

Zusammenfassung und Konsequenzen der Strategiediskussion des CERN Council

Gregor Herten

Universität Freiburg

KET Jahresversammlung, 18. Nov. 2006

Zeitfolge

16. Juni 2005: CERN Council Entscheidung:

- Beginn der Initiative

15. September 2005: CERN Council Entscheidung:

- Mandat, Mitglieder, Arbeitsplan der Strategy Group

19. Sep. 2005: Web Seite verfügbar, Input der Community

30.1 – 1.2.2006: Orsay Symposium

2-6 Mai 2006: Zeuthen Workshop,

- Draft Strategy Document

14 Juli 2006: Lissabon,

- einstimmiger Council Beschluß über das Strategie Dokument.

- **Co-chairpersons**

- T. Åkesson ECFA
- K. Peach SPC

- **Preparatory group**

- R. Aleksan ECFA
- S. Bertolucci ECFA
- A. Blondel SPC
- M. Cavalli-Sforza SPC
- R. Heuer SPC
- F. Linde ECFA
- E. Rondio ECFA
- B. Webber SPC

- **Directors**

- R. Aymar CERN
- M. Calvetti LNF
- E. Coccia LNGS
- J. Engelen CERN
- R. Eichler PSI
- A. Wagner DESY
- J. Womersley RAL
- G. Wormser LAL
- J. Zinn-Justin Dapnia

- **Scientific secretary**

- M. Mangano CERN

Some of the following slides are taken from T. Åkesson's talk at DESY

- **Members from delegations**

- W. Majerotto AUSTRIA
- R. Gastmans BELGIUM
- J. Chyla CZECH REPUBLIC
- H. Boggild DENMARK
- J. Tuominiemi FINLAND
- J. Feltesse FRANCE
- G. Herten GERMANY
- D. Nanopoulos GREECE
- G. Vesztegombi HUNGARY
- L. Cifarelli ITALY
- S. de Jong NETHERLANDS
- S. Stapnes NORWAY
- J. Nassalski POLAND
- G. Barreira PORTUGAL
- M. Aguilar SPAIN
- B. Åsman SWEDEN
- A. Rubbia SWITZERLAND
- J. Thomas UK

- **Observers**

- R. Staffin USA
- E. Rabinovici ISRAEL
- D. Demir TURKEY
- M. Nozaki JAPAN
- M. Danilov RUSSIA

- R. Wade ApPEC
- T. Bressani NuPECC
- R. Petronzio FALC

The European strategy for particle physics

Particle physics stands on the threshold of a new and exciting era of discovery. The next generation of experiments will explore new domains and probe the deep structure of space-time. They will measure the properties of the elementary constituents of matter and their interactions with unprecedented accuracy, and they will uncover new phenomena such as the Higgs boson or new forms of matter. Long-standing puzzles such as the origin of mass, the matter-antimatter asymmetry of the Universe and the mysterious dark matter and energy that permeate the cosmos will soon benefit from the insights that new measurements will bring. Together, the results will have a profound impact on the way we see our Universe; *European particle physics should thoroughly exploit its current exciting and diverse research programme. It should position itself to stand ready to address the challenges that will emerge from exploration of the new frontier, and it should participate fully in an increasingly global adventure.*

General issues

1. European particle physics is founded on strong national institutes, universities and laboratories and the CERN Organization; Europe should maintain and strengthen its central position in particle physics.
2. Increased globalization, concentration and scale of particle physics make a well-coordinated strategy in Europe paramount; this strategy will be defined and updated by CERN Council as outlined below.

Scientific activities

3. The LHC will be the energy frontier machine for the foreseeable future, maintaining European leadership in the field; the highest priority is to fully exploit the physics potential of the LHC. Resources for completion of the initial programme have to be secured such that machine and experiments can operate optimally at their design performance. A subsequent major luminosity upgrade (SLHC), motivated by physics results and operation experience, will be enabled by focused R&D; to this end, R&D for machine and detectors has to be vigorously pursued now and centrally organized towards a luminosity upgrade by around 2015.

