FCC-contacts – October 16

- News

- Workshops à venir

- Tour de Table
  - point sur les case studies / R&D / Stages proposés

- AOB

Brief news of relevance (A. Blondel/P. Janot)

1. New CERN management has been announced
   -- Director of Research is Joachim Mnich (from Desy)
   -- but new PH department head has not been announced

2. New ECFA chair has been elected: Karl Jakobs (Uni Freiburg)
   Congratulation to Greg Bernardi who arrived second.

3. MTP (as discussed in June) has been approved.
   → budget for CLIC reduced to accelerator part only
   → FCC-ee will be supported (see Patrick in 'national efforts')

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)

- **Germany**: Transforming their ILC allianz into a future ee machines allianz (F. Simon)

- **Spain**: starting within a national 'future colliders' structure (Juan Alcaraz)

- **Poland**: (T. Lesiak) planning FCC information day at Epiphany conference in January.

- **Switzerland** 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)

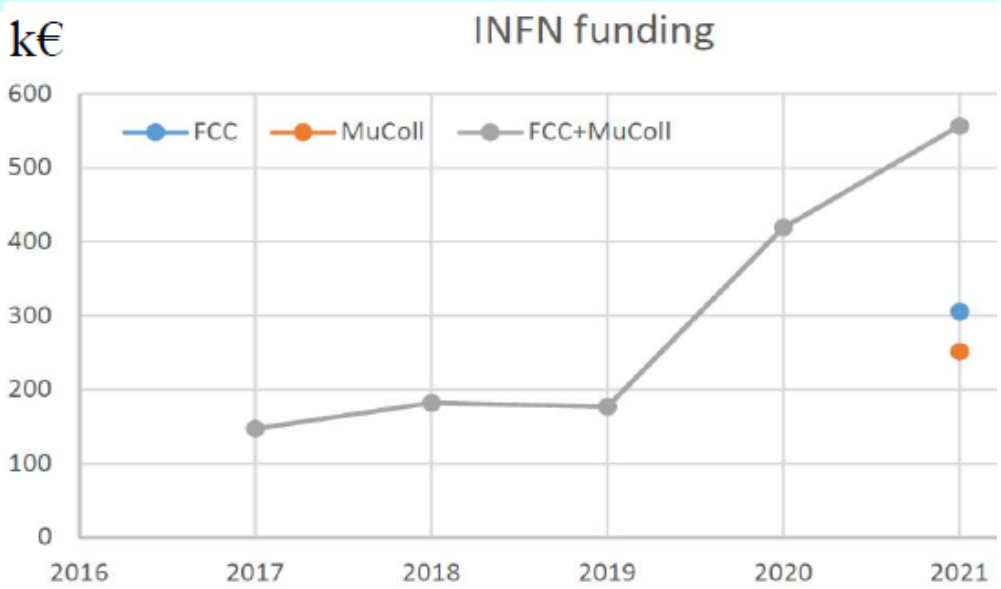
- Contacts **USA, Austria, Estonia** etc.. have been initiated – to be followed.

FCC-ee : Situation en Italie

- Transition from
  - RD_FA
    - Generic accelerators
  - To RD_FCC
    - FCC specific

2020:
- FCC: 73/13.93

2021:
- FCC: 91/17.45



Activities

- Silicon detectors:
  - DMAPS pixels for vertex detector
  - Sensors for large area trackers
- Drift chamber with cluster counting
- Dual Readout calorimeters
  - EM prototype soon on test beam
- Micro-Rwell chambers for muon and pre
- Software for fast and full simulation
  - ML analysis techniques

Conclusions

- FCC and IDEA are getting good support from I
- Participation is increasing, but
  - Some competition with Muon Collider work
  - More dedicated people are needed
    - INFN trying to setup FCC Project Associates at CERN (time s
- EU programs are VERY important
  - Help develop collaborations with other EU institution
  - Good source of funding for young collaborators
  - Co-funding in general helps in many ways
- Formal FCC structure needs clean up
  - Org charts

The Physics Group conveners are the backbone of the Physics Benchmark committee

Physics groups: Nominations wanted !

