

# Report from CERN Council

Partikeldagarna 2023  
Uppsala, October 22

Richard Brenner, Uppsala University

# Organigram

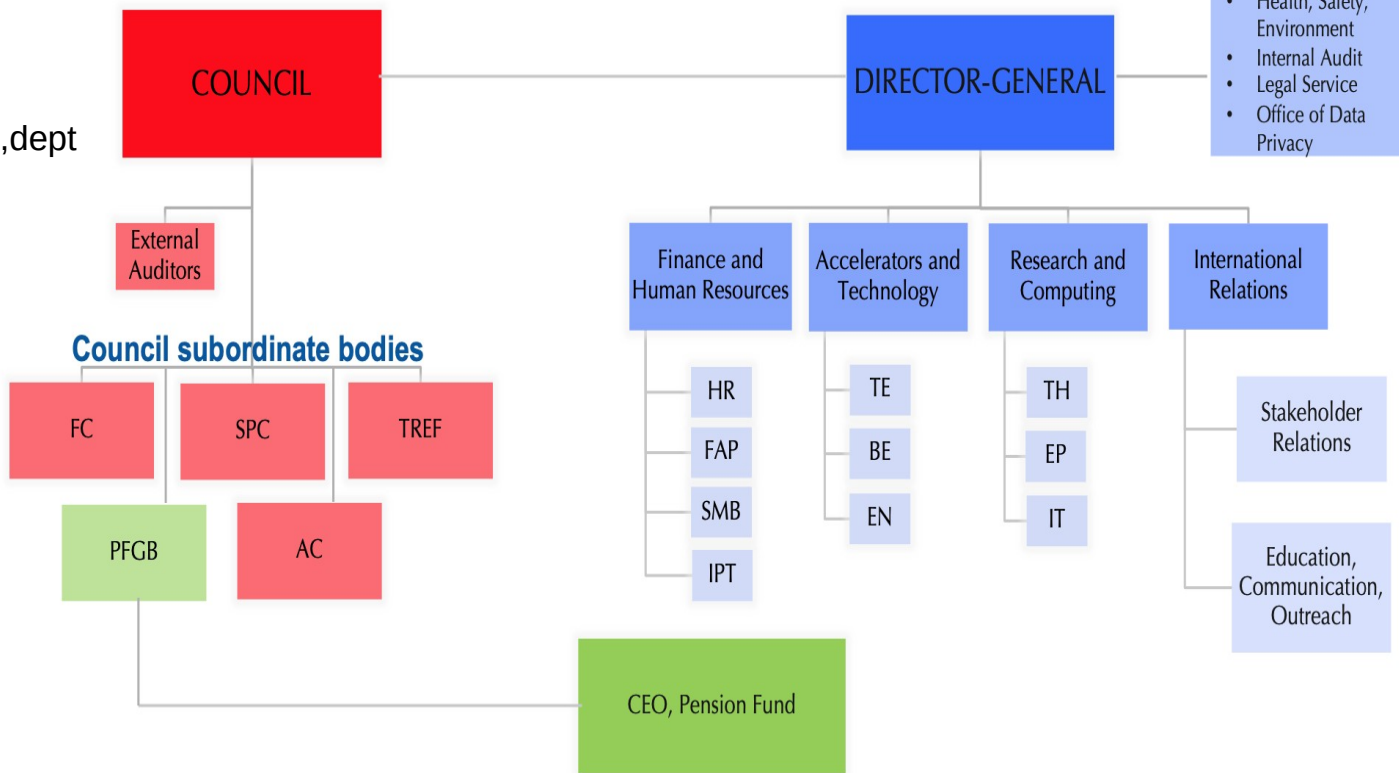
## Supreme Decision-Making Authority

## Management structure

M. Hamberg (VR)  
R. Brenner (UU)  
S. Strandberg(SU),dept

FC:  
A. Carlmark  
Malkoch (VR)  
B. Åsman (SU)

- DG services**
- Council Support
  - Health, Safety, Environment
  - Internal Audit
  - Legal Service
  - Office of Data Privacy



# CERN Council

- Not more than two delegates from each Member State
- Eliezer Rabinovici, Israel, current President of Council. Will be replaced by Costas Fountas, Greece in January 2025
- Mandate
  - determine the Organization's policy in scientific, technical and administrative matters;
  - approve the programmes of activities of the Organization;
  - adopt, by a two-thirds majority of Member States represented and voting, the parts of the budget which apply to the different programmes of activities and determine the financial arrangements of the Organization in accordance with the Financial Protocol annexed to this Convention;
  - review expenditures and approve and publish audited annual accounts of the Organization;
  - decide on the staff establishments required;
  - publish an annual report or reports;
  - have such other powers and perform such other functions as may be necessary for the purposes of this Convention.
  - European strategy for Particle Physics

