Boudoul, Didier Contardo, Suzanne Gascon (CMS), G. Cacciapaglia, A. Deandrea (Théorie) + postdocs/doctorants

Calorimètre hadronique semi-numérique (SDHCAL)/détection de muons à chambres à plaques résistives en verre (RPC): R&D depuis 2006 en grande partie transplantable au contexte FCC-ee [GG,IL,LM]

- Calorimetrie: Mesures de temps <ns pour PFA par carte de lecture conçue avec Shanghai JU: résolution 100ps attendue, RPC 'à taux élevé' par nouveau matériau pour l'électrode
- Muons: Lecture à pistes tissées validée sur chambres >0.5m → grande granularité, nombre de canaux réduits

Théorie: Modèles des bosons de Higgs et/ou pseudoscalaires composites au FCC-ee [GC,AD]

- Publié: Pseudoscalaires composites très légers (plusieurs énergies)
- En cours: Production HH par fusion de photon, et Z → γη, η → plusieurs états finals pour 'Tera-Z'
- Possible: Etude de ee → γ* → H + η, η → Zγ ou γγ, état final bbγγ ou bbZγ ($m_\eta < m_Z$) pour 'Tera-Z'

Senseurs monolithiques actifs à pixels (MAPS): Proposition de développement conjoint avec IPHC-C4PI, CPPM pour trajectographes, voire calorimètres à haute granularité [GB,DC,SG]

- EOI: Développent d'une prochaine génération en technologie 8" 65nm, soumise à la direction de l'IN2P3 dans le cadre des prospectives nationales, discussion avec la direction de l'IP2I la semaine prochaine
- Programme R&D stratégique de la division EP du CERN: Kit de développement avant fin 2020
- Premier contact/intérêt du LPC dans le cadre du pôle MICHRAU

IP2I Lyon: « Case Studies » et Demande 2021 à l'IN2P3

Physics « Case Studies »: pas encore d'engagement, mais possibilités suivantes (liste non-exhaustive):

- Mesures de luminosité via évènements diphotoniques à grand angle: $e^+e^- \rightarrow \gamma\gamma$
- Détermination du couplage effectif $HZ\gamma$
- Besoins en théorie pour FCC-ee

Demande de ressources à l'IN2P3 pour 2021 (DIALOG): 11 keuros dont:

- Missions (réunions FCC-France, FCC Weeks...): 7 k€
- 2 Stages M2 de 4 mois: 4 k€

« Simulations visant les contraintes sur et les performances des possibles détecteurs pour FCC, en particulier l'évaluation des taux de données et des occupations, et la définition des besoins de l'électronique. » G. BOUDOUL, maître de stage

«Precision bounds on composite Higgs models at the FCC-ee» G. CACCIAPAGLIA, maître de stage

Physicists involved

- T. Guillemin

Physicists ‘interested’:

- M. Delmastro, L. Di Ciaccio, J. Levêque

Physics interest

- Higgs properties

Algorithms interest, subdetector interest

- Electromagnetic calorimeter design
- Software for calorimeter reconstruction / particle flow

- Coordinator of the ANR project GRANULAR (waiting for the step 2 result):
High granularity liquid argon calorimetry for a detector at a future circular electron-positron collider

Team: LAPP, IJClab, OMEGA

Two 3-year postdocs requested. If unsuccessful: manpower issues.

GT08 recommendation

RECOMMENDATION 10 - Considering the large expertise of IN2P3 teams, starting a R&D on high granularity Liquid Argon calorimeters for future colliders experiments would ensure a good use of the Institute technical skills, providing a very high visibility to IN2P3.

Strong support from LAPP management

Collaboration with CERN and Prague (AIDA-NOVA)

Started to work on the G4 simulation of the LAr ECAL for FCC-ee

- For 2021: considering now to propose a PhD project 'full FCC'

1) Higgs self-coupling at FCC-ee (e.g. measurement of the ZH production cross section)
[Snowmass case study 12]

2) LAr R&D

- DIALOG requests for 2021: pending imminent ANR result

LLR Palaiseau (contact R. Salerno)

People involved (committed to start working by the end of 2020)

→ R. Salerno, C. Ochando, J.B. Sauvan, Y. Sirois (+few others express interest)
Physicists involved in other e+e- FC : V. Boudry, J-C Brient, F. Jimenez Morales, H. Videau

Activities, Goals etc...