In order to be in the position to push the energy and luminosity frontiers even further it is vital to strengthen the advanced accelerator R&D programme; a coordinated programme should be intensified, to develop the CLIC technology and high performance magnets for future accelerators, and to play a significant role in the study and development of a high-intensity neutrino facility.

It is fundamental to complement the results of the LHC with measurements at a linear collider. In the energy range of 0.5 to 1 TeV, the ILC, based on superconducting technology, will provide a unique scientific opportunity at the precision frontier; there should be a strong well-coordinated European activity, including CERN, through the Global Design Effort, for its design and technical preparation towards the construction decision, to be ready for a new assessment by Council around 2010.

6. Studies of the scientific case for future neutrino facilities and the R&D into associated technologies are required to be in a position to define the optimal neutrino programme based on the information available in around 2012; Council will play an active role in promoting a coordinated European participation in a global neutrino programme.
7. A range of very important non-accelerator experiments take place at the overlap between particle and astroparticle physics exploring otherwise inaccessible phenomena; Council will seek to work with AP&EC to develop a coordinated strategy in those areas of mutual interest.

1. Strengthen particle physics through Universities, national laboratories and CERN
2. Strategy will be defined and updated by Council

12. Future major facilities in Europe and elsewhere require collaboration on a global scale; Council, drawing on the European experience in the successful construction and operation of large-scale facilities, will prepare a framework for Europe to engage with the other regions of the world with the goal of optimizing the particle physics output through the best shared use of resources while maintaining European capabilities.

13. Through its programmes, the European Union establishes in a broad sense the European Research Area with European particle physics having its own established structures and organizations; there is a need to strengthen this relationship for circumventing issues related to the strategy.

European particle physics, by drawing on its future experience, will industry takes account of current best practices, and continuously profits from the accumulated experience.

Unanimously approved by the CERN Council at the special Session held in Lisbon on 14 July 2006

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- 10. Strong theoretical research and close collaboration with experimentalists are essential and should be widely supported.**

2. Increased globalization, concentration and scale of particle physics make a well-coordinated strategy in Europe paramount; this strategy will be defined and updated by CERN Council as outlined below.

Scientific activities

3. The LHC will be the energy frontier machine for the foreseeable future, maintaining European leadership in the field; the highest priority is to fully exploit the physics potential of the LHC, resources for completion of the initial programme have to be secured such that machine and experiments can operate optimally at their design performance. A subsequent major luminosity upgrade (SLHC), motivated by physics results and operation experience, will be enabled by focused R&D to this end. R&D for machine and detectors has to be rigorous, personal and centrally organized towards a business case study by around 2015.

5. It is fundamental to complement the results of the LHC with measurements at a linear collider. In the energy range of 0.5 to 1 TeV, the ILC, based on superconducting technology, will provide a unique scientific opportunity at the precision frontier; there should be a strong well-coordinated European activity, including CERN, through the Global Design Effort, for its design and technical preparation towards the construction decision, to be ready for a new assessment by Council around 2020.

6. Studies of the scientific case for future neutrino facilities and the R&D into associated technologies are required to be in a position to define the optimal neutrino programme based on the information available in around 2012; Council will play an active role in promoting a coordinated European participation in a global neutrino programme.

7. A range of very important non-accelerator experiments take place at the overlap between particle and astroparticle physics exploring otherwise inaccessible phenomena; Council will seek to work with ApPEC to develop a coordinated strategy in these areas of mutual interest.

3. Exploit LHC and do R&D for its luminosity upgrade.
4. Accelerator R&D to secure the long-term research based in Europe.
5. A strong activity, including CERN, in GDE. Assessment around 2010.
6. Council to promote a coordinated European participation in a global v-programme. Waypoint around 2012.
7. In areas of mutual interest Council will seek to work with ApPEC to develop a coordinated strategy.
8. Promote participation in flavour physics and precision measurements at the high-L frontier at lower energies, based on national/regional initiatives.
9. In areas of mutual interest Council will seek to work with NuPECC in areas of mutual interest. Maintain capability for fixed target experiments at CERN.