# CERN "family"

- Member states (24):

Austria, Belgium, Bulgaria, Czech Republic, Denmark, **Estonia**, Finland, France, Germany, Greece, Hungary, Israel, Italy, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovak Republic, Spain, Sweden, Switzerland and United Kingdom. (since August 30)

- Associate Member States in the pre-stage to Membership (2):

Cyprus and Slovenia

- Associate Member States (8):

**Brazil**, Croatia, India, Latvia, Lithuania, Pakistan, Türkiye and Ukraine (since March 13)

Chile and Ireland have submitted applications for Associate Membership

- Observer status LHC (2):

Japan and the United States of America

- Observer status CERN (2+2):

EU and UNESCO + Russian Federation and JINR suspended from 2022

# CERN "family"

- Non-member states with international co-operation agreements with CERN:

Albania, Algeria, Argentina, Armenia, Australia, Azerbaijan, Bahrain, Bangladesh, Belarus, Bolivia, Bosnia & Herzegovina, Canada, Chile, China, Colombia, Costa Rica, Ecuador, Egypt, Georgia, Iceland, Iran, Japan, Jordan, Kazakhstan, Lebanon, Malta, Mexico, Mongolia, Montenegro, Morocco, Nepal, New Zealand, North Macedonia, Palestine, Paraguay, Peru, Philippines, Qatar, Republic of Korea, the Russian Federation, Saudi Arabia, South Africa, Sri Lanka, Thailand, Tunisia, United Arab Emirates, United States and Vietnam

- Scientific contacts:

Bahrain, Costa Rica, Cuba, Ghana, Honduras, Hong Kong, Indonesia, Ireland, Kuwait, Luxembourg, Oman, Madagascar, Malaysia, Mauritius, Mozambique, Rwanda, Singapore, Sudan, Taiwan, Tanzania, Uzbekistan and Zambia

# European Commission: "Draghi's report" delivered on September 9



## Box 2 "The CERN success story"

A notable example of the remarkable returns from the joint collaboration of European countries is the creation of the European Organization for Nuclear Research (CERN) in 1954. CERN started with an initial coalition of 12 European countries. Today, it comprises 23 European Member States, along with 11 non-European Associate Member States and 4 Observers (the EU, UNESCO, Japan, and the US). CERN made it possible to set up and sustain investment in high-energy physics research that any single European country would have regarded as unsustainable over such a

prolonged period of time. The pooling of country-specific resources allowed single countries to share the considerable risks and uncertainty inherent to fundamental innovative research. Its collaborative effort has yielded remarkable successes, including two most notable discoveries: the invention of the World Wide Web, invented at CERN 35 years after its inception, and the discovery of the Higgs Boson particle, announced on 4 July 2012. CERN scientific leadership spans various domains, including superconductivity, magnets, vacuum, radio frequency, precision mechanics, electronics, instrumentation, software, computing and Artificial Intelligence. CERN's technologies have generated significant societal benefits, including advancements in cancer therapy, medical imaging, autonomous driving with artificial intelligence, and environmental applications of superconducting cables. The Large Hadron Collider has propelled CERN to global leadership in particle physics – a mantle that has shifted from the US to Europe – and it stands as CERN's flagship facility. **One of CERN's most promising current projects, with significant scientific potential, is the construction of the Future Circular Collider (FCC): a 90-km ring designed initially for an electron collider and later for a hadron collider. Chinese authorities are also considering constructing a similar accelerator in China, recognising its scientific potential and its role in advancing cutting-edge technologies. If China were to win this race and its circular collider were to start working before CERN's, Europe would risk losing its leadership in particle physics, potentially jeopardising CERN's future.**

We have already discussed the remarkable returns from the creation of the European Organization for Nuclear Research (CERN) and emphasised that the future of CERN is at risk due to China's progress in emulating one of CERN's most promising current projects, the Future Circular Collider (FCC). **Refinancing CERN and ensuring its continued global leadership in frontier research should be regarded as a top EU priority, given the objective of maintaining European prominence in this critical area of fundamental research, which is expected to generate significant business spillovers in the coming years**

# CERN 70th year

- Community event Sept. 17

Open to all holders of a CERN access card and their families  
A major organizational, logistic, safety effort, which involved many sectors/departments/units and 100 volunteers during the event.

~ 8000 participants, a great atmosphere !



- High level celebration Oct 1

Participation confirmed so far: 1 member of a royal family, 6 Heads of State, 1 Head of Government, 9 Ministers

Other distinguished guests: Christine Lagarde, Tim Berners-Lee, Eric Schmidt, etc.





