Accelerating NEWS

ACC

ISSUE 27

10 Dec 2018

# Interview with Jorgen D'Hondt

by Panagiotis Charitos (CERN)

interview European Strategy Update for Particle Physics

Jorgen D'Hondt is the chairperson of the ECFA.

Jorgen D'Hondt (right) with François Englert (left), Nobel prize laureate for the prediction and detection of the Higgs boson. (Image: CERN)

**Jorgen D'Hondt, Professor at the Vrije Universiteit Brussel, is the Chairperson of the European Committee for Future Accelerators (ECFA). In this interview, we discuss with him about the European Strategy Update for Particle Physics, the recent ECFA meeting, and communication of accelerator science and technology.**

**Which are the key challenges lying ahead for ECFA and its role in the ongoing European Strategy Update in particle physics?**

**The general role of ECFA in our community is to enhance the dialogue among all parties to prepare the particle physics community for the strongest future, such that we can optimally pursue our research aspirations. This dialogue can be on scientific as well as organizational aspects relevant to our field, because bringing together human and financial resources is challenging in a research field with a strong ambition.**

**In this context, the role of the European Strategy process is essential for our field and somewhat unique for science; offering an example perhaps for other disciplines. It is a truly bottom-up approach to define a coherent and shared vision on how we most optimally make progress towards an understanding of fundamental interactions.**

**Surely this is a challenge to be discussed in a global context and reaching out to adjacent fields of research like nuclear physics and astroparticle physics, as well as the recently enhanced field of gravitational waves. When the scientists themselves reach a consensus on their vision for the future, it will facilitate the policy makers and funding providers to create resource loaded funding programs to match our aspirations, and this must happen in a coherent fashion across nations.**

**Are there any differences in the process from the previous Strategy Update?**

**The core of the process remains very similar; a bottom-up approach in which every scientist is able to express her/his opinion and to participate in the open debate.**

**The Open Symposium organized at Granada in May 2019 will offer a venue for this scientific debate among scientists. Provided with this information, the European Strategy Group (ESG) will continue the dialogue towards a draft update of the European Strategy for Particle Physics to be presented to the CERN Council for approval by May 2020.**

**What has changed in the environment compared to the past European Strategy Update.**

**Although as discussed the process did not change, we are indeed in a different research environment. The previous update in 2013 came after a milestone discovery of a new and yet unique particle, the Higgs boson, basically crowning the Standard Model of particle physics. We know however that there must be new physics phenomena out there for us to discover and understand. The current Strategy update seems to proceed with a different type of discovery in mind, namely the fact that our most simple models for new physics seem to be excluded by running experiments.**

**The fact that the landscape for new physics might be much wider and complicated than we initially hoped for is a recent discovery and defines a different environment for the upcoming European Strategy discussions.**

**ECFA takes this into account and one way in which we try to assist future decisions is by setting dedicated working groups. For example, we recently agreed to establish a new working group revolving around the potential to explore the Higgs sector with future colliders, and especially to verify the complementarity between these colliders. This working group will assist the strategy process and inform the community towards the discussions on the European Strategy.**

**In the recent ECFA meeting at CERN, the results of a survey on recognition of individuals were presented. Which are the key messages that came out?**

**The future of particle physics research depends strongly and mostly on the researchers involved and their talents to innovate technology and physics. It is very important to understand if our field provides the most optimal conditions to attract these talents and to foster them.**

**One should note that a similar survey on the topic of authorship on collaboration wide publications was conducted about 10 years ago by ICFA, and now 10 years in the research program of the LHC experiments, we thought that it is time to verify where we are.**

**The survey has shown that the community appreciates innovation driven researchers as well as the technical work (hardware and software) that is required for our experiments. I personally welcome very much these observations, but at the same time I tend to observe in the data from the survey the tension between recognition for the collaborative efforts and the individual efforts. Because setting up adequate procedures to accommodate both is certainly not exact science, the opinions are sometimes very diverse on how to archive this balance between the collective and the individual but I am proud that ECFA contributes to this discussion.**

**Surely these discussions and debates are not the end of a process. These merely inform the community about the challenges we face. ECFA will verify if it could invite collaborations to join a working group to further the discussions, and to match the observations in the survey with best practices and to learn from each other, across collaborations. I believe that is ECFA's role to foster the research environment and therefore to facilitate these discussions**

**by bringing together all parties.**

**From your experience – including both your academic work and the various managerial roles that you had - why is it important to talk about accelerators today? What should inform our effort to communicate accelerator science and technology?**

**For scientists, especially those with research aspirations in high-energy physics, it should be obvious why we should continuously learn about new accelerator technologies and therefore future collider options. We simply do not have sufficient resources to build all the accelerators and colliders we would like to. At the high-energy frontier there are only a handful of options and thus we have to map thoroughly the full landscape of the physics potential with each option.**