3. The LHC will be the energy frontier machine for the foreseeable future, maintaining European leadership in the field; *the highest priority is to fully exploit the physics potential of the LHC, resources for completion of the initial programme have to be secured such that machine and experiments can operate optimally at their design performance.* A subsequent major luminosity upgrade (SLHC), motivated by physics results and operation experience, will be enabled by focussed R&D; *to this end, R&D for machine and detectors has to be vigorously pursued now and centrally organized towards a luminosity upgrade by around 2015.*

Scientific Activities (2)

4. In order to be in the position to push the energy and luminosity frontier even further it is vital to strengthen the advanced accelerator R&D programme; *a coordinated programme should be intensified, to develop the CLIC technology and high performance magnets for future accelerators, and to play a significant role in the study and development of a high-intensity neutrino facility.*

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7. A range of very important non-accelerator experiments take place at the overlap between particle and astroparticle physics exploring otherwise inaccessible phenomena; Council will seek to work with APFEC to develop a coordinated strategy in those areas of mutual interest.

11. Council should define and update the Strategy advised by a dedicated scientific body established for this purpose
12. Council will prepare a framework for Europe to engage with the other regions for a global strategy while maintaining European capabilities
13. A formal relationship should be established with EU for issues related to the strategy
14. Council will establish how non-member States should be involved in defining the strategy

By engaging with other regions of the world, Europe will optimize the particle physics output through the best shared use of resources while maintaining European capabilities.

13. Through its programme, the European Union established in a broad sense the European Research Area with European particle physics having its own established structures and organizations; there is a need to strengthen this relationship by communicating issues related to the strategy.

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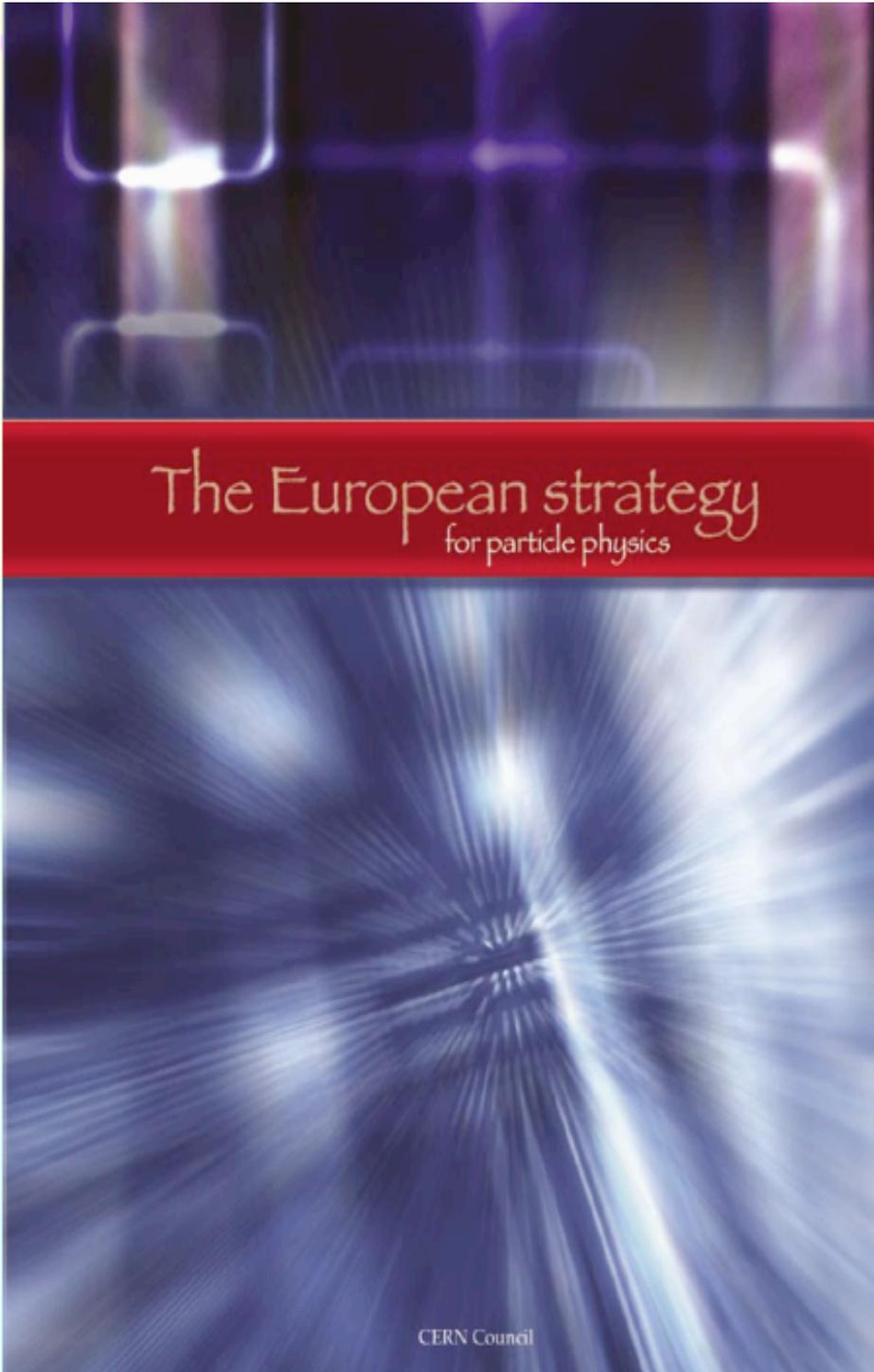
15. Implement outreach from the start of any major project.