# 2024 Grand Prize for Innovative Collaboration from the EC

- ❑ Arts at CERN started in 2011
- ❑ Fosters dialogue between art and physics, engaging new communities with CERN  
Artists from around the world are invited to experience how fundamental research addressed the big questions, through dialogue with CERN scientists
- ❑ 3 strands: resident artists, art commissions, and exhibitions and events
- ❑ Materials budget from donations (CERN & Society): typically ~ 150 kCHF/year
- ❑ 500-800 applications/ year from ~ 80 countries; > 250 artists hosted at CERN and 35 new artworks
- ❑ Collaborates with leading cultural institutions worldwide (exhibitions in Centre Pompidou, Victoria & Albert Museum, Art Basel, Kunsthaus Zürich, ..)
- ❑ Significant attention from general public and media (NYT, FT, Guardian, Nature, etc.)

Arts at CERN awarded the 2024 Grand Prize for Innovative Collaboration from the EC [S+T+Arts initiative](#).

The competition honours innovative projects at the nexus of art, technology and science that contribute to economic and social innovation.



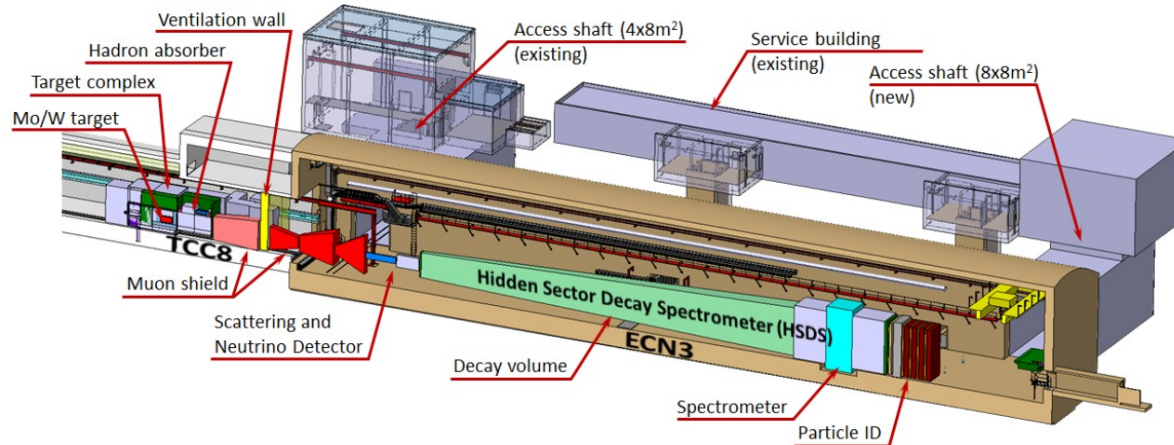
*Broken symmetries* touring exhibition attracted 100,000 visitors.  
10 artworks produced by resident artists





# SHIP

- SHIP experiment was in March 2024 chosen to run in the North Area's ECN3. This is the first decision for a major experiment at CERN since the start of LHC.
- The experiment will search for feebly interacting particles using the SPS accelerator
- The experiment is led by Richard Jacobsson



# European Particle Physics Strategy Update

<https://europeanstrategyupdate.web.cern.ch/welcome>

- In June 2024, the CERN Council established and approved the remit of the European Strategy Group  
"The aim of the Strategy update should be to develop a **visionary and concrete plan** that greatly advances human knowledge in fundamental physics through the **realisation of the next flagship project at CERN**. This plan should attract and value **international collaboration** and should **allow Europe to continue to play a leading role in the field.**"
- The ESG (European Strategy Group) should take into consideration:
  - The input of the particle physics community;
  - The status of implementation of the 2020 Strategy update;
  - The accomplishments over recent years, including the results from the LHC and other experiments and facilities worldwide, the progress in the construction of the High-Luminosity LHC, the outcome of the Future Circular Collider Feasibility Study, and recent technological developments in accelerator, detector and computing;
  - The international landscape of the field
- The Strategy update should include the **preferred option** for the next collider at CERN and **prioritised alternative options** to be pursued if the chosen preferred plan turns out not to be feasible or competitive.
- The Strategy update should also indicate areas of **priority for exploration complementary to colliders** and for **other experiments to be considered** at **CERN** and at other **laboratories in Europe**, as well as for participation in **projects outside Europe**.
- The ESG should review and update the Strategy and **add other items identified as relevant to the field**, including **accelerator, detector and computing R&D, the theory frontier**, actions to minimise the environmental impact and to improve the sustainability of accelerator-based particle physics, the strategy and initiatives to **attract, train and retain the young generations, public engagement and outreach**.

