



Open Symposium on European Strategy for Particle Physics

<https://europeanstrategygroup.web.cern.ch/EuropeanStrategyGroup/>

Fourth International Workshop on
Prospects for Charged Higgs Discovery at Colliders
Uppsala, Sweden, 8-11 October 2012

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Chair of Strategy Group and Preparatory Group

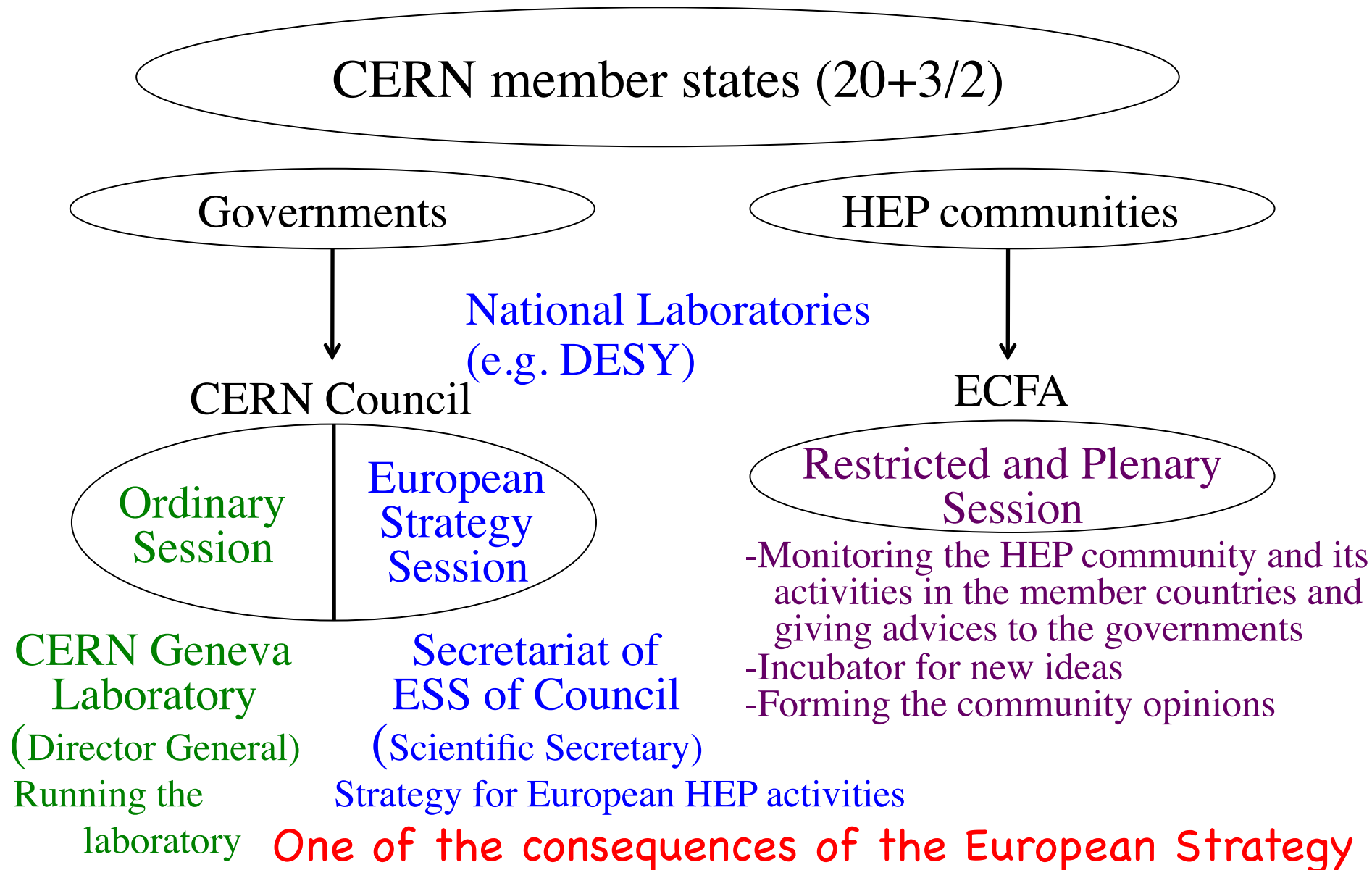


Current European Strategy

Current Strategy

- Current strategy was adapted by the Council in July 2006
- It consists of 17 strategy statements:
 - two General issues; necessity of strategy
 - **eight Scientific activities** (LHC, Accelerator R&D, ILC, Neutrino, Astroparticle, Flavour, Nuclear physics, Theory)
 - four Organizational issues
 - CERN Council's role in coordinating European particle physics
 - Globalization
 - Non-member state relation
 - Relation with EU
 - three Complementary issues
 - Outreach
 - Technology Transfer Network
 - Relation with industry

