ECFA

European Committee for Future Accelerators

ECFA Newsletter #1

Following the Plenary ECFA meeting at ALBA, 19-20 July 2018
https://indico.cern.ch/event/730568/
Summer 2018

ECFA

European Committee for Future Accelerators

In front of you is the first issue of the ECFA Newsletter, summarising the topics discussed during the recent plenary meeting of the half-century-young European Committee for Future Accelerators (https://ecfa.web.cern.ch). ECFA is an important representative body of the European particle physics community, with delegates hailing primarily from major laboratories, research centres and universities. Traditionally, all CERN Member States, Associate Member States and Observer States are members of ECFA.

The quest to find answers at the energy and intensity frontier continues to fascinate people with aspirations in fundamental physics and cutting-edge technology and instrumentation. ECFA plays a major advisory role within the community, providing oversight and information about new developments on all fronts. Our community has not only developed methods for organising research, but has also established a unique culture of collaboration among researchers, from devising initial conceptual ideas to uniting thousands around a shared ambition. ECFA has an important role to play in fostering that culture and promoting further developments on the supranational European level in order to achieve our collective scientific objectives.

Some of the main aims of ECFA are to contribute to the long-range planning of European high-energy physics facilities, to ensure a good balance between the roles of international and national laboratories and academic institutions, and to foster close relations between research and education in high-energy physics and other fields. ECFA also monitors the conditions for research and the sharing of facilities between physicists, irrespective of nationality and origin, ensuring that they are conducive to successful collaboration. The above aims are achieved through regular Plenary ECFA meetings and dedicated country visits by Restricted ECFA. On 19-20 July 2018, our plenary meeting was kindly hosted at the ALBA synchrotron light source near Barcelona.

ECFA establishes study groups and workshops to reflect on specific scientific, technical, organisational and societal aspects of our community, with the objective of improving and strengthening our sustainable research programme. The resulting reports or statements are communicated to the community and policy makers in an appropriate fashion.

It remains essential that our accelerator-based community continue to uphold strong links with our colleagues in astroparticle and nuclear physics. At ALBA, in collaboration with ApPEC (Astroparticle Physics European Consortium) and NuPECC (Nuclear Physics European Collaboration Committee), a working group was set up to organise triennial joint seminars. Diversity is important for all organisations, including the scientific bodies and collaborations within our community. Diversity charters can help to promote diversity-related activities consistently across a community. Together with ApPEC and NuPECC, we have established a working group to explore the options for developing such a charter. This newsletter contains brief reports from the ECFA working groups established at ALBA on the topics of the evolution of software for data analysis and the recognition of individual achievements in large scientific collaborations.

We also report on the plans for updating the European Strategy for Particle Physics, from a bottom-up consultation to the development of a strategy that will roll out a path to our future.

Jorgen D'Hondt, ECFA Chair
Carlos Lacasta, ECFA Scientific Secretary

The ALBA synchrotron light source is an instrument that provides solutions to societal challenges, from health to energy production and storage, from environmental challenges to advances in communication, from understanding to preserving our cultural heritage.

It is managed by the Consortium for the Construction, Equipment and Exploitation of the Synchrotron Light Laboratory (CELLS) and has been in operation since 2012. It is included in the Spanish Map of Unique Scientific and Technical Infrastructures (ICTS, *Instalaciones Cientifico-Tecnicas Singulares*), and is a Spanish public entity in which the national and regional governments play an equal role. It is the only user facility of its kind in the southwest of Europe. Located in the *Parc de l'Alba*, on the outskirts of Barcelona, near the Autonomous University of Barcelona campus, it provides a vivid scientific and technological environment.

The core of the infrastructure is the accelerator system, which includes a Linac that produces a 100 MeV electron beam, a booster that accelerates the beam to 3 GeV and the low-emittance storage ring, working in top-up mode, where synchrotron radiation is produced with photon energies ranging from infrared to the hard X-ray regime up to 60 keV, using dipoles and different kinds of insertion devices as photon sources. The beamlines (BLs), located around the synchrotron, are the experimental stations where the synchrotron light is exploited. Currently, eight BLs are in operation and four more in construction, each specialising in a different technique covering the needs of diverse scientific communities. These specialisms include the x-ray magnetic circular dichroism capacity of the BOREAS BL, a key tool for magnetic studies on thin layers and nanostructures, and the high-resolution 3D imaging of biological cells available at the cryo-soft x-ray microscope of the MISTRAL BL, whose penetration power makes imaging possible at the level of 30 nm full cells, without altering their morphology by slicing.