- 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)

Black = exp.
White = 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 → H D. d'Enterria

QCD and γγ physics D. d'Enterria P. Skands	Flavours physics S. Monteil J. Kamenik	New physics M. Pierini, C. Rogan M. McCullough, S. Heinemeyer	Global Analysis Synergies J. De Blas	Precision Calculations J. Gluza, A. Freitas

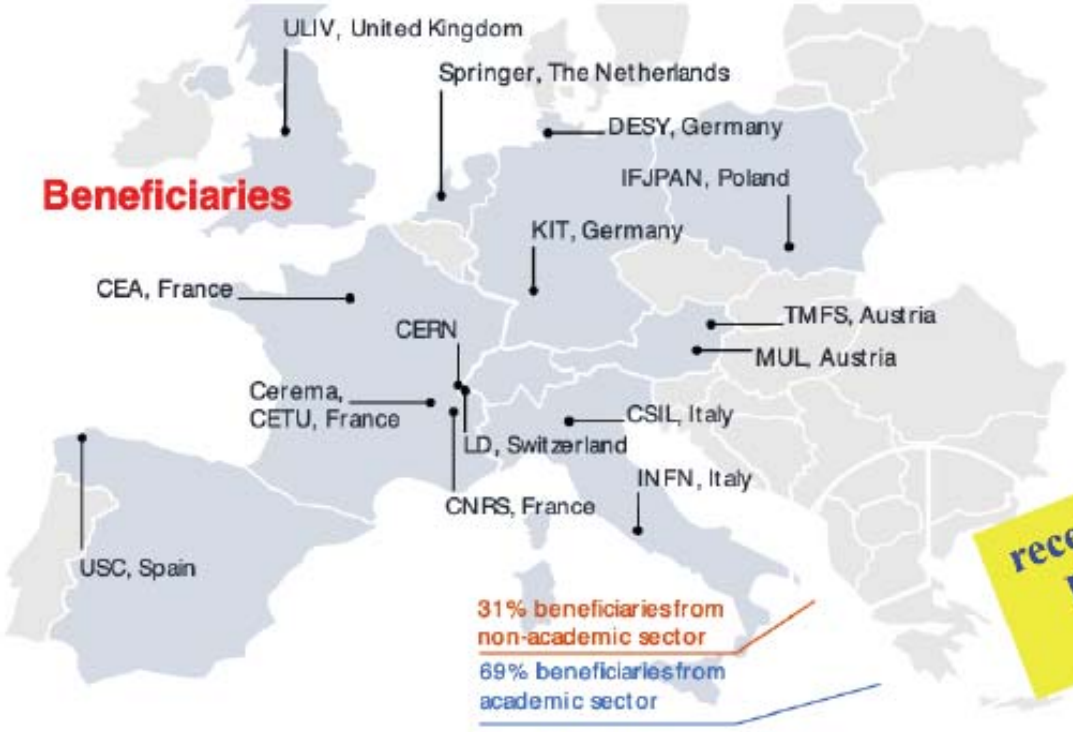
- By 15 September, we would like to receive
  - Your proposals of new physics groups (tau, LLP, ...)
  - Your nominations (including self) for physics group conveners
    - ➔ Current conveners who want to continue should of course let us know
      Some have already said they could not continue as conveners
    - ➔ Most urgent part of the mandate will be to enlarge international participation

Deadline extended until 15 October

Possible creation of LLP and tau groups

H2020 FCC Innovation study 2020-2024

Beneficiaries



Partners

- D.R.R.T. (F)
- Etat de Geneve (CH)
- DOE (US)
- BINP (Ru)
- U Oxford (UK)

recently accepted for funding by the European Commission with the highest achievable score

Design optimisation, construction planning, environmental impact assessment, management of excavation materials, user community building and public engagement, socio-economic impact,…

Preparatory work with Host States

General secretariat of the region Auvergne-Rhône-Alpes and notified body "Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement" CEREMA

Working group with representatives of federation, canton and state of Geneva and representation of Switzerland at the international organisations and consultancy companies