Current Structure



Cracow Open Symposium for the European Strategy Updates

NB. No conclusion yet

Overview

- On 10 to 12 September, two and half days of session
- Close to 500 participants
- Plenary speakers summarising the current status and future options, with long discussion sessions, for
 - high energy frontier
 - Flavour and symmetries
 - Strong interactions
 - Astroparticle physics
 - Neutrino

} directly relevant for the scientific strategy, discussed today

 - Theoretical physics
 - Accelerator science
 - Instrumentation, computing, and infrastructure

} relevant for the axial issues of the strategy not discussed today
- Very good local organization!!

Some of the discussed points (I)

- Direct-search of new particles at High Energy Frontier and
Indirect-search of new physics, i.e. precision measurements at any energy machines to study rare processes looking for a deviation from the Standard Model calculations, are providing fruitful complementary results.
But no compelling sign of New Physics so far.
→ Continue pushing at two fronts is essential.

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- Direct-search of new particles at High Energy Frontier and
Indirect-search of new physics, i.e. precision measurements at any energy machines to study rare processes looking for a deviation from the Standard Model calculations, are providing fruitful complementary results.
But no compelling sign of New Physics so far.
→Continue pushing at two fronts is essential.
- Discovery of “Higgs” like boson at LHC opens a new line of indirect-search: precision measurement of “Higgs” properties.
→Is LHC alone enough or a *new facility also needed?*
Linear or Circular e^+e^- colliders, Circular $\mu^+\mu^-$ collider $\gamma\text{-}\gamma$ collider based on circular e^- storage rings

Some of the discussed points (II)

- LHC serves for a wide platform with open questions:
 - Direct (ATLAS&CMS) and indirect (LHCb) New Physics search, perturbative and non-perturbative QCD (ALICE, ATLAS, CMS, LHCb, etc.). Further exploitation is possible by upgrading the machine luminosity and detectors.
 - What is the scientific scope for the upgrade from 0.3 to 1~3 ab^{-1} ? (W_L scattering, Trip.H. coupling, ..)

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 - What is the scientific scope for the upgrade from 0.3 to 1~3 ab^{-1} ? (W_L scattering, Trip.H. coupling, ..)
- The next machine beyond LHC at CERN:
 - A machine **running concurrently with LHC possible?**
LHeC (possibly LEP3: circular e^+e^- in LHC tunnel?)
Is PDF measurements by LHeC crucial for High-Lumi LHC?
 - For a high energy frontier machine (VLHC etc.) need **more input**: from LHC run @ 13~14 TeV e.g.

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- A facility for a long baseline neutrino detector share common interests between astroparticle physics and particle physics (both accelerator and non-accelerator based)
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- Major challenges in neutrino physics: **mass hierarchy**, precision measurement of the **mixing parameters** (in particular **the CP violation phase**), **sterile neutrinos**.

Some of the discussed points (IV)

- European neutrino community presented
 - CERN SPS long baseline neutrino beam to Finland with a massive liquid Ar detector for the mass hierarchy and mixing parameter measurements → ApPEC joint coordination?
 - CERN SPS short baseline neutrino beam for sterile neutrino search, with existing detector moving from GSNL to CERN
 - Neutrino factory for ultimate precision measurements of the mixing parameters for a longer term future.

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- Interest generated by an idea of muon storage ring without pre-cooling. A clean low energy neutrino source for sterile neutrino search, with conventional technology(?)

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- JP community pushes **250-500 GeV linear e^+e^- collider** with a hope to start data taking before 2030, and **Hyper Kamiokande water Cherenkov** (or liquid-Ar in Okinoshima) detector for JPARC neutrino beam with a hope to start construction in ~ 2018 , while SuperKEKB construction is in progress.

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- For high baryon density environment, SPS can provide interesting data, as well as RICH, and new facilities, e.g. FAIR, NICA,:
 - Do we need experiments at all the facilities?

What will follow

Foreseen Steps

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- Outreach event in May in Brussels, also targeting at the EU parliament members.

Expected Documents

- Briefing Book for Scientific Cases:
by the Preparatory Group and Scientific Secretaries of the
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describing the **scientific rational** for the strategy statements
and a possible **framework for implementing the strategy** for the Council discussion.

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- **Brochure** for **funding agencies, politicians, and public**
by CERN communication group and Strategy Group