**The results we achieve today with the LHC experiments are far beyond what we initially thought would have been possible. This is possible due to the long timescales of our experiments of course, but mainly because of the enormous amount of innovative and paradigm shifting research done by the community. We need to be smart enough to predict the impact of bold innovation in particle physics for the next decades, not only for the accelerator technology but as well for the ingenuity in data analysis and theoretical modeling. The better we map the full landscape that is realistically reachable with each of the future collider options, the better the community can make choices and reach a consensus on how to move forward.**

**For the majority of the society the high-tech technology deployed in industry remains invisible. People understand typically what enters in their immediate environment, your kitchen, your car, your family, etc. The real science and technology to build microwave ovens, or to obtain healthy food, or self-driving cars, or the technology lying behind the medical healthcare of your loved ones, is known to only a handful of people. Therefore, researchers have a major responsibility to create awareness of the impact of their science and technology in society.**

**The exponential growth of the number of accelerators in industry is a clear example, with an enormous market value. With accelerators we can in principle make the invisible more visible, and adapt microstructures of materials. The analysis and modification of biological and chemical materials, and the medical diagnostics of the inside of our bodies are few examples. Less than 1% of the accelerators worldwide are used for truly fundamental research, yet its them that push the frontier of the accelerator technology for the other 99%!**

**Group photo from the Plenary ECFA meeting that was held from 19 to 20 July 2018 at ALBA (Spain)**

**I would like to ask you also about ECFA's collaboration with similar bodies in other parts of the world in light also of the upcoming strategy update.**

**Let me start with Europe where ECFA represents the particle physics community, NuPECC stands for the nuclear physics community and ApPEC for the astroparticle physics community. There are obvious synergies between the scientific, technological and organizational challenges and opportunities of these three communities. Therefore we are increasingly strengthening the crosstalk between these communities. This vision was also shared in the previous update of the European Strategy for Particle Physics and in my view is important to go forward.**

**On a global scale, we have ICFA that embraces members from all continents and fosters exactly the intercontinental dialogue for particle physics. The CERN's DG, the DESY's research director and the ECFA chair currently represent Europe in several meetings that we try to have per year. These active contacts are essential for our research field because we reached with the LHC a truly global enterprise, and surely all aspirations for major future colliders will have to embrace this global and international profile.**

**In your view which are the main challenges lying ahead in designing future accelerators? What the communities working in the design of future machines should take into account?**

**There are challenges on diverse fronts. There are the well-known technological challenges to reach higher collision energies and higher luminosities in a cost-efficient manner. To reach our research objectives in fundamental physics our community needs to push the frontier of technology so much that we should not forget to bring the industry along in this endeavor. We should always have an adequate number of strong companies that can work with us and are able to deliver technology for our accelerators and experiments on an industrial scale.**

**There is a challenge to foster and sustain this crosstalk between science and industry, which will as well strengthen our opportunities towards societal impact. This connection is typically established at the level of the captains of science and the captains of industry, but should also infiltrate in the minds of the early career researchers and even of students at universities. The mindset to bring our innovations in research to the society and the market is to be enhanced, and more platforms are to be created to stimulate and facilitate, for both the very early career researcher and the established one. This will be beneficial for the society but as well for the individual researcher, certainly in the context of career opportunities by facilitating the potential transition to non-academic jobs.**

**On the aspect of resources we reached with the LHC a situation where we need to combine the human and financial resources from around the world in order to achieve our research ambitions. This will also be the case for any major future collider. We are however in a good situation because additional and economically strong countries have enhanced their aspirations in particle physics and even seek leadership on the international scene.**

**You have also been the first chairman of the foundation of Belgium Young Academy and I am wondering which were the lessons from this role? How well the field of particle physics is doing in attracting young talents?**

**Indeed I was the first chair of the Young Academy in Belgium, and therefore helped to bring together typically younger and very talented professors across disciplines and universities. For most, if not for all, this was an eye opener.**

**To take the time to learn about other disciplines was an enriching experience. Not only to learn about their research outcomes, but mostly about who they are, what drives them, what are their challenges to excel in their profession. All this leads to a more profound appreciation for each other's research. Where we have identified synergies in our challenges and frustrations, we opened the debate towards potential solutions. And surely we did not hesitate to communicate them to policy makers in Belgium.**

**As I am getting older, now I am not part of the Young Academy any more, and it was a pleasure for me that the Belgian King joined the ceremony to wave us out. This is somewhat a demonstration that if you bring together the most excellent talents with the right mindset, the cocktail is a prelude for a successful future. Likewise for our particle physics community, our**

**main challenge is to keep attracting the best talents and to provide them with sufficient guidance yet freedom to seek their ambitions, and to recognize them when they succeed.**