- Administrative processes for project preparatory phase developed.
- First review of tunnel placement performed.
- Requirements for urbanistic, environmental, economic impact, land acquisition and construction permit related processes defined.
- **Ongoing: common optimization of collider tunnel and surface site infrastructure implementation.**

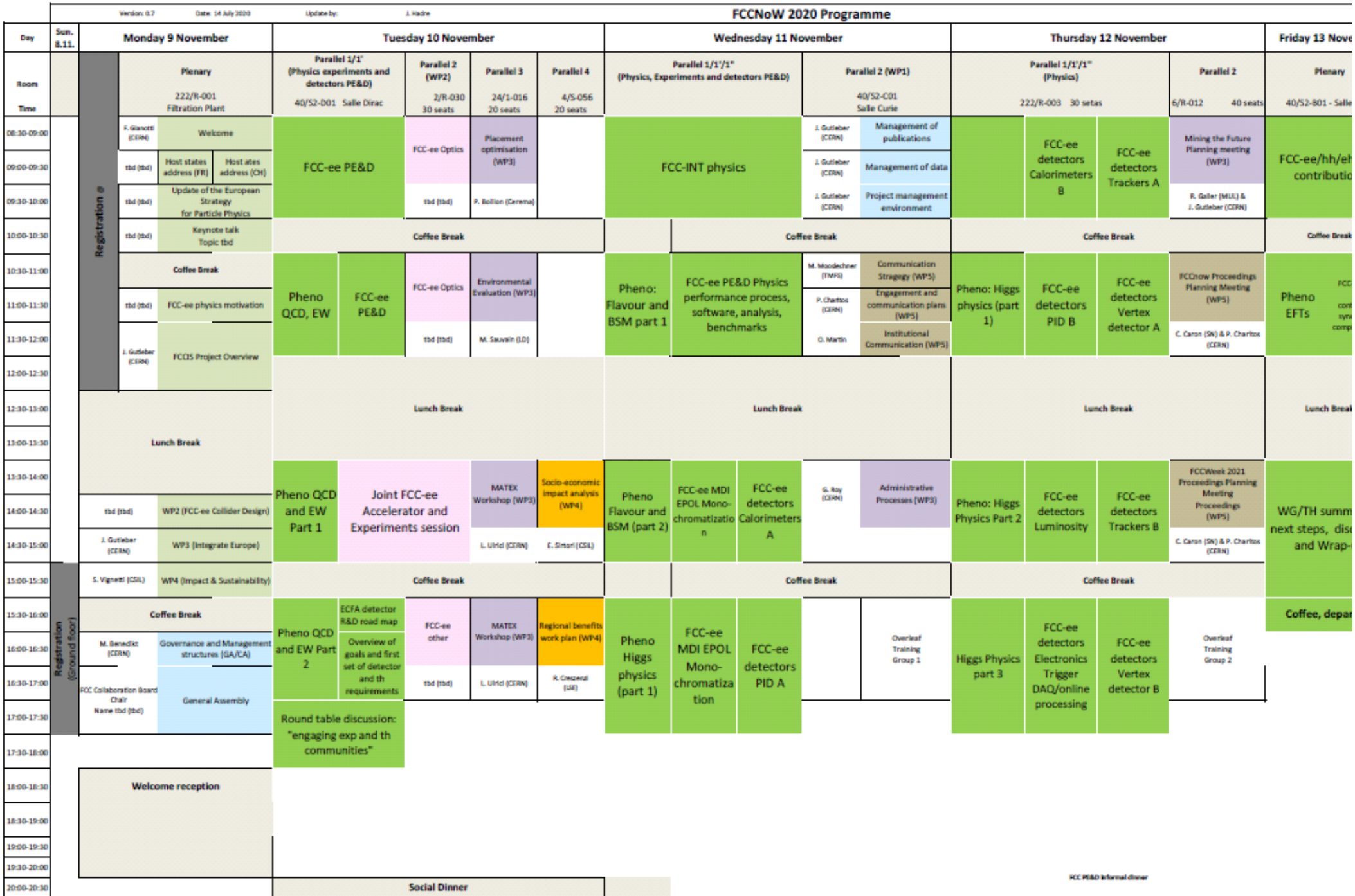
FCC-IS Kick-Off Meeting (9-13 Nov)

