News and Next Steps

A. Blondel and P. Janot

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1. **First Look at the Physics Case of TLEP**
   TLEP Design Study Working Group (M. Bicer (Ankara U.) *et al.*). Aug 28, 2013. 49 pp.
   Published in **JHEP 1401 (2014) 164**
   DOI: 10.1007/JHEP01(2014)164
   Conference: C13-07-29.2 Proceedings
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1. **Higgs boson decay into four bottom quarks in the SM and beyond**
Jun Gao. May 13, 2019.
e-Print: arXiv:1905.04865 [hep-ph] | PDF
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2. **Theory report on the 11th FCC-ee workshop**
A. Blondel (Geneva U.) *et al.*. May 13, 2019. 290 pp.
e-Print: arXiv:1905.05078 [hep-ph] | PDF
References | BibTeX | LaTeX(US) | LaTeX(EU) | Harvmac | EndNote
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3. **Gravitational Waves from First-Order Phase Transition in a Simple Axion-Like Particle Model**
P.S. Bhupal Dev, Francesc Ferrer, Yiyang Zhang (McDonnell Ctr. Space Sci. & Washington U., St. Louis), Yongchao Zhang (McDonnell Ctr. Space Sci. & Peking U., CHEP & Washington U., St. Louis). May 2, 2019. 32 pp.
e-Print: arXiv:1905.00891 [hep-ph] | PDF
References | BibTeX | LaTeX(US) | LaTeX(EU) | Harvmac | EndNote
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4. **Collider Signals of the Mirror Twin Higgs through the Hypercharge Portal**
Zackaria Chacko (Maryland U.), Can Kilic (Texas U.), Saereh Najjari (Brussels U., IIHE & Mainz U., Inst. Phys. & U. Mainz, PRISMA), Christopher B. Verhaaren (UC, Davis, QMAP). Apr 26, 2019. 29 pp.
MITP-18-113, UTTG-25-18
e-Print: arXiv:1904.11990 [hep-ph] | PDF
References | BibTeX | LaTeX(US) | LaTeX(EU) | Harvmac | EndNote
ADS Abstract Service
Detailed record - Cited by 1 record

5. **Future e+e−Colliders at the Energy Frontier**
Tadeusz Lesiak (Cracow, INP). 2019. 10 pp.
Published in **EPJ Web Conf. 206 (2019) 08001**
DOI: 10.1051/epjconf/201920608001
Conference: C18-09-03.1 Proceedings
References | BibTeX | LaTeX(US) | LaTeX(EU) | Harvmac | EndNote
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Detailed record

6. **$H \to b\bar{b}j$ at Next-to-Next-to-Leading Order Accuracy**
Roberto Mondini, Ciaran Williams (SUNY, Buffalo). Apr 18, 2019. 43 pp.
e-Print: arXiv:1904.08961 [hep-ph] | PDF
References | BibTeX | LaTeX(US) | LaTeX(EU) | Harvmac | EndNote
ADS Abstract Service
Detailed record - Cited by 2 records

7. **N^{3}LO predictions for the decay of the Higgs boson to bottom quarks**
Roberto Mondini, Matthew Schiavi, Ciaran Williams (SUNY, Buffalo). Apr 18, 2019. 25 pp.

Next steps

1. FCC week in Brussels ➔ register if not done yet.
https://fccweek2019.web.cern.ch/
Agenda of Physics Sessions is complete

2. ESPP is an intense process – let's not forget that the best strategy is not defense but forward motion.
➔ Complete Energy calibration paper, FAQ (see PJ's talk), CDR5 contributions etc…
➔ move forward with detector concepts and technologies, and physics studies.

FCC design
1. Michael Benedikt et al preparing implementation design study for FCC-INT plan (ee and hh)
2. Following question by SPC chair a study of LE-FCC-hh will be done: what is the energy of a 100km hadron collider which costs the same as FCC-ee? or what is the cost of a FCC-40?

FCC-ee cost and performance design optimization: 4IPs etc…

FCC-ee: Your Questions Answered

Contribution to the European Particle Physics Strategy Update 2018-2020

Alain Blondel, Patrick Janot (editors)
The author list is under construction and can be found in the next page

Latest change: 23 May 2019, 8 a.m. (All red parts since 17 May turned to black.)

Abstract

This document answers in simple terms many FAQs about FCC-ee, including comparison with other colliders. It complements the FCC-ee CDR [1] by addressing many questions fro non-experts and clarifying issues raised during the European Strategy symposium in Granad with a view to informing discussions in the period between now and the final recommendatio by the CERN Council in 2020. This document will be regularly updated as more question appear or new information becomes available.

