

# European HEP Strategy Update

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Preparatory Group

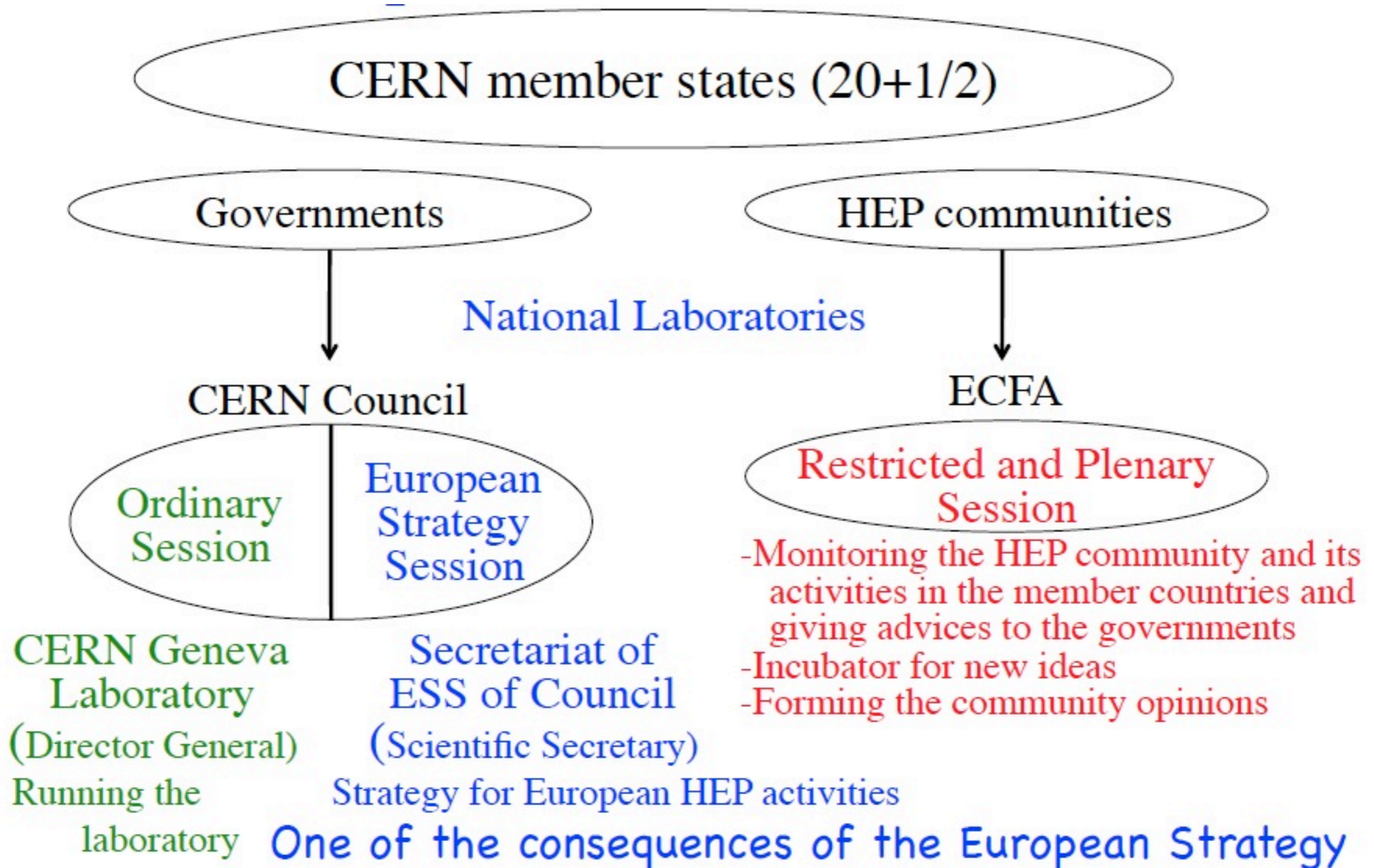
March 12, 2012

# Update of the European Strategy for Particle Physics

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

- **Mandate for the European Strategy Group (ESG):**
  - **Establish a Proposal for an update of the medium and long-term European Strategy for Particle Physics, for approval by the Council. In particular aim at:**
    - enhancing the visibility of existing European particle physics programmes;
    - increasing collaboration among Europe's particle physics laboratories, institutes and universities;
    - promoting a coordinated European participation in global projects and in regional projects outside Europe;
    - encouraging knowledge transfer to other disciplines, industry, and society.
  - **The proposal shall include a review of the implementation of the 2006 Strategy, as well as of the structures and procedures currently in place with regard to the Strategy.**

# European HEP Structure



## 2006 Discussion Document contains more information

### *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 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.*

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.*
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 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 ApPEC to develop a coordinated strategy in these areas of mutual interest.*