- **Monday Morning Plenary Session – see https://indico.cern.ch/event/923801/**

Day	Monday 9 November			
Room	Registration	Plenary		
Time		(Chair: Joachim Mnich, tbc)		
08:45-09:00		Jorgen d'Hondt (tbc)	Welcome	
09:00-09:30		tbd	Host states address (FR)	Host states address (CH)
09:30-10:00		U. Bassler (tbc)	Update of the European Strategy for Particle Physics	
10:00-10:30		F. Gianotti	CERN vision and goals until next strategy	
10:30-11:00		Coffee Break		
11:00-11:30		C. Grojean	FCC-ee physics motivation	
11:30		M. Benedikt	FCCIS Project Overview	

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

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



Welcome address — *Joachim Mnich*
40/S2-D01 - Salle Dirac, CERN 09:00 - 09:15

FCC-ee Physics Experiments and Detector Study; goals and plans — *Patrick Janot*
40/S2-D01 - Salle Dirac, CERN 09:15 - 09:40

FCC-ee: the experimental challenge — *Mogens Dam*
40/S2-D01 - Salle Dirac, CERN 09:40 - 10:05

FCC-ee: the challenge for theory — *Janusz Gluza et al.*
40/S2-D01 - Salle Dirac, CERN 10:05 - 10:30

Ultimate strong coupling determination at the FCC-ee via W and Z Pseudo-observables
David d'Enterria

Jet clustering with machine learning at FCC-ee — *Tao Liu*
4/3-006 - TH Conference Room, CERN 11:30 - 12:00

Resolving Parton Dynamics at Small x at FCC-eh
Marco Bonvini

Experiments and detectors: FCC-ee PE&D
40/S2-D01 - Salle Dirac, CERN 11:00 - 12:30

Precision Tests of Electroweak Interactions in ep
Daniel Britzger

New 3 loop correction to electroweak precision observables
Ayres Freitas

Global EW fit in the FCC-ee era — *Jens Erler*
4/3-006 - TH Conference Room, CERN 14:25 - 14:55

Revisiting QCD uncertainties in the experimental measure…
Prof. Juan Alcaraz Maestre

Joint Accelerator and Experiment session
Dr Angeles Faus-Golfe, Dr Jorg Wenninger, Manuela Boscolo, Nicola Bacchetta
40/S2-D01 - Salle Dirac, CERN 13:30 - 15:00

Coffee break
4/3-006 - TH Conference Room, CERN 15:20 - 15:40

Update on Bhabha luminosity at 0.01% — *Bennie Ward*
4/3-006 - TH Conference Room, CERN 15:40 - 16:05

Robust measure of event isotropy at colliders — *Cari Cesarotti*
4/3-006 - TH Conference Room, CERN 16:05 - 16:30

QCD measurement in LEP data, lessons for FCC-ee
Anthony Badea

The ECFA detector R&D road map — *Philip Patrick Allport*
40/S2-D01 - Salle Dirac, CERN 15:30 - 16:00

BELLEII and Synergies with the FCC-ee — *Leo Piilonen*
40/S2-D01 - Salle Dirac, CERN 16:00 - 16:20

CEPC and Synergies with the FCC-ee — *Wang Yifang*
40/S2-D01 - Salle Dirac, CERN 16:20 - 16:40

linear and circular collider detector synergies — *Felix Sefkow*
40/S2-D01 - Salle Dirac, CERN 16:40 - 17:00

Joint TH-EXP session: Round table Discussion : engaging the theory and experimental communities
Beate Heinemann, David Anthony Milstead

The status of the SANC project for polarized electron-positron beams — *Vitaly Yermolchyk*
4/3-006 - TH Conference Room, CERN 08:30 - 08:50

Simulating hard photon production with WHIZARD — *Jan Henryk Kalinowski*
4/3-006 - TH Conference Room, CERN 08:50 - 09:15

Preparing Sherpa for e+e- — *Alan Price*
4/3-006 - TH Conference Room, CERN 09:15 - 09:40