ALBA serves more than 4000 users from the academic and industrial world. It has contributed to the increase in the Spanish user community by one order of magnitude since it came into operation, and attracts competitive international users, hailing from as many as 30 different countries. As an example, in 2017, more than 1700 researchers visited the facility, two thirds national and one third international. ALBA fosters technology transfer to high technology companies and the development of a previously non-existent Spanish industrial user community. All key performance indicators are competitive with those of sister facilities, for example the number and impact factor of peer-reviewed publications based on beamtime, operation availability and stability, data management, user support and industrial usage. ALBA is developing an efficient outreach programme towards society, has established a student training programme, and has created a network of international links and fruitful collaborations with national research facilities, also through the use of ancillary laboratories. A good example is the measurement of dipoles for the storage ring of the SESAME project, carried out through a collaboration with CERN as part of the H2020 CeSsaMag project.

The ALBA accelerator team, whose priority is the operation and development of the synchrotron, is also involved in several projects that go beyond the synchrotron radiation community, an example being its participation in the FCC design studies and the CLIC project.

ALBA is a member of the recently created League of European Accelerator-based Photon Sources (LEAPS), within which it contributes to the general European scientific and technological strategy. The aim of LEAPS is to enhance European science, innovation and integration through closer cooperation and coherence in developing and implementing new technologies, better engagement with industry, broadening its user community and improving outreach and training programmes.

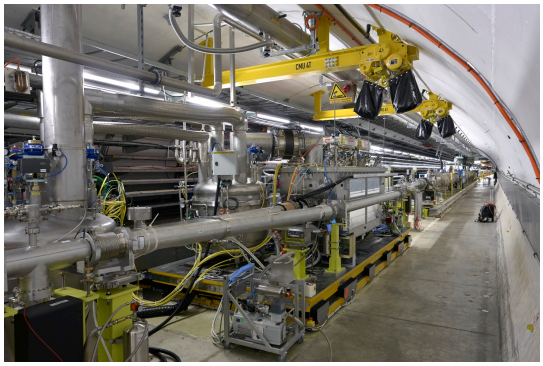
Reports from laboratories in Europe

A standing item on the agenda of Plenary and Restricted ECFA meetings is a report from some of the major laboratories in Europe, *in casu* CERN, DESY and Frascati. These reports inform the community of new developments and opportunities and, within the mandate of ECFA, stimulate the culture of collaboration. When relevant, the management of other laboratories in Europe can contact the ECFA Chair to find out whether an appropriate slot is available on the agenda of a future meeting.

CERN – presented by Fabiola Gianotti (CERN Director-General)

The CERN accelerator complex restarted operation swiftly and smoothly after the 2017-2018 year-end technical stop. In 2018, the LHC has been routinely operating close to the record peak luminosity of 2 x 10^{34} cm^{-2} s^{-1} (twice as high as the design value). At the time of the recent ECFA meeting, total integrated luminosity of 120 fb^{-1} had been delivered in Run 2 to each of ATLAS and CMS, 5 fb^{-1} to LHCb and 49 pb^{-1} (in proton-proton) to ALICE. ATLAS and CMS show excellent performance in terms of efficiency and resolution for the main physics objects up to a pile-up (number of simultaneous proton-proton interactions per bunch crossing) of about 60 events, despite having been designed for an average pile-up of about 20 events. Recent highlights in terms of physics results include the observation of Higgs production in association with a top-antitop quark pair (ttH) by ATLAS and CMS.

Work on the upgrade of the accelerator complex (LHC Injectors Upgrade and High-Luminosity LHC projects) and of the LHC experiments is progressing well. Two prototype crab cavities were installed during the year-end technical stop and tested for the first time with proton beams in the SPS (see the picture of the installation). Tests of full-size prototypes of the new Nb_3Sn superconducting quadrupoles and dipoles for HL-LHC have started.