→ Work on fast/full simulation
→ Optimisation of the detector properties for optimal physics reach

Physics interest :

→ Study the EWSB (Scalar sector, Higgs boson self-coupling, VBS)

Algorithms interest, sub-detector interest

→ high-granularity Si-based calorimeter
→ Particle Flow event reconstruction

Future R&D :

→ high-granularity Si-based calorimeter (continuous operation, timing)

Case studies for SnowMass2021

- “Measurement of Higgs parameters at FCC-ee”
* **the total $e^+e^- \rightarrow ZH$ cross section σ_{HZ}** at two energies to achieve a model-independent demonstration of the existence of the trilinear Higgs boson self-coupling
- **the Higgs boson total decay width Γ_H** focus on the requirements on the detector design (Si-based calorimeter) and on jet clustering algorithms to achieve an effective separation between the $H \rightarrow ZZ$ and $H \rightarrow WW$

Requests 2021

- 2K€ for missions
- 1K€ for functioning (M1 or M2 stage during spring 2021 , other half from LLR)

- **Physicists involved**
 - G.Bernardi, B.Malaescu, G.Marchiori, L.Poggioli (ATLAS), A.Blondel (T2K)
- **Activities**
 - Coordination, Physics studies, Detector requirements, software & computing
- **Physics interest**
 - Electroweak (eg beam Energy calibration and polarization)
 - Higgs couplings, Higgs: H to bb/cc/gg. Di-jet mass resolution
 - QCD: α_s measurement at Z pole and below
- **Algorithms interest, subdetector interest**
 - b/c tagging. Jet & di-jet reconstruction, EM calorimetry, Vertexing
- **Future R&D**
 - Oriented towards Si sensors developments, for calorimetry and tracking (Calice & ITk involvement)

- **Snowmass2021**
 - Contact persons: Overall (AB) Energy frontier (GB), Computational frontier (LP)
 - Implication in 5 Accelerator frontier Lols (AB), 11 in Energy frontier, eg
 - Perspectives for high-precision $\alpha_S(m_Z^2)$ determinations from e+e- measurements at FCC-ee (BM,AB)
 - High-precision $\alpha_S(m_Z^2)$ determinations from FCC-ee e+e- → hadrons data below Z peak (BM,AB)
 - Higgs boson coupling measurements to charm quarks at FCC-ee (GB, GM, AB)
- **Next**
 - FCC to be defended at Conseil Scientifique November 2020
 - Expect approval and support
 - Effort to reinforce the team
 - eg from LHCb (rich heavy flavor program at FCC)
 - Goal: PhD in 2021 (ATLAS/FCC)

DIALOG requests for 2021: 7k€ (Missions) + 2k€ (Functioning)

FCC in LPC Clermont: past, present, future (contact S. Monteil)

- **Physicists involved**
 - S. Monteil (LHCb) + point-like contributions TH. team (A. Teixeira, J. Orloff). More physicists interested (CDR signatures); involvement if applications are successful.
- **Activities**
 - Coordination (Flavours), Physics studies, Detector requirements.
- **Physics interest**
 - Flavour Physics (light and heavy flavours), hep-ph[1412.6322](#), hep-ph[1705.11106](#)
 - Electroweak Physics (Z pole heavy quark properties)
- **Algorithms interest, subdetector interest**
 - b/c tagging. Partial reconstruction, Flavour tagging, b/c tagging
 - Vertexing, PID, calorimetry
- **Future R&D (Plans)**
 - Pixel detectors (if opportunities), Calorimetry

FCC in LPC Clermont: past, present, future (contact S. Monteil)

- **Snowmass2021**
 - Contact person: (SM) Rare and Precision Frontier
- **Next**
 - FCC seminar towards lab. researchers and technical services
 - Case studies for detector performance [vertexing, calorimeter, PID] within the Flavours group.
 - ANR proposal BooST 2020: analysis of $b \rightarrow s\ell$ transitions. Part of the project dedicated to projections at FCC. Also IJCLab, CPPM, LPNHE.
 - PhD funding application 2021: on EFT interpretation of top production and decays observables at FCC-ee (co-tutelle w/ TUDO).