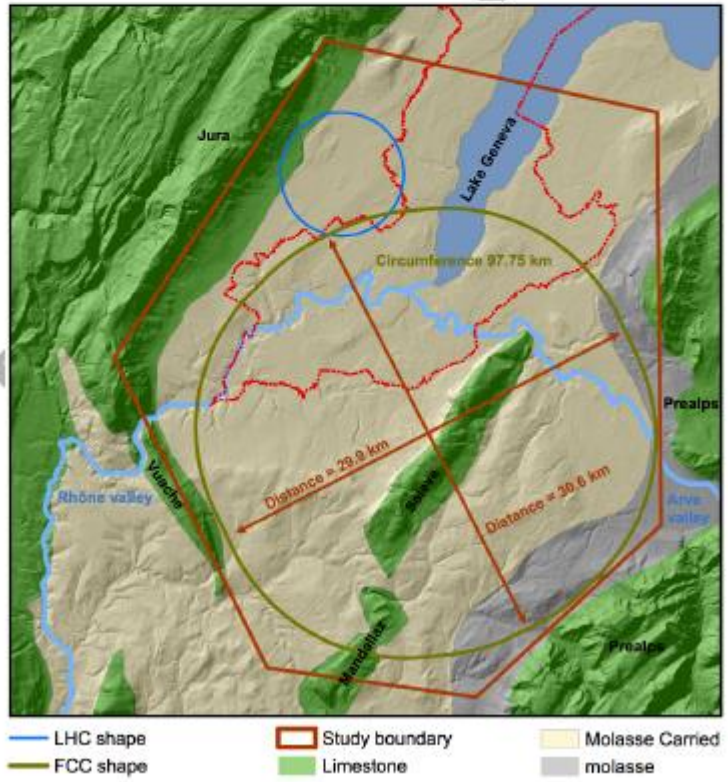

Figure 1: Current baseline layout and optimized placement in the Geneva basin of the FCC tunnel, with a perimeter of 97.5 km, showing the main topographical and geological features.

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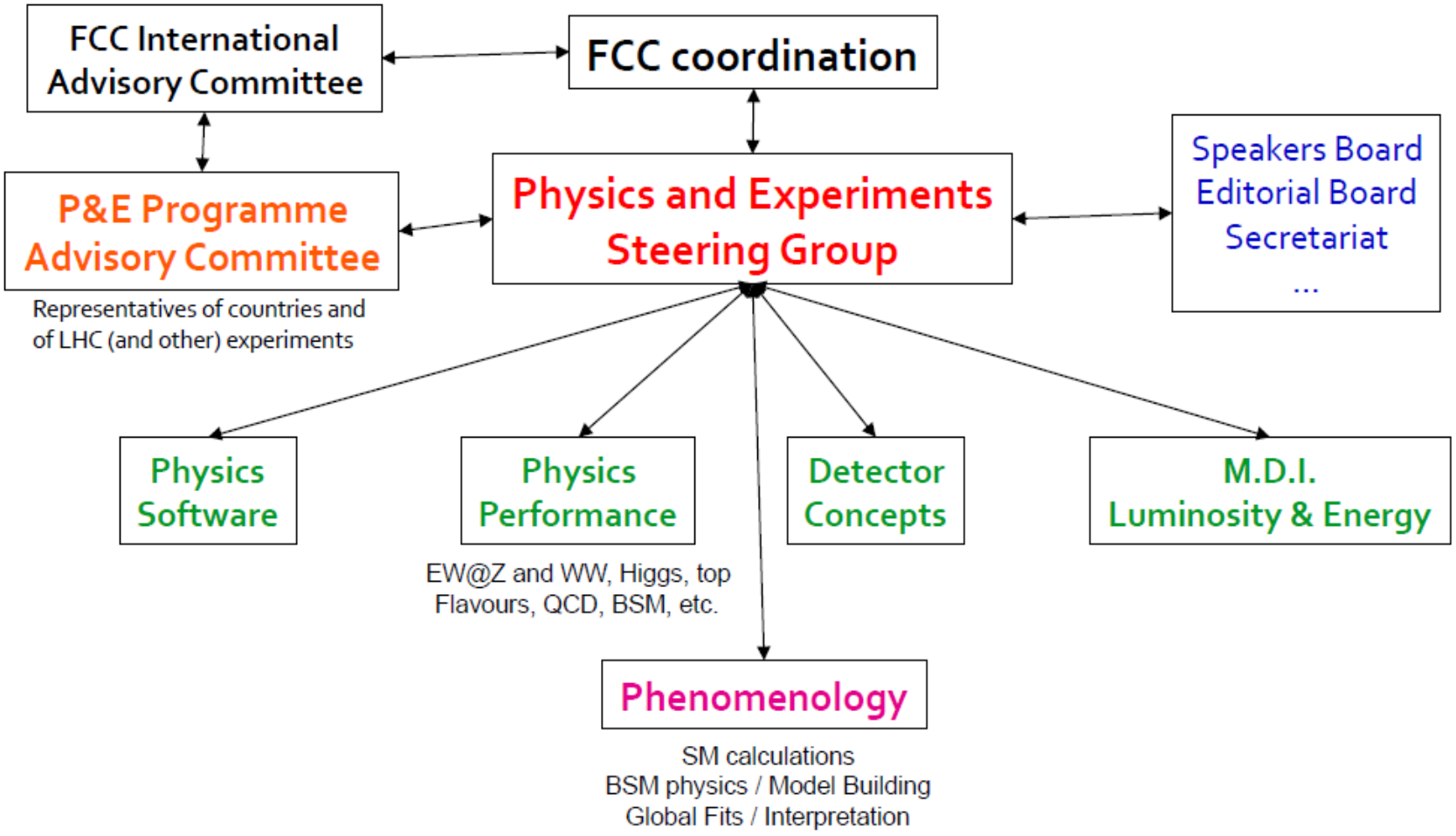
FCC Physics and Experiments Study Organization