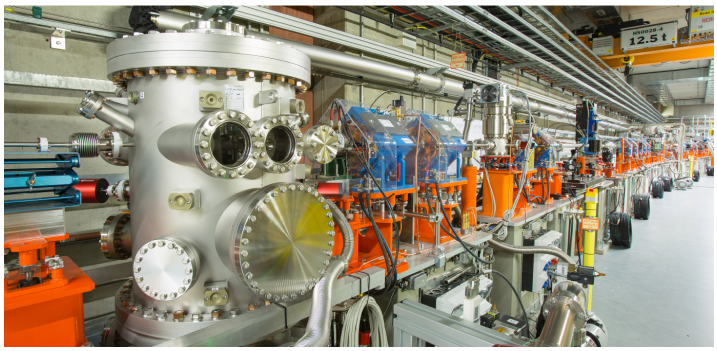


The scientific diversity programme also produced nice results: for example the NA62 experiment provided its first measurement of the branching ratio of $K^+ \rightarrow \pi^+ \nu\bar{\nu}$, and the plasma wakefield acceleration project AWAKE reported first electron acceleration. Design studies for future colliders and other projects (CLIC, FCC, Physics Beyond Colliders) proceed in full swing towards preparing input for the upcoming update of the European Strategy for Particle Physics.

Since the last Plenary ECFA meeting, Lithuania has joined CERN as an Associate Member State. Good progress is being made with the Science Gateway, a new centre for education and outreach to be located near the Globe of Science and Innovation, which will be entirely funded by external donations.

DESY – presented by Joachim Mnich (DESY Research Director)

The commissioning of the European XFEL has been progressing well, with all 25 RF stations now commissioned and the design beam energy of 17.5 GeV reached, for the first time, on 12 July 2017. So far, three beamlines are in user operation and 124 experiment proposals have been submitted for the period September 2017 to October 2018, with 616 user shifts requested.

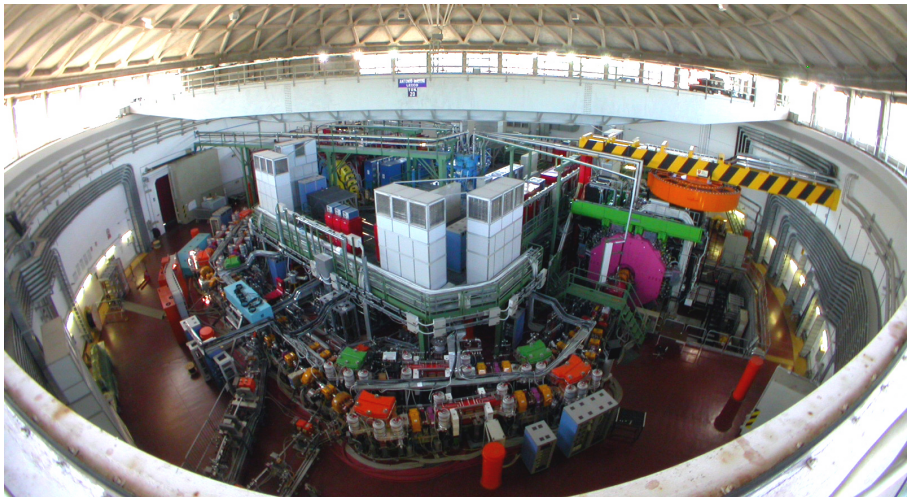


The FLASHForward beamline (picture of the electron and laser beam lines), an experiment for plasma wakefield acceleration research at FLASH, showed first beam-plasma interactions on 19 June 2018, with the strong excitation of a wakefield of (12.3 ± 1.7) GeV/m in a 30 mm plasma cell. It is expected that a complete energy depletion of the beam will be able to be achieved in 23.5 cm plasma.

The DESY-2030 strategy process has concluded and the resulting strategy is now being implemented. For particle physics, the LHC (ATLAS and CMS) and Belle II contributions remain the workhorses, together with a strong on-site experimental programme in the field of axion physics in particular, and an excellent theory group. The preparation of a strong DESY and German contribution to future large international projects is a vital component of the strategy.

National Laboratory of Frascati – presented by Pierluigi Campana (LNF Director)

The DAFNE collider completed data-taking for the KLOE2 experiment on 31 March, delivering the planned 6 fb^{-1}. Groundwork is ongoing for the next nuclear physics experiment, SIDDHARTA2, which will start its run in early 2019.