DIALOG requests for 2021: 5k€ (Missions and internships)

Potential Physicists: F. Malek (ATLAS), A. Lucotte (ATLAS)*

Activités 2021

- Involvement in the simulation of the physics processes

Physics interest

- EW Observables precision measurement (@TeraZ physics), Key properties of the Top, High-precision Higgs physics

Demande DIALOG 2021:

- Missions (stage M2) : 2 k€
- Demande Bourse de thèse FCC/ATLAS

Sujet potentiel: étude par simulation de la mesure de section efficace du Higgs invisible accompagné d'un Z se désintégrant en 2 leptons . En parallèle, une partie de la thèse s'effectuera sur ATLAS avec les données du run 3 du LHC dans l'expérience ATLAS, par exemple avec l'étude du canal VBF H-invisible.

L2IT Toulouse (contact J. Stark)

L2IT (Laboratoire des 2 Infinis -- Toulouse) was founded on January 1st 2020.

It is a CNRS/IN2P3 and Université Toulouse III - Paul Sabatier Laboratory

Physicists involved : J. Stark (ATLAS) as L2IT contact (and director) for the time being

Developing FCC activity :

not first immediate priority but one option of our scientific program.

Current related activity

The ATLAS and computing groups @L2IT are working on the measurement of the tri-linear coupling of the Higgs boson (using di-Higgs events) and on tracking algorithms for ITk (new tracker for HL-LHC phase).

Algorithms interest

Interest in the development of techniques for the measurement of the tri-linear Higgs coupling at the FCC-hh.

L2IT : especially interested in understanding what the FCC-hh will be able to say about the quartic Higgs coupling. “It would be a pity to build a new hh collider that is just short of what it takes to study the quartic Higgs coupling”. What exactly does it take ?

Next Milestones for FCC(-France)

- **Snowmass effort in the USA (final session July 2021)**
 - US DOE commitment to FCC was a very important input to ESPP.
 - Snowmass is a good opportunity to put forward new efforts for FCC
 - ➔ case studies
- **Approval of the FCC-Innovation Study (5 years)**
 - ➔ strong motivation to deepen FCC physics and detector studies right away
- **FCC-IS kick-off meeting** 9-13 November 2020
- **4th FCC Physics workshop** 9-13 November 2020
 - For FCC-ee emphasis on:
 - precision measurements and calculations.
 - BSM aspects of precision, flavour (τ, b), and direct search program
 - flavour program
 - detector requirements from benchmark studies, and new ideas
- **Second FCC-France workshop @ Annecy, January 2021**
 - will cover Accelerator, Detector and Physics (exp & theory)
- **FCC General Meeting @ Paris, April 2021 (following Brussels in 2019)**
- **Third FCC-France workshop Fall 2021 ?**

Total des demandes des Labos

Labo	Missions	Fonctionnement/ Stages/Equipement	Total
CPPM	4 kE	2 kE	6 kE
IJC Lab	2 kE	1 kE	3 kE
IPHC	3 kE	2 kE	5 kE
IP2I	7 kE	4 kE	11 kE
LAPP	2 kE (tbc)	-	2 kE
LLR	2 kE	1 kE	3 kE
LPNHE	7 kE	2 kE	9 kE
LPC	3 kE	2 kE	5 kE
LPSC	2 kE	-	2 kE
L2IT	-	-	-
FCC-IN2P3	32 kE	14 kE	46 kE

+ support pour organiser FCC-France

Discussion

Backup

Physics groups

□ Current/Previous organization (not all conveners are active)

