

Preparation of ES18-20

Lots of activities 18

PERLE at Daresbury

Hongkong

FCC Physics January

FCC Week Amsterdam

DIS Kobe

Seminars

H,t, BSM and other progress

Higgs, Heavy Neutrinos..

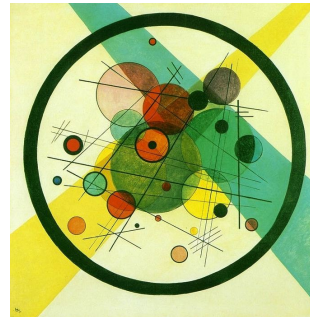
PERLE consultations

HL LHC workshop

...

Will not directly

talk about these but:



Dates

Mandates of IAC and this Coordination Group

How to Proceed?

Max Klein

Meeting of LHeC Coordination Group, CERN, 22.6.2018

Some relevant and approximate Dates

2012: CDR for 10^{33} , **Discovery of the Higgs Boson**

2013: Strategy: Highest Priority HL LHC, CERN: New accelerators “with emphasis on pp and ee”..

2014: **No BSM Physics at the LHC**, anywhere: Mandates for new IAC, our group and convenors

2016: in June: Fabiola et al confirm the Heuer mandates for the LHeC and FCCeh →

2018: **still no BSM, discovery through precision**; Nov: submission of 10 page summaries, many..

2019: February (cf below): Update of the CDR; May 13, town meeting in Spain. TDR for PERLE

2020: January: Bad Honnef - , hopefully not Hornberg .. and less foggy than Erice in 2013..
late spring: Announcement of Updated Strategy

2024: LS3 for until mid 2026 [2015 in 2006 strategy]

2030: LS4

2034: LS5

2038: Conclusion of the 2013 HL LHC Programme of accumulated 3 ab^{-1} . [2030 in 2013 strategy]

Hornberg

*Jedweddes Kind auf der weiten Erd v.
Hornberger Schiessen schon hat
gehört, das Pulver ging aus zur
schönsten Stund, so dass man nicht
mehr schiessen kunnt!* Anno 1564

Welcome of Duke Christoph von Wuerttemberg in Hornberg, 1564, ...
too many fake coaches arriving prior to the Duke, no gun powder left

International Advisory Committee

Composition and Mandate

IAC Composition 6/16

Guido Altarelli +
Sergio Bertolucci
Stan Brodsky
Nicola Bianchi
Hesheng Chen
Andrew Hutton
Young-Kee Kim
Victor Matveev
Shin-Ichi Kurokawa
Leandro Nisati
Leonid Rifkin
Herwig Schopper (chair)
Jürgen Schukraft
Achille Stocchi
John Womersley
Ex officio:
Frederick Bordry
Eckhard Elsen
Oliver Bruening
Max Klein

The advisory committee was invited end of December 2014 by the CERN directorate with the following four year mandate

“Advice to the LHeC Coordination Group and the CERN directorate by following the development of options of an ep/eA collider at the LHC and at FCC, especially with:

Provision of scientific and technical direction for the physics potential of the ep/eA collider, both at LHC and at FCC, as a function of the machine parameters and of a realistic detector design, as well as for the design and possible approval of an ERL test facility at CERN.

Assistance in building the international case for the accelerator and detector developments as well as guidance to the resource, infrastructure and science policy aspects of the ep/eA collider.”

LHeC Coordination Group

Composition and Mandate

LCG Composition 6/16

Gianluigi Arduini
Nestor Armesto
Oliver Brüning
Stefano Forte
Andrea Gaddi
Erk Jensen
Max Klein
Peter Kostka
Bruce Mellado
Paul Newman
Daniel Schulte
Frank Zimmermann

The coordination group was invited end of December 2014 by the CERN directorate with the following four year mandate

“The group has the task to coordinate the study of the scientific potential and possible technical realisation of an ep/eA collider and the associated detectors at CERN, with the LHC and the FCC, over the next four years. It also should coordinate the design of an ERL test facility at CERN as part of the preparations for a larger energy electron accelerator employing ERL techniques.

The group will cooperate with CERN and an International Advisory Committee, chaired by the emeritus DG of CERN, Professor Herwig Schopper, who also advises the CERN directorate. The Coordination Group is asked to represent the ep/eA collider development towards CERN, its committees and the international community. The current composition is listed *left*. CERN has asked Max Klein to chair and Oliver Brüning to co-chair this activity.”

Electron-Hadron Scattering at the Energy Frontier – A Higgs Physics Facility Resolving the Substructure of Matter

Draft Table of Contents (9. June 2016)

1. Introduction: The LHC, Modern Particle Physics and the Rôle of ep/eA
2. Physics: QCD/PDFs, Higgs, top, BSM, small x, eA at the LHeC; key items at 1.9/3.4 TeV
3. ERL electron beam: Design, Components, Injector, Dump, Civil Engineering ..
4. LHeC Performance: Collider Parameters, Luminosity, Joint Operation, Infrastructure..
5. Detector: Machine Interface (IR), Design and Performance, Components, Software
6. Installation of the Machine and Detector
7. Summary

Appendix:

- Status of the LHeC Demonstrator and ERL Developments
- Cost-Energy Relation and Cost Estimate for LHeC
- Detector Cost Estimate
- Extensions into the HE LHC Phase
- Electron-Hadron Scattering with the FCC (link to FCC CDR)

LHeC CDR update because:

- Lumi * 10
- LHC results
- Technology progress

Open for any participation

Update of the LHeC CDR^{*)} and input to EU Particle and Nuclear Physics Strategy

*) [arXiv:1206.2913](https://arxiv.org/abs/1206.2913)

Deep Inelastic Scattering at CERN CDR update

DRAFT – Illustration only – needs more stringent headlines

A: **DIS at the Energy Frontier at CERN**

A Higgs Facility Resolving the Substructure of Matter

1. Modern Particle Physics and the LHC
2. Baseline ep and eA Parameters
3. Physics at the LHC as Twin (pp+ep) Collider
 - Standard Model
PDFs, eweak+top, Higgs, new parton distributions
 - New Physics BSM
exotic Higgs, Dark Matter, Heavy Neutrinos, substructure, BFKL, Leptoquarks..
 - Discovery in Nuclear Physics
4. Experimentation at the LHeC
Detector Design
Performance (HQ tagging, DIS x calibration, FL..)
5. Infrastructure and Installation

B: **An Electron ERL at CERN**

Design Concept and Developments

1. From HERA to ERLs
2. The ERL configuration of the LHeC
3. LINAC and RF
4. Role of PERLE
5. Interaction Region
6. Lattice
7. Magnets
8. Cryogenics
9. Civil Engineering

Appendix

Cost and Energy Variation for ep

Interested Parties

Dedicated ERL Operation in 2040+

-Photo-nuclear interactions

-Laser

-SAPHIRE

To be updated for next week

Describe also genuine DIS, HL LHC → HE etc

All for Discussion

Should think of status, work and strategic consequences and prepare for Orsay ..

Comments received very recently:

J de Hondt: ECFA Chair: Submit backup document no later than February 2019
ep/A are part of the ECFA agenda: 15/16.11. at CERN
SPC wants eh to be included in CERN's list (Freddy mail)
Attention to a high quality website,
10 pages - as a portal to further information
Community: describe the community *potentially* interested

A Stocchi: submit one coherent document on physics, experiment and accelerator
INPO+LALO unification to come, PERLE ready to invest.

Should have clarity after IAC next Friday.