Resonant e+e- --> Higgs at the FCC-ee: an unrivaled probe of the electron Yukawa coupling — *David d'Enterria*
4/3-006 - TH Conference Room, CERN 09:40 - 10:05

Physics with FCC-eh -- complementarity with ee and hh — *Max Klein*
4/3-006 - TH Conference Room, CERN 10:05 - 10:30

Triplet scalar DM at FCC-hh — *Michael Ramsey-Musolf*
4/3-006 - TH Conference Room, CERN 11:00 - 11:25

Dark matter spin effects — *Bohdan Grzadkowski*
4/3-006 - TH Conference Room, CERN 11:25 - 11:50

Testing neutrino mass generation mechanism at the futur…
Arindam Das

Exploring heavy neutrinos at FCC — *Suchita Kulkarni*
4/3-006 - TH Conference Room, CERN 12:10 - 12:30

Experiments and detectors: FCC-ee PE&D
Emmanuel Francois Perez, Patrizia Azzi
30/7-018 - Kjell Johnsen Auditorium, CERN 11:00 - 12:30

Probing Low Scale Heavy Neutral Leptons at Colliders — *Manimala Mitra*

Flavour studies at the Tera-Z factory
LINGFENG LI
4/3-006 - TH Conference Room, CERN
14:00 - 14:30

Search for scalar lepton partners at future lepton colliders
Sebastian Baum

Electroweak Top Couplings, Partial Compositeness and Top Partner Searches
Christoph Englert

Joint Accelerator and Experiment session: MDI Polarization Monochromatization
Angeles Faus-Golfe, Jorg Wenninger, Manuela Boscolo, Nicola Bacchetta
30/7-018 - Kjell Johnsen Auditorium, CERN
14:00 - 15:30

Introduction to CALICE
Roman Poeschl

Technological developments
Lucia Masetti

CALICE Results — *Daniel Heuchel*
CERN 14:30 - 14:50

R&D on Noble Liquid Calorimetry fo…
Brieuc Francois

R&D on light-weight cryostats and o…
TBD

Coffee break
4/3-006 - TH Conference Room, CERN 15:30 - 16:00

Down type iso-singlet quarks at FCC
Gokhan Unel

Four tops for the future — *Ennio Salvioni*

Composite scalar searches
Aldo Deandrea

New physics in B meson mixing: future sensitivity and limitations

Joint Accelerator and Experiment session: m
Angeles Faus-Golfe, Jorg Wenninger, Manuela Boscolo, Nicola Bacchetta
30/7-018 - Kjell Johnsen Auditorium, CERN
16:00 - 17:30

Study of Bs -> Ds K at FCC-ee and constraints on detector
Roy Aleksan

Time of flight (TOF) review — *Jerry Vavra*
CERN 16:25 - 16:50

Timing layers — *Chih-Hsiang Yeh*
CERN 16:50 - 17:10

PID at EIC — *Thomas Hemmick*
CERN 17:10 - 17:35

Experiment & Detector session co

SESSION Alain, Patrick	present timing (indicative)	conveners
FCC-ee Physics performance session	Wedesday 11-12:30	Patrizia Azzi Emmanuel Perez
MDI, Polarization, Monochromatization	Tuesday 13:30-15:00 Wednesday 14-15:30 Wednesday 16-17:30	Nicola Bacchetta Manuela Boscolo Angeles Faus Golfe Jorg Wenninger
FCC-ee detectors: calorimeters	Wednesday 14-15:30 Thursday 11-13:00	Martin Aleksa Franco bedeschi
FCC-ee detectors: PID	Wednesday 16-18:00 Thursday 9-10:30	Guy Wilkinson Stéphane Monteil
FCC-ee detectors: Vertex detector	Thursday 9-10:30 Thursday 16-17:30	Auguste Besson Paula Collins Andeas W. Jung
FCC-ee detectors: Tracker	Thursday 11-13:00 Thursday 14:00-15:30	F. Grancagnolo Dominik Dannheim Bernhard Ketzer
FCC-ee detectors Luminosity monitor	Thursday 14-15:30	Mogens Dam xx
FCC-ee TDAQ, Electronics	Thursday 16-17:30	Christos Leonidopoulos Richard Brenner Niko Neufeld, Beat Jost