Council establish a network of communication officers from each member state to

- Incorporate existing activities
- Propose, implement and monitor a communication and education strategy
- Report on a regular basis to Council

16. Create a technology transfer forum to analyze experience, propose measures, and promote mobility between industry and research

17. Council will ensure that future engagement with industry takes account of current best practices, and profits from the accumulated experience



The European strategy for particle physics

CERN Council

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Next Steps: Implementation of the Strategy

Discussion at CERN in SPC and Council:

4 items (priorities) until 2010 identified by CERN management for the implementation of the strategy at CERN (240 MCHF needed).

1. LHC (experiments, analysis manpower, collimators, beam control, injector, power supply of PS)
2. Renovation, reliability (design new PS and SPL, Linac 4)
3. Accelerator R&D for SC magnet, SLHC, detectors, CLIC.
4. with outside labs: SC cavities, high power targets, anti-proton cooler, NA48, HIE Isolde).

Outcome of the discussions:

- CERN needs more resources and man power to implement the strategy, but not easy to obtain them soon.
- CERN should work out a plan together with national laboratories how to share the effort on accelerator R&D.
- Urgent to set-up “dedicated scientific body” to advice Council on how to proceed.

Next Steps

Council WG on Implementation of Organisational Issues

(established Oct. 2006)

G. Herten, Chair (Germany)

D-O. Riska (Fin; Denmark, Finland, Norway, Sweden)