Physics and Experiment Studies coordination

A. Blondel, P. Janot (EXP), C. Grojean, M. McCullough, M. Mangano, J. Ellis (TH)

EW Physics with Z's and W's
J. Alcaraz, P. Azzurri, E. Locci
A. Freitas

Higgs properties
M. Klute, K. Peters
C. Grojean

Top quark physics
P. Azzi, F. Blekman

$ee \rightarrow H$
D. d'Enterria

QCD and $\gamma\gamma$ physics
D. d'Enterria
P. Skands

Flavours physics
S. Monteil
J. Kamenik

New physics
M. Pierini, C. Rogan
M. McCullough

Global Analysis
Synergies
J. De Blas

Precision Calculations
A. Freitas, J. Gluza
S. Heinemeyer

we would like to receive

- Your proposals of new physics groups ex: *tau physics, Long Lived Particles, (+FCC-hh)*
- Your nominations for physics group conveners

→ Current conveners who want to continue should of course let us know

Some have already said they could not continue as conveners

→ Most urgent part of the mandate will be to enlarge international participation

FCC-ee : Case studies Electroweak, QCD, HF, Taus

LOI repository

<https://indico.cern.ch/event/951830/>

1. Towards an ultimate measurement of $R_\ell = \frac{\sigma(Z \rightarrow \text{hadrons})}{\sigma(Z \rightarrow \text{leptons})}$
2. Towards an ultimate measurement of the Z total width Γ_Z
3. Towards an ultimate measurement of the Z peak cross section
4. Direct determination of $\sin^2 \theta_{\text{eff}}^\ell$ and of $\alpha_{\text{QED}}(m_Z^2)$ from muon pair asymmetries
5. Determination of the QCD coupling constant $\alpha_S(m_Z^2)$
6. Tau Physics, Lepton Universality, and Lepton Flavour Violation
7. Tau exclusive branching ratios and polarization observables
8. Z-pole Electroweak observables with heavy quarks
9. Long lived particle searches
10. Measurement of the W mass

FCC-ee : Case studies, Higgs, Top, Theory, misc

11. Measurement of the Higgs boson coupling to the c quark
12. Measurement of the ZH production cross section
13. Measurement of the Higgs boson mass - Part I
14. Measurement of the Higgs boson mass - Part II
15. Inferring the total Higgs boson decay width - Part I
16. Inferring the total Higgs boson decay width - Part II
17. Determination of the $HZ\gamma$ effective coupling
18. Electron Yukawa via s -channel $e^+e^- \rightarrow H$ production at the Higgs pole
19. Measurement of top properties at threshold and above
20. Search for FCNC in the top sector
21. Theory Needs for FCC-ee
22. Beyond MFV: constraints on RH charged currents and on dipole operators
23. Construction of CP-odd observables to probe CP-violating Higgs couplings
24. Combined fit of Higgs and top data

FCC-ee : Evolution dans les différents pays

Progress continuing:

- FRANCE and ITALY: are well established already. Contact (G. Bernardi, R.Aleksan) (F. Bedeschi)
- UK: lots of progress. Contacts in all HEP groups and at the two STFC lab sites (RAL and DL). First meeting in September. (Christos Leonidopoulos, Guy Wilkinson)
- Poland: (T. Lesiak) planning FCC information day at Epiphany conference in January.
- Spain: starting within a national ‘future colliders’ structure (Juan Alcaraz)
- CH well in the road map, CHARD for accelerator (e+ source) discussions on towards effort FCC funding. CH unambiguously supported FCC-INT project.
- Belgium and Netherlands (just starting, contact Freya Blekman)
- Contacts with Germany, USA, Austria, Estonia etc.. have been initiated – to be followed.