Since 1999, DAFNE has been an electron-positron collider at a centre of mass energy of 1.02 GeV, creating phi (ϕ) mesons that decay into kaons, which were reconstructed and studied at the KLOE experiments.

Meanwhile, the PADME experiment at the Linac Beam Test Facility, dedicated to dark sector searches, will start data-taking by September 2018. Possible reuse of DAFNE as an accelerator test facility beyond 2020 is under scrutiny.

The Laboratory is continuing its collaboration with EuPRAXIA, a H2020 project that expects to complete a design study for a free-electron laser facility operated by plasma acceleration by the end of 2019. In this framework, a conceptual design report (CDR) proposing to host it in a new infrastructure on the Frascati premises (EuPRAXIA@SPARC_LAB) was finished in May. The design project for the hall is also in preparation.

Scheduled mid-term reports from countries

After each Restricted ECFA country visit, a report is issued to the executive policy makers in the country, typically the minister responsible for science, research and/or education. These reports are public and available on the ECFA website. Because the period between two visits to each country is generally seven years, a mid-term report is scheduled at Plenary ECFA meetings to verify and discuss the progress on the aspects raised in the reports.

Germany – presented by Peter Schleper (University of Hamburg)

The report focused on the long-term strategy for large-scale projects and the financial resources for particle physics and related fields. Total R&D spending in Germany has increased to almost 3% of the GDP over the past 10 years. For particle physics, the additional resources required for the upgrades of ATLAS and CMS are budgeted. In a series of five workshops, the German community has discussed future projects and priorities in hadron and lepton collider physics, non-collider physics and neutrino physics. These will be completed by November 2018 and the results submitted as input for the European Strategy update.

Hungary – presented by Peter Levai (MTA Wigner Research Centre for Physics)

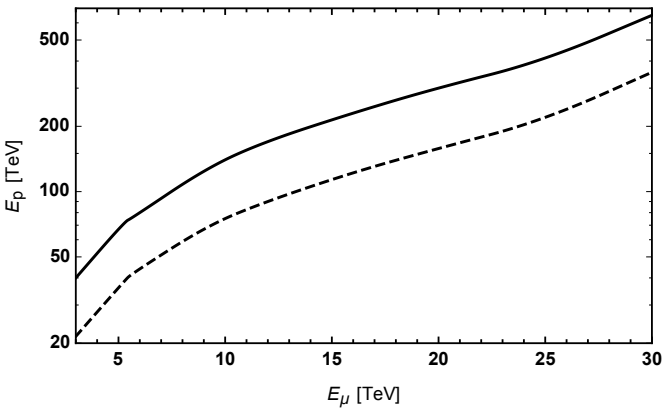
Over the last five years, Hungarian participation in the ALICE and CMS experiments has become more robust. In particular, the volume of the contributions to the upgrade programme has increased, both financially and in terms of human resources. Activities in the ALICE TPC and O2 and in the CMS pixel detector upgrades have received increased attention in Hungary, increasing the visibility of CERN-related hardware developments. New groups have joined the FCC and AWAKE collaborations. The financing of the Hungarian CERN contribution is secured and the human resources for running and planned activities are stable. Every September, Hungarian scientists organise the CERN@WIGNER Open Weekend, where interested local students and the general public receive an overview of recent CERN activities, including the upgrade programme, data analysis, the contribution of the Wigner Data Centre to CERN's computing efforts and future plans.

United Kingdom – presented by Stewart Boogert (University of London)

The report from the UK included a brief overview of the diverse particle physics activities and corresponding funding in the UK, at both universities and national laboratories. The programme in the UK is vibrant, diverse and reasonably funded. The level of investment in the UK over the last five years is approximately constant in value and therefore eroded by inflation. There are major changes to the funding landscape in the UK, firstly with the formation of UK Research and Innovation (UKRI), a research funding body, from the merger of the separate specialist research councils. Secondly, with Brexit looming, the community faces potential issues in accessing funding and talent. The UK community is adapting to these recent changes and a more complete picture will be available at the next RECFA UK visit. UK planning for the European Strategy update is well under way and three community consultations will have occurred before input is given.