J. Nassalski (PL; Czech Republic, Hungary, Poland, Slovakia)

M. Aguilar (ES; Bulgaria, Greece, Portugal, Spain)

S. Bais (NL; Austria, Belgium, the Netherlands)

R. Eichler (Switzerland)

M. Spiro (France)

R. Petronzio (Italy)

R. Wade (UK)

R. Aymar, CERN

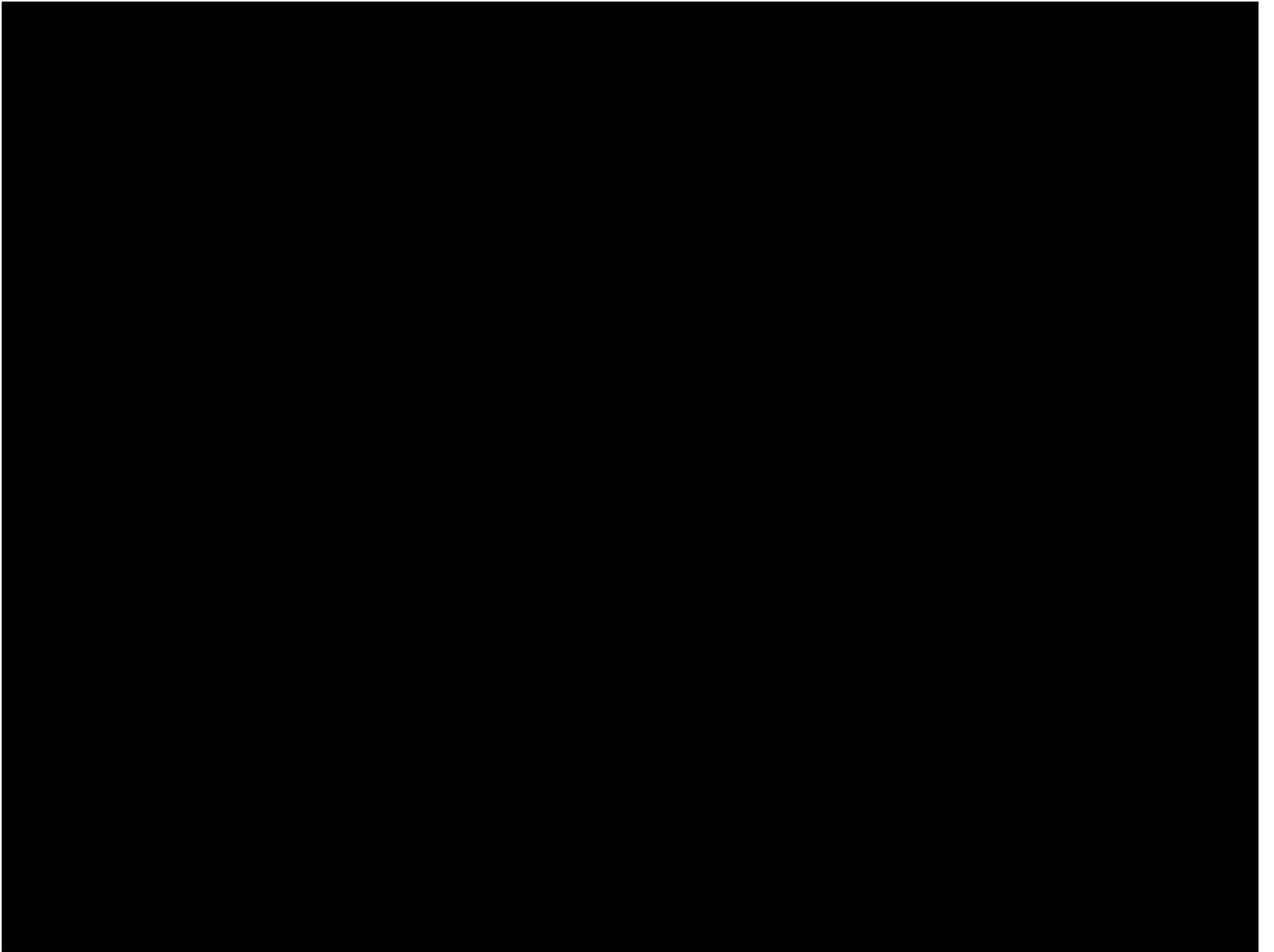
A. Wagner, DESY

T. Akesson, ECFA chair

K. Peach, SPC chair

Remit of the Working Group

- ❑ advise Council on implementation of
 - item 11 (Dedicated scientific body)
 - item 12 (European participation in global projects)
 - item 13 (Relation with the EU)
 - item 14 (Involvement of non-member states)
- ❑ Starting point is the outcome of the Zeuthen discussions.
- ❑ Formal proposal to the Council for approval.
- ❑ Should be based on consensus of all member states.



6. Studies of the scientific case for future neutrino facilities and the R&D into associated technologies are required to be in a position to define the optimal neutrino programme based on the information available in around 2012; *Council will play an active role in promoting a coordinated European participation in a global neutrino programme.*

11. There is a fundamental need for an ongoing process to define and update the European strategy for particle physics; *Council, under Article II-2(b) of the CERN Convention, shall assume this responsibility, acting as a council for European particle physics, holding a special session at least once each year for this purpose. Council will define and update the strategy based on proposals and observations from a dedicated scientific body that it shall establish for this purpose.*