

MAY 2019

» FOCUS



EUROPEAN PARTICLE PHYSICS STRATEGY: UPDATE ON WORK FOR A NEW ROADMAP IN GRANADA

The European particle physics community met from 13 to 16 May in Granada, Spain, to discuss the next steps that will determine the research route in this field of physics, and not just in Europe. The objective, in fact, is to define and delineate scientific priorities and technological developments on which to concentrate in the following years, in order to build future programmes in the medium and long term. At the centre of discussion, in particular, was the evaluation of accelerators and of next generation experiments, that is, of the successors to the LHC and its detectors, when these will reach the end of their lifespan in 2035. Discussions, therefore, concentrated on their scientific significance and the discovery of potential new projects, on technological challenges associated with their being implemented and on the necessary resources for completing the projects.

In particular, one of the recommendations of the previous update to the European strategy, in May 2013, was to conduct studies into the planning and feasibility of an ambitious post-LHC accelerator project. As a result, in recent years, Europe, in collaboration with partners from all around the world, has committed to accelerator research and development projects. One project, in particular, is the CLIC (Compact Linear Collider): a linear machine for producing head-on electron and positron collisions that could, in successive phases, reach energies of up to several teraelectronvolts (TeV). The objective would be to discover new physics through the precise measurements of the standard model's properties and the direct detection of new particles. Another project is the FCC (Future Circular Collider), a circular collider with higher performance than the LHC, in terms of both energy and intensity, that proposes three different possible types of particle collider scenarios: collisions between hadrons (proton-proton and heavy ions), like in the LHC; between electrons and positrons, like in the LEP; and between electrons and protons. In 2016, CERN also launched a study to investigate the possibility of constructing projects that complemented high energy colliders, exploiting the



MAY 2019

» FOCUS

opportunities offered by CERN's exclusive accelerator complex. Attendees considered these contributions during the discussion, while also taking into account, of course, the global landscape of particle physics and developments in related fields.

Ample time was also dedicated, during the working days in Granada, to alternative developments, highlighting the potential for a high-energy muon collider, which requires the concentration of an international research and development effort to prove its feasibility and operability, for example in the LHC tunnel. New acceleration techniques, such as plasma, which is also applied to muons, constitute the new frontier on the horizon.

To carry out these ambitious projects, expertise, both in the field of accelerators and in the construction of large detection equipment and in related calculations, must be maintained and cultivated. It is increasingly important to recognise the merits of the communities who work in this field, who maintain relationships with industries, and who strive, at a national level, to ripen and grow expertise. These are vital to the field of particle physics and have strong repercussions for all other fields of technological development. In this context, the importance of enhancing and encouraging synergy among big national laboratories distributed across countries, and of investing in the training of new generations of physicists, was also underlined. The working days in Granada also provided an opportunity for a meeting with scientific communities

The compilation of a Briefing Book will follow the symposium that has just concluded, and the policy document, including proposed recommendations, will be drafted at a Strategy Drafting Session to be held in Bad Honnef, Germany, from 20 to 24 January 2020. The update to the European particle physics strategy is expected to conclude with the CERN Council's approval of this document, within one year, in May 2020. ■

engaged in other areas of fundamental physics, such as astroparticle physics and nuclear physics.