Physics with muon colliders

Muon-based accelerators have the potential to enable facilities at both the intensity and the energy frontiers in particle physics[1]. Thanks to the limited amount of synchrotron radiation, circular muon colliders might reach centre-of-mass energies of tens of TeV. Such high collision energies are currently achievable only with next-generation proton-proton machines. During the meeting, Andrea Wulzer (CERN, EPFL and Università di Padova) presented an overview of their physics reach. The obvious advantage in colliding muons rather than protons is that the muon collider energy, E_μ, is entirely available to produce short-distance reactions. At a proton collider, the relevant interactions occur between the proton constituents, which carry a small fraction of the collider energy, E_p. This can be illustrated by considering the pair production of heavy particles with mass M equal to half the muon collider energy. The cross-section scales geometrically as approximately $1/E^2$ at both colliders, but at a proton collider it is to be multiplied with a M^2/E_p^2 dependent suppression factor due to the steeply falling parton luminosities. Equal muon and proton collider cross-sections are thus obtained for $E_\mu << E_p$, as shown in the figure.



The centre-of-mass energy (y-axis) at which the proton collider cross-section equals that of a muon collider of energy (x-axis). The dashed line assumes a comparable Feynman amplitude for the muon and the proton production processes. A factor-of-ten enhancement of the proton production amplitude squared, possibly due to QCD production, is considered in the continuous line

The figure suggests that a muon collider with sufficient luminosity might be very effective as a direct exploration machine, with a physics motivation and potential similar to that of a 100 TeV proton collider[2]. Although detailed analyses are not yet available, early estimates reveal that a luminosity of around $E_\mu^2/(10\ \text{TeV})^2\ 10^{35}\ \text{cm}^{-2}\text{s}^{-1}$ would be sufficient to make decisive progress on several beyond-the-SM questions, and to be conclusive on some of those. For instance, by exploiting the very large vector-boson fusion cross-section, a muon collider could effectively probe new particles coupled with the Higgs boson[3], possibly related to electroweak baryogenesis. It might also discover Higgsinos or other heavy WIMP dark matter scenarios. In this context, it is important to remark that motivated "minimal"[4] WIMP dark matter candidates might have a mass of up to 16 TeV[5]. It could probe top partners relating to naturalness up to a mass of several TeV, where those particles should emerge[6] even in elusive "neutral naturalness" scenarios. Finally, the above-mentioned luminosity would produce sufficient statistics for an extensive programme of high-energy electroweak cross-section measurements in which new physics could show up indirectly. The measurement of the Higgs trilinear coupling appears particularly promising. All in all, a tens-of-TeV muon collider opens up exciting physics opportunities, providing motivation for technological feasibility studies and R&D programmes.

[1] M. Boscolo et al., arXiv:1808.01858; [2] N. Arkani-Hamed et al., *Phys. Rept.* 652 (2016) 1-49, arXiv:1511.06495; [3] D. Buttazzo et al., arXiv:1807.04743; [4] M. Cirelli et al., *Nucl. Phys.* **B753** (2006) 178-194, hep-ph/0512090; [5] E. De Nobile et al.. *ICAP* **1604** no. 04 (2016) 048; [6] R. Contino et al.. *Phys. Rev.* **D96** no. 9 (2017) 095036, arXiv:1702.00797

Software for data analysis

Developing optimal data analysis techniques for particle physics experiments is vital to our community and there is continuous dialogue on the subject between software experts and analysers. In this context, Andrey Ustyuzhanin (Yandex School of Data Analysis) gave a presentation on the evolution of software for data processing and analysis. Software architectures need a strong foundation in order to sustain developments over many years. Strategic choices must be made with foresight, in collaboration with developers and users. Graeme Stewart (CERN) presented an overview of the challenges and benefits of these opportunities for particle physics, with a focus on end-to-end optimisation. Our community is going through a paradigm shift in which we are starting to remove some RAW data and trust the data analysis structures. Will developing data analysis engines become the work of software engineers, interfaced with simplified toolboxes for physics users?