# The Strategy Secretariat and European Strategy Group (ESG)

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## Strategy Secretariat:

Organising and running the ESPP process

Karl Jakobs (Strategy Secretary, Chair)  
Hugh Montgomery (SPC Chair)  
Dave Newbold (LDG Chair)  
Paris Spicas (ECFA Chair)

## European Strategy Group (ESG)

Preparation of the Strategy Document

- The Strategy Secretary (acting as Chair)
- One representative appointed by each CERN Member State (R. Brenner appointed by VR)
- One representative appointed by each of the laboratories represented in the Large Particle Physics Laboratory Directors Group (LDG), including its Chair
- The CERN Director-General
- The CERN Director-General elect
- The SPC Chair
- The ECFA Chair
- Invitees: President of CERN Council, one representative from each of the Associate Member and Observer States, one representative from the European Commission, the Chairs of APPEC, NuPECC and ESFRI, the members of the Physics Preparatory Group.

# The Physics Preparatory Group (PPG)

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**Physics Preparatory Group (PPG):** collects input from the community, organises the Open Symposium, prepares the Briefing Book

- Strategy Secretary (acting as Chair)
- **Four members appointed by Council on the recommendation of the SPC**
- **Four members appointed by Council on the recommendation of ECFA**
- **One representative appointed by CERN**
- **Two representatives from the Americas and two representatives from Asia (appointed by the respective regional representatives in ICFA)**
- The SPC Chair
- The ECFA Chair
- The LDG Chair

# PPG and working groups

PPG MEMBERS	
<b>Strategy Secretariat</b>	
Scientific Secretary (Chair)	Prof. Karl Jakobs (DE)
SPC Chair	Dr Hugh Montgomery (USA)
ECFA Chair	Prof. Pareskevas Sphicas(GR)
LDG Chair	Prof. Dave Newbold (UK)
<b>SPC</b>	
Prof. Pilar Hernandez (ES)	
Prof. Gino Isidori (CH)	
Prof. Fabio Maltoni (BE/IT)	
Prof. Jocelyn Monroe (UK)	
<b>ECFA</b>	
Dr Tommaso Boccali (IT)	
Dr Thomas Bergauer (AT)	
Dr Cristinel Diaconu (FR)	
Prof. Monica Dunford (DE)	
<b>CERN</b>	
Dr Gianluigi Arduini (CERN)	
<b>ASIA/AMERICAS</b>	
Dr Anadi Canepa (USA)	
Prof. Xinchou Lou (China)	
Prof. Rogerio Rosenfeld (Brazil)	
Prof. Yuji Yamazaki (Japan)	

Working Group		
	Co-convener (PPG member)	Co-convener
Electroweak physics	Monica Dunford (DE, exp)	Jorge de Blas (ES, theory)
Strong interaction	Cristinel Diaconu (FR, exp)	Andrea Dainese (IT, exp, HI)
Flavour physics	Gino Isidori (CH, theory)	Marie-Hélène Schune (FR, exp)
BSM physics	Fabio Maltoni (BE/IT, theory)	Rebeca Gonzalez-Suarez (SE, exp)
Neutrino physics and cosmic messengers	Pilar Hernandez (ES, theory)	Sara Bolognesi (FR, exp)
Dark matter and dark sector	Jocelyn Monroe (UK, exp)	Matthew McCullough (CERN, theory)
Accelerator science and technology	Gianluigi Arduini (CERN, acc)	Phil Burrows (UK, exp, acc)
Detector instrumentation	Thomas Bergauer (AT, exp)	Ulrich Husemann (DE, exp)
Computing	Tommaso Boccali (IT, exp, comp)	Borut Kersevan (SL, exp, comp)



# Timeline for the update of the European Strategy for Particle Physics



More in ECFA talk by A. Ferrari in this session (<https://indico.uu.se/event/1633/contributions/4113/attachments/1770/2745/ECFA-PD2024.pdf>)

# Future Circular Collider (FCC)

- EPPSU → NFP = FCC?
- FCC reference group in Sweden: Lars Börjesson (CTH), Anders Karlhede (SU), Sara Strandberg(SU), Lisbeth Ohlsson (VR), Mathias Hamberg (VR), Mathias Marklud (VR), Anna Carlmark Malkoch (VR). (R.Brenner (UU) exofficio)
- FCC conceptual design report: <https://fcc.web.cern.ch/fcc.cdr.web.cern.ch>
- More at FCC day (afternoon) on Wed. Oct 23.

## FCC IN A NUTSHELL

### Timeline

- **2025:** Completion of the FCC Feasibility Study
- **2027–2028:** Decision by CERN Member States and international partners

### Tunnel

- **90.7 km** circumference
- **200 m** average depth
- **8 surface points** (7 in France, 1 in Switzerland)

### Two stages

- **FCC-ee** (precision measurements) about 15 years from the **mid-2040s**
- **FCC-hh** (high energy) about 25 years from the **2070s**

### Costs/benefits

- **15 billion CHF**, spread over at least **15 years** for FCC-ee with four experiments
- Estimated benefit–cost ratio of **1.66**
- About **800 000** person-years of employment created