8. Flavour physics and precision measurements at the high-luminosity frontier at lower energies complement our understanding of particle physics and allow for a more accurate interpretation of the results at the high-energy frontier; *these should be led by national or regional collaborations, and the participation of European laboratories and institutes should be promoted.*
9. A variety of important research lines are at the interface between particle and nuclear physics requiring dedicated experiments; *Council will seek to work with NuPECC in areas of mutual interest, and maintain the capability to perform fixed target experiments at CERN.*
10. European theoretical physics has played a crucial role in shaping and consolidating the Standard Model and in formulating possible scenarios for future discoveries. Strong theoretical research and close collaboration with experimentalists are essential to the advancement of particle physics and to take full advantage of experimental progress; *the forthcoming LHC results will open new opportunities for theoretical developments, and create new needs for theoretical calculations, which should be widely supported.*

#### *Organizational issues*

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.*
12. Future major facilities in Europe and elsewhere require collaborations 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 communicating issues related to the strategy.*

14. Particle physicists in the non-Member States benefit from, and add to, the research programme funded by the CERN Member States; *Council will establish how the non-Member States should be involved in defining the strategy.*

#### *Complementary issues*

15. Fundamental physics impacts both scientific and philosophical thinking, influencing the way we perceive the universe and our role in it. It is an integral part of particle physics research to share the wonders of our discoveries with the public and the youth in particular. Outreach should be implemented with adequate resources from the start of any major project; *Council will establish a network of closely cooperating professional communication officers from each Member state, which would incorporate existing activities, propose, implement and monitor a European particle physics communication and education strategy, and report on a regular basis to Council.*
16. Technology developed for nuclear and particle physics research has made and is making a lasting impact on society in areas such as material sciences and biology (e.g. synchrotron radiation facilities), communication and information technology (e.g. the web and grid computing), health (e.g. the PET scanner and hadron therapy facilities); *to further promote the impact of the spin-offs of particle physics research, the relevant technology transfer representatives at CERN and in Member states should create a technology transfer forum to analyse the keys to the success in technology transfer projects in general, make proposals for improving its effectiveness, promoting knowledge transfer through mobility of scientists and engineers between industry and research.*
17. The technical advances necessary for particle physics both benefit from, and stimulate, the technological competences available in European industry; *Council will consolidate and reinforce this connection, by ensuring that future engagement with 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*

# 2006 European Strategy for Particle Physics

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# 2006 European Strategy for Particle Physics

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# 2006 European Strategy for Particle Physics

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.*

Reference for Strategy Update: European Roadmap for  
Astroparticle Physics (2011)

<http://www.aspera-eu.org/images/stories/roadmap/SAC-Roadmap-Nov-1-2011-final.pdf>

# 2006 European Strategy for Particle Physics

8. Flavour physics and precision measurements at the high luminosity frontier at lower energies **complement our understanding** of particle physics and allow for a more accurate interpretation of the results at the high-energy frontier; *these should be led by national or regional collaborations, and the participation of European laboratories and institutes should be promoted.*

# 2006 European Strategy for Particle Physics

<http://council.web.cern.ch/council/en/EuropeanStrategy/ESParticlePhysics.html>

- The strategy adopted by the Council in July 2006 consists of seventeen (17) strategy statements:
  - **Two (2) General issues; necessity of strategy**
  - **Eight (8) Scientific activities**
    - LHC, Accelerator R&D, ILC, Neutrino, Astroparticle, Flavor, Nuclear physics, Theory
  - **Four (4) Organizational issues**
    - CERN Council's role in coordinating European particle physics
    - Globalization
    - Non-member state relations
    - Relations with EU
  - **Three (3) Complementary issues**
    - Outreach
    - Technology Transfer Network
    - Relation with industry

# The European Strategy for Particle Physics (2006)

<http://council-strategygroup.web.cern.ch/council-strategygroup/>

## The European strategy for particle physics

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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.*

CERN Council

# The European Strategy for Particle Physics (2006)

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The European strategy  
for particle physics

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CERN Council

European Strategy update is in progress

# European Strategy Update

- Strategy Update Mandate(continued):
  - Outline priorities with special emphasis on future large infrastructures/projects, including preparatory steps for a next project at CERN after LHC in a global context. Also consider possible future participation by CERN in experiments outside the Geneva Laboratory as part of the Strategy implementation.
- The CERN Council updates the strategy every 5 years by setting up a working group, the European Strategy Group (ESG), that is assisted by the European Strategy Preparatory Group (ESPG).
- The kickoff meeting for the Strategy Update was held at a joint ECFA-EPS session during the 2011 EPS meeting in Grenoble.

# European Strategy Group (ESG)

Strategy Secretariat Members	
Scientific Secretary	Prof. T. Nakada
SPC Chair	Prof. F. Zwirner
ECFA Chair	Dr. M. Krammer
Representative EU Lab Directors	Ph. Chomaz

Members of ESG and ESPG.

The Scientific Secretary of the Strategy Session of the CERN Council, (Tatsuya Nakada) chairs the ESG and the Preparatory Group.

- The ESG prepares the Draft Strategy Statements to be presented to the CERN Council.
- The ESG will meet in January 2013 to prepare the Draft Strategy Statements during a week long session.
- The next ESG meeting will be held on March 16, 2012.