Evolution of data analysis software

Software developers are particularly interested in two main avenues: new machine learning (ML) algorithms and new infrastructures that include them. On the ML front, progress is being made on deep learning approaches, Bayesian optimisation, interpretability of neural nets, etc., while on the infrastructure front, support is being developed for different hardware systems and for complicated workflows. Both deserve particular attention and require specific skills, for which there are a growing number of (online) training resources that help communities and are accessible to HEP researchers. Due to a significant overlap between the needs of the HEP community and open developments in the data analysis field, the related skills and talents are highly appreciated when it comes to pursuing a non-academic career. The overlap makes it possible to attract software from the world outside HEP, rather than investing only in mono-disciplinary developments. The full range of options for collaboration should be explored in order to find the optimal format. Examples include new positions for joint research, ML-oriented summer schools or camps, centres for developing ML skills and crowd-sourcing partnerships.

New opportunities and challenges for physics analysis

The next generation of detectors and accelerators will produce data in quantities never before seen by the HEP community, posing a major challenge for physics analysis. At the same time, improvements in CPU and storage are slowing down and exploiting concurrency has become ever more important for efficient processing. As outlined in the HEP Software Foundation's recent Community White Paper (arXiv:1712.06982), new ideas are needed to face this challenge. ALICE and LHCb already aim to provide higher quality analysis data directly from the trigger farms, even going as far as not storing raw data for some events – but this is a win as it allows events that would otherwise be completely discarded to be used. Analysis clusters are being prototyped to greatly speed up the production of skimmed selections. Improvements in data layout support this processing model, as does the radical reduction of event data for some analyses, as is being undertaken by CMS. HEP can learn from the large-scale data analysis clusters developed by industry, although HEP data has some unique properties that make a complete off-the-shelf solution unlikely. However, developing declarative methods of describing our analysis would provide an abstraction that would lead to a clearer description of what we are doing, enabling a smart backend to optimise how it is done on modern hardware. That makes integrating novel machine learning techniques, as well as accelerators like GPUs, a lot easier, which even extends our physics reach. That analytical and computing power must be harnessed for the physics analysis of the future, so continued R&D in these areas is vital to our success.

Recognition of individual achievements

ECFA acknowledges the importance of correctly recognising individual achievements and affirms the challenges therein when dealing with scientific collaborations of between one hundred and many thousands of researchers.

Through an inspiring presentation, Archana Sharma (CERN) explained why correct recognition is important for both the individual and the collaboration itself. She observed that we are facing a paradigm shift from previous generations of experiments and, consequently, the need to rethink how we nurture individual recognition. Opportunities arise to strengthen the system in view of individual careers and the strength and efficiency of collaborations. This is a broad and complex issue for the community, which must study the interplay of the parameters at play for the collaborations and the incentives for researchers to engage in the work of large collaborations while making progress in their own careers.

Recently, within the role and responsibility of ECFA, a working group was created to explore the current status of the recognition of individual achievements in large collaborations, with the aim of providing recommendations as input for the update of the European Strategy for Particle Physics. At the meeting at ALBA, the results of a survey of the leaders of 29 CERN-based or CERN-recognised experiments in particle, nuclear, astroparticle and astro-physics were reported. Encouragingly, the leaders of these collaborations declared our efforts to be highly appreciated, timely and welcome. We are therefore convinced that the community is open-minded, ready for a profound dialogue on the topic and receptive to recommendations.

Mitigating the feeling of being a small fish in a big pond and promoting those who take action rather than just talking about doing so were among the key aspects raised. Conference talks were mentioned as key opportunities for researchers, particularly those at an early stage of their careers, to demonstrate their talents, provided that presentations are not forced into a pre-defined or expected blueprint. If the bridges between individual achievements and the world outside the collaboration are to be as short and transparent as possible, a system significantly relying on personal recognition statements from individual collaboration members is not ideal. Several possible alternatives to the alphabetical author list that might better highlight individual contributions to publications, such as public internal notes, were discussed. Collaborations are taking effective steps to implement a system that enables the voices of early-career researchers in particular to be heard. Optimal recognition systems, whereby efforts and innovations are matched with suitable individual rewards, will surely attract more new researchers to the field.