First PESG meeting this week

Refine list of P&E PAC and activate quickly….

Increasing activity and making numbers felt is the best way of REACHING OUT

-- AIDA
-- ITN funding request for theory (Gluza et al)
-- summer conferences – EPS in Ghent, Lepton-Photon in Toronto
-- next plenary meetings
    -- 11-13 (TBC)September 2019: focus on experiments, detector technologies, simulations
    -- 1st open week of January 2020: focus on theory

No time to lose!

AIDA

Paolo Giacomelli has forwarded the EOI forms for the AIDA++ integrated infrastructure
➔ should be prepared and concatenated for the FCC week in June.

Looking out for candidates, sifting and concatenating the EOI forms will be the first task of the P&E steering group…

➔ dont be shy!

Not all EOIs will win but all winners will have submitted an EOI.

see documents attached (under AIDA++) and email sent.

Please send EOI to alain.blondel@cern.ch asap and no later than 5 JUNE 2019.

Expression of Interest for participating in the H2020 Innovation Pilot on detector technologies at accelerators

Title: *indicate the main topic with possibly some keywords*

Participants (max. 6): *list the participating institutes, laboratories and industrial partners*

Name of the legal entity	Type (university, institute, laboratory, company)	Country

Contacts: *One name + e-mail per participant*

Participating institute / company	Main contact person	E-mail

Description: *(max. 1 page)*

- *Brief description of the planned activity and the main results*
- *Relevance to future accelerator-based HEP project or an upgrade of existing facility*
- *Common interest and added value for the community*
- *Role of industrial partner(s) (if any)*
- *Innovative aspects: what is new compared to existing R&D programmes and projects, what is the progress beyond work done in AIDA-2020, what is the level of novelty w.r.t. to the State of the Art, is it a new or an improvement of existing technology, etc.*

Deliverables (max. 3): list the expected deliverable(s) of the proposed activities

- Deliverable 1:
- Deliverable 2:
- Deliverable 3:

Budget estimate

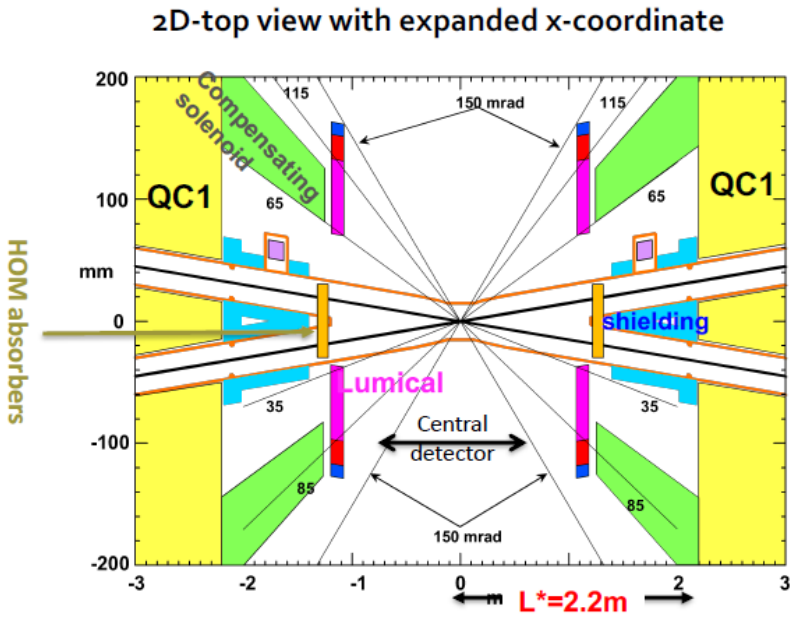
- *Man-power (total number of person-months which are needed to achieve the objectives)*
- *Full cost including personnel and other direct costs (typically 1/3 EC contribution, 2/3 matching resources)*
- *DO NOT include overheads, which will be added to the EC contribution at the proposal preparation phase*

Total number of PMs	EC contribution (in kEUR) (a)	Matching funds (in kEUR) (b)	Full costs (in kEUR) (a) + (b)

FCC-ee detector challenges…

No pileup, no underlying event, and demonstrated to be feasible but:

- Extremely large statistics / statistical precision
- …need small systematics (10^{-5} !) to match
- Physics event rates up to 100 kHz
- Bunch spacing down to 20 ns
- Continous beams, no power pulsing
- Complex interaction region
- beam pipe ∅ 2-3 cm



Optimization to be done for extremely rich physics capabilities, especially at the Z pole

10^{12} bb, cc, 2 10^{11} ττ, etc…

-- search for rare processes → excellent acceptance closure, sensitivity to displaced vertices

-- luminosity measurement at 10^{-4} (rel), 10^{-5} (abs)

-- acceptance definition at $\leq 10^{-5}$

-- optimal b/c/gluon separation

-- PID (TOF, dE/dx, Ckov?)

-- determination of point-to-point scan energies at 10 keV level

NEW challenges in design, technology, metrology, stability, monitoring

Talks at conferences

Thanks to Markus KLUTE and Patrizia AZZI, we have been invited to present talks and posters at the following conferences

Please volunteer ! We can help wiht material etc… most of which can be found in the slides shown at the FCC CDR resentation Symposium 4-5 March 2019

https://indico.cern.ch/event/789349/

which constitute a good set of rerefence presentations.

Also Vertex 2019 Dubrovnic 13-18 October

EPS FCC-ee in Brussels http://eps-hep2019.eu/ July 10-17 Ghent, Belgium accepted talks and posters

Abstract #	Date/ Time	Abstract Titel	Status	Track	Speaker
278		Physics at FCC-ee	Poster	Flavour Physics and CP Violation	-
278		Physics at FCC-ee	Accepted	QCD and Hadronic Physics	
279		FCC-ee machine performance	Poster	Accelerators for HEP	-
280		Higgs measurements at the FCC-ee	Accepted	Higgs Physics	
281		Electroweak Physics at FCC-ee	Accepted	Top and Electroweak Physics	
282		Reconstruction of the W mass and width at and above WW threshold at FCC-ee	Accepted	Top and Electroweak Physics	Marina Beguin
283		Global EFT fits from Higgs and EW at FCC-ee	Accepted	Higgs Physics	
284		Top-quark physics at the FCC-ee	Accepted	Top and Electroweak Physics	
286		Right-Handed neutrino searches at the FCC-ee	Accepted	Searches for New Physics	

Volunteers and nominations welcome please send mail to Patrizia Azzi Patrizia.Azzi@cern.ch ,
Alain Blondel alain.blondel@cern.ch,
Markus Klute klute@mit.edu

XXIX International Symposium on Lepton Photon Interactions at High Energies
http://www.leptonphoton2019.ca/ August 5-10, 2019

LP	Aug 5-10		
LP 305		Physics at FCC-ee	M. Klute
LP 306		FCC-ee machine performance	M. Dam
LP 307		Higgs measurements at the FCC-ee	Poster
LP 308		Electroweak Physics at FCC-ee	Poster

Volunteers and nominations welcome please send mail to Patrizia Azzi Patrizia.Azzi@cern.ch ,
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