

Report from ECFA, the European Committee for Future Accelerators

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Abstract. An overview of the work of the European Committee for Future Accelerators is given. Founded in 1963, its main mandate is to help to shape the future of physics with high-energy accelerators.

1 History and purpose

The European Committee for Future Accelerators (ECFA) was founded in 1963 at the initiative of Victor Weisskopf, Director-General of CERN and Cecil Frank Powell, Chair of the CERN Scientific Policy Committee, in order to shape the future of physics with high-energy accelerators.

An extract from an article in the February 1964 edition of the CERN Courier tells the story:

"The strong-focusing alternating gradient proton synchrotrons at CERN and at Brookhaven (USA) represent the highest and most sophisticated stage so far reached in accelerator technology. The very successes achieved through the use of high-energy accelerators, however, have raised new problems which are not capable of solution at the machine energies presently available. To achieve "super-high energies", new machines capable of accelerating particles to energies effectively greater by orders of magnitude than those achieved by the CERN PS are needed."

Unfortunately such machines take many years to design and build. With this situation in mind the then Chairman of the CERN Scientific Policy Committee, Professor C F Powell of Bristol University, together with the Director-General of CERN, convened a meeting of leading high-energy physicists in January 1963. This meeting, which constituted itself into the European Committee for Future Accelerators (ECFA), appointed a small working party under the chairmanship of Prof. Edoardo Amaldi (University of Rome) to prepare a comprehensive report on the desirable programme of large accelerator construction for Europe and its financial and manpower implications. The working party reported its findings (CERN FA/WP/23) to a full meeting of ECFA in June 1963. These findings were endorsed and passed on to the Scientific Policy Committee, which in turn passed them on to the CERN Council for consideration. At the meeting of CERN Council in December 1963, approval was given for a supplementary budget in 1964 to enable further development of design studies for the new accelerators envisaged in the report, but it was made clear by all concerned that this move did not imply any commitment for later years."

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ECFA is advisory to CERN Management, CERN Council and its Committees, and to other organizations, national or international. More information may be found at its website <https://ecfa.web.cern.ch/>.

2 Mission and activities

Guidelines on the work of ECFA, its membership and governance have been worked out in 1976, and amended in 1981, 1997 and 2008.

According to the 1981 ECFA terms of reference [1] the primary aim is the long-range planning of high-energy facilities, which include accelerators, large-scale facilities and equipment adequate for the conduct of a valid high-energy research programme by the community of physicists in the participating countries and matched to the size of this community and to the resources which can be put at the disposal of high-energy physics by society. Duplication of similar accelerators should be avoided and international collaboration for the creation of these facilities should be encouraged if essential and efficient for attaining the purpose.

There should be equilibrium between the roles of international and national laboratories and university institutes in this research, and a close relation between research and education in high-energy physics and other fields. Adequate conditions for research and a just and equitable sharing of facilities between physicists, irrespective of nationality and origin, as conducive to a successful collaborative effort should be provided.

To achieve these aims ECFA can engage in - among others - the following activities:

- regular meetings;
- ad hoc symposia and conferences sponsored or organized by ECFA;
- study groups, set up by ECFA, or jointly with other organizations, for special problems;
- demographic studies of the high-energy physics community and resources in the ECFA countries, repeated at regular intervals;
- monitoring of the ongoing implementation of the European Strategy for Particle Physics in the CERN Member States, and presentation of corresponding status reports to the European Strategy Session of Council.

The latest update of the strategy was made in 2013 [2], and the next one is expected to take place around 2018.

3 Organization

ECFA consists of Plenary ECFA (P-ECFA), Restricted ECFA (R-ECFA), the Chairperson, the Secretary and permanent or ad-hoc working groups.

Plenary ECFA decides on all ECFA activities, appoints the Chairperson, the Secretary and the members, approves final reports of working groups and terminates activities, decides on admission of new countries and observers, and makes recommendations. Meetings normally take place twice a year. Unless decided otherwise, they are public. P-ECFA members are physicists from member states of CERN, including CERN itself. The duration of their term is a maximum of two times three years. They are appointed as individuals, although they should be able to represent the views of their communities. Physicists from other countries may be invited to join as well. There are also ex-officio members – representatives of national or international laboratories or organizations of importance to ECFA's activities, and representatives of countries that wish to follow the work of ECFA or contribute views. Currently there are about one hundred members. The number of members per country is no fixed, typically it is in the range between one and twelve. Among the observers – at

present over twenty – are the former ECFA Chairpersons, the President of the CERN Council and the Chairpersons of the Scientific Policy Committee, the Finance Committee, NuPECC (Nuclear Physics European Collaboration Committee), the EPS-HEPP Board (High Energy Particle Physics Board of the European Physical Society), and APPEC (Astroparticle Physics European Consortium). Other observers are from the Russian Federation and JINR (Joint Institute for Nuclear Research), the United States, the European Physical Society (EPS), and the European Science Foundation (ESF).

Restricted ECFA assists and advises the Chairperson and Secretary in the running of ECFA. It acts as the communication channel to each participating country, its physics community and national institutes and authorities. It makes regular country visits and gives feedback and recommendations to the communities, governments and funding agencies. There are normally two meetings in connection with the meetings of P-ECFA, and three to four country visits per year. Membership consists of one member per country, who is appointed for two three-year terms at most.