FCC-IS kick-off meeting and 4th Physics workshop

9-13 November <https://indico.cern.ch/event/932973/>

Day	Sun. 8.11.	Monday 9 November		Tuesday 10 November				Wednesday 11 November				Thursday 12 November				Friday 13 November												
Room		Plenary 223/R-001 Filtration Plant		Parallel 1/1' (Physics experiments and detectors PE&D) 40/S2-D01 Salle Dirac		Parallel 2 (WP2) 2/R-030 30 seats	Parallel 3 24/1-016 20 seats	Parallel 4 4/S-056 20 seats	Parallel 1/1'/1" (Physics, Experiments and detectors PE&D)		Parallel 2 (WP1) 40/S2-C01 Salle Curie	Parallel 1/1'/1" (Physics)		Parallel 2	Plenary 40/S2-B01 - Salle Curie													
08:30-09:00	Registration @ FCC-ee PE&D Workshop (Round 500)	A. Gianotti (CERN) Welcome		FCC-ee PE&D	FCC-ee Optics	Placement optimisation (WP3)	J. Gutekuer (CERN)	Management of publications	FCC-INT physics		J. Gutekuer (CERN)	Management of data	J. Gutekuer (CERN)	Project management environment	Mining the Future Planning meeting (WP3)		FCC-ee/hh/el contribution											
09:00-09:30		tbd (tbd)	Host states address (FIR)						FCC-INT physics																			
09:30-10:00		tbd (tbd)	Update of the European Strategy for Particle Physics						FCC-INT physics																			
10:00-10:30		tbd (tbd)	Keynote talk Topic tbd	Coffee Break					Coffee Break				Coffee Break		Coffee Break		Coffee Break											
10:30-11:00		Coffee Break		Pheno QCD, EW	FCC-ee PE&D	FCC-ee Optics	Environmental Evaluation (WP3)	M. Moedelchian (TUM)	FCC-ee PE&D Physics performance process, software, analysis, benchmarks	Pheno: Flavour and BSM part 1	P. Charlots (CERN)	Engagement and communication plans (WP5)	Pheno: Higgs physics (part 1)	FCC-ee detectors PID B	FCC-ee detectors Vertex detector A	FCCnow Proceedings Planning Meeting (WP5)		Pheno EFTs conf syn comp										
11:00-11:30		tbd (tbd)	FCC-ee physics motivation						FCC-INT physics																			
11:30-12:00		J. Gutekuer (CERN)	FCCIS Project Overview						FCC-INT physics								C. Caron (IN) & P. Charlots (CERN)											
12:00-12:30		Lunch Break							FCC-INT physics																			
12:30-13:00		Lunch Break							FCC-INT physics								Lunch Break											
13:00-13:30		Lunch Break		Pheno QCD and EW Part 1	Joint FCC-ee Accelerator and Experiments session		MATEX Workshop (WP3)	Socio-economic Impact analysis (WP4)	Pheno Flavour and BSM (part 2)	FCC-ee MDI EPOL Mono- chromatizatio	FCC-ee detectors Calorimeters	G. Roy (CERN)	Administrative Processes (WP3)	Pheno: Higgs Physics Part 2	FCC-ee detectors Luminosity	FCC-ee detectors Trackers B	FCC Week 2021 Proceedings Planning Meeting (WP5)	WG/TH sum next steps, disc and Wrap-up										
13:30-14:00		tbd (tbd)	WP2 (FCC-ee Collider Design)																									
14:00-14:30		J. Gutekuer (CERN)	WP3 (Integrate Europe)				L. Ulrich (CERN)	E. Sitarz (CERN)	C. Caron (IN) & P. Charlots (CERN)																			
14:30-15:00		S. Vignati (CERN)	WP4 (Impact & Sustainability)	Coffee Break						Coffee Break				Coffee Break		Coffee Break												
15:00-16:00		Coffee Break		Pheno QCD and EW Part 2	ECFA detector R&D road map	FCC-ee other	MATEX Workshop (WP3)	Regional benefits work plan (WP4)	Pheno Higgs physics (part 1)	FCC-ee MDI EPOL Mono- chromatiza	FCC-ee detectors PID A	Overleaf Training Group 1	Higgs Physics part 3	FCC-ee detectors Electronics Trigger DAQ/online processing	FCC-ee detectors Vertex detector B	Overleaf Training Group 2	Coffee, depa											
16:00-16:30		M. Benedikt (CERN)	Governance and Management structures (GA/CA)		Overview of goals and first set of detector and th requirements	tbd (tbd)	L. Ulrich (CERN)	R. Czerwinski (SLAC)																				
16:30-17:00		General Assembly																										
17:00-17:30		FCC Collaboration Board Chair Name tbd (tbd)		Round table discussion: "engaging exp and th communities"																								
17:30-18:00	Welcome reception																											
18:00-18:30																												
18:30-19:00																												
19:00-19:30																												
19:30-20:00																												
20:00-20:30					Social Dinner																							
													FCC PE&D Informal dinner															