# European Strategy Group Membership

Member States	
Austria	
Belgium	Prof. W. Van Doninck
Bulgaria	
Czech Republic	Prof. J. Chyla
Denmark	Prof. J. J. Gaardhoje
Finland	Prof. P. Eerola
France	Prof. E. Augé
Germany	Prof. S. Bethke
Greece	Prof. P. Rapidis
Hungary	Prof. P. Levai
Italy	Prof. R. Petronzio
Netherlands	Prof. S. De Jong
Norway	Prof. A. Read
Poland	Prof. A. Zalewska
Portugal	Prof. G. Barreira
Slovakia	Dr L. Sandor
Spain	Prof. C. Pajares
Sweden	Prof. B. Asman
Switzerland	Prof. K. Kirch
U.K.	Prof. J. Butterworth

CERN	
Director General	Prof. R. Heuer
Major European National Laboratories	
CIEMAT	C. Lopez
DESY	J. Mnich
IRFU	Ph. Chomaz
LAL	A. Stocchi
NIKHEF	F. Linde
LNF	U. Dosselli
LNGS	L. Votano
PSI	L. Rivkin
STFC-RAL	J. Womersley
Candidate for Accession to Membership	
Romania	Dr S. Dita
Associate Member; pre-stage of Membership	
Israel	Prof. E. Rabinovici
Observer States	
India	Prof. T. Aziz
Japan	Prof. Sh. Asai
Russian Federation	Prof. A. Bondar
Turkey	Prof. Dr M. Zeyrek
United States	Prof. M. Shochet



# European Strategy Update Timeline

Timeline for Update of European Strategy	
Open for Submissions on scientific issues	1 February 2012
Submissions closed for the Open Symposium	31 July 2012
<i>All submissions will be made available to the speakers and the session chairs of the Open Symposium</i>	
Open Symposium (at Cracow)	10-12 September 2012
Submissions closed for being included in the Briefing Book to the Strategy Group	15 October 2012
Strategy Group meeting to draft Update of Strategy	21-26 January 2013
Finalizing Update of Strategy by CERN Council	March 2013
Special Council Session to adopt Update of European Strategy in Brussels	May/June 2013

# European Strategy Preparatory Group (ESPG)

Strategy Secretariat Members	
Scientific Secretary	Prof. T. Nakada
SPC Chair	Prof. F. Zwirner
ECFA Chair	Dr. M. Krammer
Repres. EU Lab Directors	Ph. Chomaz
SPC	
	Prof. R. Aleksan (FR)
	Prof. P. Braun-Munzinger (DE)
	Prof. M. Diemoz (IT)
	Prof. D. Wark (UK)
ECFA	
	Prof. K. Desch (DE)
	Prof. K. Huitu (FI)
	Prof. A. P. Zarnecki (PL)
	Prof. C. De Clercq (BE)
CERN	
	Dr. P. Jenni
Asia/Americas	
Asia	Prof. Y. Kuno
Americas	Dr. P. McBride

- **ESPG collects and prepare the scientific and technical material for the Strategy update.**
  - **Compiles community input and discussions from the Open Symposium into briefing documents.**
- **Plans the agenda and organize discussions for the Open Symposium.**
- **ESPG Logistics:**
  - **ESPG meets once per month Sept 2011 - early 2013**

# Call for Submissions

<http://europeanstrategygroup.web.cern.ch/europeanstrategygroup/espg/submissions.html>

- The European Strategy Preparatory Group welcomes submissions on issues related to the strategy from individual physicists, from groups of scientists representing a community, as well as from Institutions and Organizations.
- Contributions will be discussed at the meetings of the Preparatory Group and during the Open Symposium, and made available to the Strategy Group.
- Send your contribution using: [http://indico.cern.ch/event/espg\\_input](http://indico.cern.ch/event/espg_input)
- **Topics for Submissions**
  - ➔ *Accelerator Physics*
  - ➔ *Astroparticle Physics, Gravitation and Cosmology*
  - ➔ *Flavour Physics and Symmetries*
  - ➔ *Physics at High Energy Frontier*
  - ➔ *Physics of Neutrinos*
  - ➔ *Strong Interaction Physics*
  - ➔ *Particle Physics Theory*
  - ➔ *General infrastructure and facilities*
  - ➔ *General comments*
- Input should be self-contained (no external links except in the references), and be up to 15 pages in length.

# European Strategy Summary

- The process to update the medium and long-term European Strategy for Particle Physics is underway.
- The community is asked to submit input to the strategy group and is encouraged to attend the Open Symposium, to be held on 10-12 September 2012 in Cracow, Poland.
- The proposal for the update to the European Strategy for Particle Physics is to be formulated by the Strategy Group (ESG) in January 2013 and presented to the CERN Council in March 2013.
  - “The proposal shall comprise a series of ordered and concise statements of 1-2 lines each, or 1-2 pages in total followed by more detailed presentations that shall not exceed 25 pages.”