The report served to inform the subsequent panel debate, moderated by Manfred Krammer (CERN), which continued with reflections on the topics. The panel consisted of Pierluigi Campana (Frascati, Italy), Max Klein (University of Liverpool, UK), Jo van den Brand (Nikhef, the Netherlands), Francesco Forti (University of Pisa, Italy) and Enrique Kajamovitz (Technion, Israel). They explored the key topics relating to the theme and made many important contributions to the ongoing discussion.

With the results of this debate in mind, ECFA is preparing a community-wide survey to find out how these topics are perceived. The survey will be distributed widely via the ECFA website (https://ecfa.web.cern.ch) and broad participation is essential if we are to make progress on this important topic.

Some quotes from the panel members

Francesco Forti (Chairperson of the LHC Experiments Committee; INFN, University of Pisa)
"It is very difficult to properly recognize detector, software and computing work, which are all essential for the physics programme. Conference talk assignments as well as internal collaboration awards should take detector, software and computing people in proper consideration."

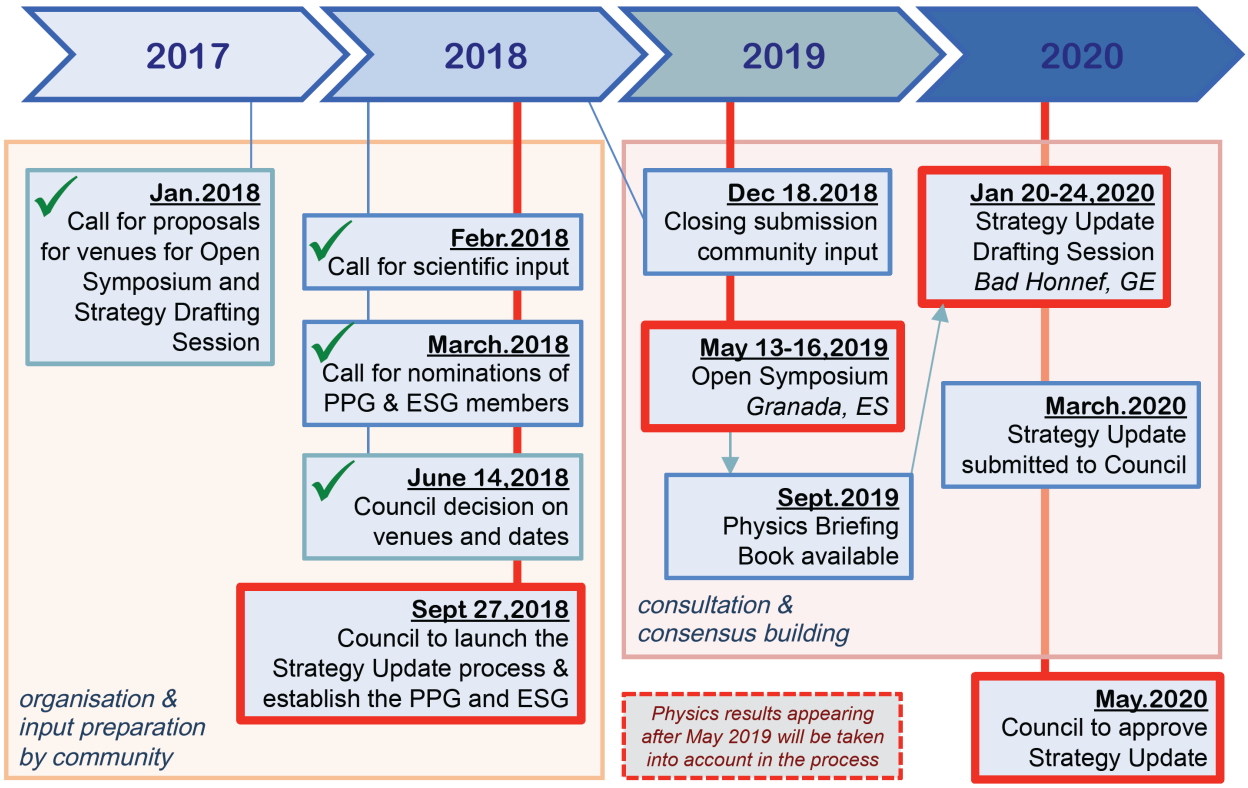
Pierluigi Campana (Director of the National Laboratories of Frascati; INFN)
"Service work remains a big issue for individual recognition. This part should be a well identified (and required) part of CVs – as e.g. outreach activities – with correct valuing when job positions are setup."