Name
BEDESCHI, Franco
BESSON, Auguste
GRANCAGNOLO, Francesco
ALEKSA, Martin (EP-ADO-AM)
AZZI, Patrizia (EP-UCM)
BACCHETTA, Nicola (EP-UCM)
BLONDEL, Alain (EP-UGC)
BRENNER, Richard (EP-UAT)
COLLINS, Paula (EP-LBD)
DAM, Mogens (EP-UAT)
DANNHEIM, Dominik (EP-DT-TP)
FAUS-GOLFE, Angeles (EP-UC3)
JANOT, Patrick (EP-CMG)
JOST, Beat (EP-LBC)
JUNG, Andreas (EP-UCM)
KETZER, Bernhard (EP-UFT)
LEONIDOPOULOS, Christos (EP-UAT)
MONTEIL, Stephane (EP-ULB)
NEUFELD, Niko (EP-LBC)
PEREZ, Emmanuel Francois (EP-CMG-OS)
WENNINGER, Jorg (BE-OP-LHC)
WILKINSON, Guy (EP-ULB)

Workshops à venir

.

Le LAPP a confirmé sa disponibilité, mais peu de place dans l'amphi et COVID grandissant. Meeting de Janvier On-line ?

Nov 9 FCC CERN

Jan 20 2nd Workshop FCC-FR (theo-exp-det-acc) on-line ?

Apr 26 FCC week-Paris (Angeles Faus-Golfe and GB contacts for IN2P3. Saclay?)

July 7 Or Sep 8 → 3rd Workshop FCC-FR en présentiel ?

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

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

Next meeting: Vendredi 16 Octobre 15h ?

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
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 11	Perspectives for high-precision $\alpha_S(m_Z^2)$ determinations FCC-ee High-precision αS(m2Z) from e+e− → hadrons data below the Z peak Higgs boson coupling measurements to charm quarks at FCC-ee	
LPC			
LPSC			
L2IT			
FCC-IN2P3			

Labo	Implication R&D
CEA	- TPC
CPPM	- Collab avec IP2I sur senseurs monolithiques actifs à pixels (MAPS):
IJC Lab	- GranuLar (~10 fois plus de cellules que le calo ATLAS) - Powder-O (fibres scintillantes immergées dans une poudre; version 'solide' de Liquid-O)
IPHC	- CMOS **(Picsel/C4PI)** : exploration de la techno 65 nm première soumission conjointe avec CERN (EP R&D WP1.2 et ALICE, oct. 20),
IP2I	- Calorimètre hadronique semi-numérique (SDHCAL)/détection de muons à chambres à plaques résistives en verre (GRPC): R&D depuis 2006 en grande partie transplantable au contexte FCC-ee [GG,IL,LM] - Senseurs monolithiques actifs à pixels (MAPS): Proposition de développement conjoint avec IPHC-C4PI, CPPM pour trajectographes, voire calorimètres à haute granularité [GB,DC,SG]
LAPP	- High granularity liquid argon calorimetry for a detector at a future circular electron-positron collider / Team: LAPP, IJClab, OMEGA
LLR	- high-granularity Si-based calorimeter (continuous operation, timing)
LPNHE	- Oriented towards Si sensors developments, for calorimetry and tracking (Calice & ITk involvement)
LPC	- Pixel detectors (if opportunities), Calorimetry
LPSC	
L2IT	

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

LOI repository
https://indico.cern.ch/event/951830/

1. Towards an ultimate measurement of $R_\ell = \frac{\sigma(\mathrm{Z}\to\mathrm{hadrons})}{\sigma(\mathrm{Z}\to\mathrm{leptons})}$
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 $\sin^2\theta^\ell_\mathrm{eff}$ and of $\alpha_\mathrm{QED}(m^2_\mathrm{Z})$ from muon pair asymmetries
5. Determination of the QCD coupling constant $\alpha_\mathrm{S}(m^2_\mathrm{Z})$
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 $e^+e^- \to H$ 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