The ECFA Chairperson is elected by R-ECFA for one term of three years, which is normally not renewable. The Secretary is nominated by the Chairperson and endorsed by P-ECFA. Both are responsible for the day-to-day running of the Committee. The Chairperson and Secretary until the end of 2014 are Manfred Krammer (Austria) and Calin Alexa (Romania), respectively. The election of the next Chairperson takes place in November 2014.

R-ECFA country visits are typically organized in the following way. There is a one-day open session, where the community presents reports on scientific activities, the research planning, structure and funding, human resources, as well as education and outreach. Students or young non-tenured researchers also present their point of view. An initial feedback is given by the Committee to the community at the end of the day. On the next day there is a half-day closed session, where final conclusions from the country visit are drawn up. An official letter with the assessment of the visit and recommendations is sent to official bodies later. Reports from CERN, DESY, INFN Frascati or other laboratories are also given, followed by working group reports. The rest of the meeting is taken up by the planning of future high-energy physics activities.

4 Recent activities

The most recent R-ECFA country visits were to Denmark in May 2013, to Hungary in October 2013, to Israel in April 2014, and to Germany in May 2014. A recommendation on the restructuring of funding in Denmark was apparently followed by the government. The visit to Israel came at a significant time for the country, since it had recently become a CERN member state, in January 2014. The recommendations to Germany gave support to the authorities for their decision to add the LHC phase II upgrade programme to the national roadmap for physics. R-ECFA meetings in connection with P-ECFA were held at CERN in November 2013 and at DESY in July 2014.

Recent examples of P-ECFA topics were reports from CERN, DESY, Frascati, Belle II and SuperKEK, Fermilab, SESAME and from IPPOG, the International Particle Physics Outreach Group. Furthermore, it was decided to prolong the ECFA Study for Linear Collider Physics and Detectors until 2016. The chairperson of the ECFA review panel for detector R&D, Yannis Karyotakis, also gave a report. He explained the purpose of this panel, which is to receive R&D proposals and make recommendations, to evaluate and monitor progress of R&D programs on request, to help to create a coherent global R&D effort, and to overview the European effort for detector R&D. The panel is hosted by DESY [3]. It is also customary that countries give mid-term reports between two R-ECFA country visits. Bulgaria, Norway, Switzerland, Belgium, and Finland gave such reports recently.

There exists a related, but not entirely equivalent panel to ECFA at the international level, the International Committee for Future Accelerators ICFA [4]. The newly elected Chairperson of this

panel, Joachim Mnich, comes from Europe. At the July 2014 P-ECFA meeting he reported on discussions about planned and possible future large accelerator facilities such as the high-luminosity upgrade of the LHC (HL-LHC), the International Linear Collider (ILC), the Compact Linear Collider (CLIC), the Future Circular Collider (FCC) near CERN, and the Chinese Circular Electron-Positron or Proton-Proton Collider (CEPC/CppC). He also said that ICFA issued a statement on global planning for particle physics, in which it endorsed the particle physics strategic plans produced in Europe, Asia and the United States and the globally aligned priorities contained therein. It reaffirmed its support of the ILC, which is in a mature state of technical development and offers unprecedented opportunities for precision studies of the newly discovered Higgs boson. In addition, ICFA continues to encourage international studies of circular colliders, with an ultimate goal of proton-proton collisions at energies much higher than those of the LHC.

Concerning the next Conference on High Energy Physics of the European Physical Society, which is to take place in Vienna, Austria, in July 2015, the organization of the now traditional joint ECFA – EPS-HEPP session was discussed and its theme fixed: “Connecting scales: bridging the infinities”. Another common effort between ECFA and EPS-HEPP was also launched – the drafting of a short document on how to evaluate researchers working in high-energy physics, aimed in particular at non-particle physicists, but also giving recommendations for evaluees.

Among the mandate of ECFA is the organization of relevant studies and workshops. The most recent ones were the HL-LHC Experiments Workshops at Aix-les-Bains in October 2013 and October 2014, and the kick-off meeting of the FCC Study at the University of Geneva in February 2014. CERN Council approved the inclusion of the HL-LHC construction in the medium-term of the laboratory. A proposal for the timeline of the FCC Study over the next years was worked out, with the goal to have a Conceptual Design Report ready by 2018. The international organizational structure was also proposed, with a Steering Committee consisting of two to three members per region, an Advisory Committee with one to two experts per field, and a Collaboration Board with one member per participating institution, all under the auspices of the Director-General of CERN. The Steering Committee oversees the coordination of the FCC Study, addressing the topics hadron and lepton collider physics experiments, electron-proton physics experiments and accelerator, hadron injectors, hadron collider, lepton injectors, lepton collider, infrastructures and operation, as well as costing and planning.

Among the mandate of ECFA is linking research with training and education. A recent example of a training initiative is the Instrumentation School in Novi Sad, Serbia, which is jointly organized by ECFA, the ICFA Instrumentation Panel and CERN. The idea for the venue of the school emerged in fact at a R-ECFA meeting in Belgrade during the country visit to Serbia in October 2012.

Acknowledgments

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References

- [1] ECFA/81/52/Rev.4 (2008), <https://ecfa.web.cern.ch/ecfa/en/termsoref.html>
- [2] <http://council.web.cern.ch/council/en/EuropeanStrategy/ESParticlePhysics.html>
- [3] <http://ecfa-dp.desy.de>
- [4] <http://www.fnal.gov/directorate/icfa/>