Max Klein (Chairperson of the ATLAS Collaboration Board; University of Liverpool)
"I believe we can and we need to rely on our colleagues' own, genuine motivation as scientists, engineers and technicians who work for discoveries, precision measurements or technology innovation. It has been a privilege to work in particle physics, and that motivation is and must be higher than any satisfaction through some recognition. This means the prime task is to keep the motivation high, the believes certain, the standards demanding, and the conviction reliable in whatever we do."

Manfred Krammer (Head of the Department for Experimental Physics; CERN)
"Collaborative work in large groups is no longer a peculiarity of experimental particle physics. In all these large scientific collaborations the issue of recognition should be constantly on the agenda. There is no magic formula, hence all options for recognition should be explored."

European Strategy for Particle Physics

The CERN Council has approved the objective to deliver an update of the European Strategy for Particle Physics by May 2020. This strategy or vision will thereafter be a guiding roadmap for funding agencies and laboratories, helping them to define concrete research programmes. The process is organised by the Strategy Update Secretariat, which comprises Jorgen D'Hondt (ECFA Chair), Keith Ellis (SPC Chair) and Lenny Rivkin (European LDG Chair) and is chaired by Halina Abramowicz. The timeline is depicted in the diagram below.



The Strategy Update follows a bottom-up approach, with an open call for input to be submitted by 18 December 2018. The practicalities for submitting input will be communicated in due course. The aim is to collect all relevant input, such as scientific projects, position papers, national roadmaps, etc. The general guidelines for the layout of input dictate that it should be brief, comprehensive and self-contained. Individuals, research groups, research networks and collaborations, laboratories, universities, national and international institutions and organisations, etc., can submit input.

The Physics Preparatory Group (PPG) will organise an Open Symposium to be held on 13-16 May 2019 in Granada (Spain), where the community will be invited to discuss the input. This will culminate in a Physics Briefing Book, which will be made available to the community and will form the basis for continued strategic discussions within the European Strategy Group (ESG). Among others, each CERN Member State will be represented in the ESG, which will gather on 20-24 January 2020 for a Strategy Update Drafting Session in Bad Honnef (Germany). Thereafter, the draft will be submitted to the CERN Council for further discussion and approval during a dedicated session.

ECFA
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Next Plenary ECFA meeting
CERN, 15-16 November 2018
Main Auditorium

The Plenary ECFA meeting is scheduled for Thursday, 15 and Friday, 16 November.

On Thursday, 15 November, the full morning will be devoted to a workshop to disseminate the results of the ECFA survey on the recognition of individual achievements in large collaborations. The afternoon session will start with the brief standing items of Plenary ECFA, followed by a 1.5-day session including comprehensive overviews of all of the main future collider projects in and beyond Europe and related accelerator technologies.

The venue will be the main auditorium at CERN. The auditorium will be open to the community, with reserved seats for registered ECFA members. In due course, a detailed agenda will be published on the ECFA website (https://ecfa.web.cern.ch).

The presentations will be webcast and the recordings shared with the community.

	14 Nov Wednesday	**15 Nov** Thursday	**16 Nov** Friday
morning (from 9 a.m.)		PECFA *recognition*	PECFA *future colliders*
afternoon	RECFA *closed session* *from 4 p.m.*	PECFA *standing items* *future colliders*	PECFA *future colliders* *until 4.30 p.m.*

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Historic note on ECFA during the "25 Years of the LHC Experimental Programme" symposium at CERN on 15 December 2017

Slide from L. Evans – 25 years LHC

At the beginning of the 1960's a debate was raging about the next step for CERN. Opinions were sharply divided between a "large PS", a proton machine of 300 GeV energy or a much more ambitious colliding beam machine, the Intersecting Storage Rings (ISR). In order to try to guide the discussion, in February 1964, 50 physicists from among Europe's best met at CERN. They decided to transform themselves into a European Committee for Future Accelerators (ECFA) under the chairmanship of Eduardo Amaldi. It took nearly 2 years more before the consensus was formed. On 15th December 1965, with the strong support of Amaldi, the CERN Council approved the construction of the Intersecting Storage Rings

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