

Viewpoint

Authors and supporters

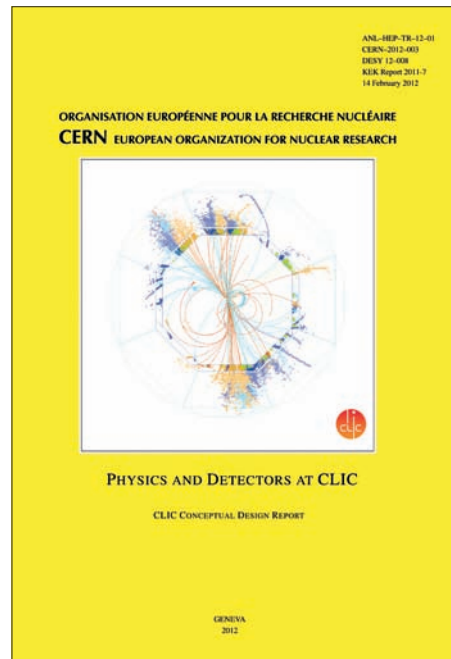
Lucie Linssen and **Steinar Stapnes** examine the question of authoring long-term development projects for particle physics.

The first “high-energy” accelerators were constructed more than 80 years ago. No doubt they represented technological challenges and major achievements even though, seen from a 2012 perspective, the projects involved only a few people and small hardware set-ups. For many of us, making a breakthrough with just a few colleagues and some new equipment feels like a dream from a different era. Nowadays, frontier research in particle physics requires huge infrastructures that thrill the imagination of the general public. While people often grasp only a fraction of the physics at stake, they easily recognize the full extent of the human undertaking. Particle-physics experiments and accelerators are, indeed, miracles of technology and major examples of worldwide co-operation and on-site teamwork.

Looking ahead

Studies on future accelerators and particle-physics experiments at the energy or luminosity frontier now span several decades and involve hundreds, if not thousands, of participants. This means that, while progress is made with the technical developments for a future facility, the physics landscape continues to evolve. The key example of this is the way that current knowledge is evolving quickly thanks to measurements at the LHC. As a result, it is impossible to predict decades in advance what the best machine option will be to expand our knowledge. Pursuing several options and starting long-term R&D well in advance is therefore essential for particle physics because it allows the community to be prepared for the future and to make informed decisions when the right moments arise.

For the post-LHC era, several high-energy accelerator options are already under study.



Physics and Detectors at CLIC: *a new concept in authoring.*

Beyond high-luminosity extensions of the LHC programme, new possibilities include: a higher-energy proton collider in the LHC tunnel, as well as various electron–positron colliders, such as the International Linear Collider (ILC) and the Compact Linear Collider (CLIC); and a muon collider. There is typically much cross-fertilization and collaboration between these projects and there is no easy answer when it comes to identifying who has contributed to a particular project.

When, some months ago, we were discussing the authoring of the CLIC conceptual design report, we faced exactly such a dilemma. The work on the CLIC concept has been ongoing for more than two decades – clearly with a continuously evolving team. On the other hand, the design of an experiment for CLIC has drawn heavily on studies carried out for experiments at the ILC, which in turn have used results from earlier studies of electron–positron colliders. Moreover, we also wanted both the accelerator studies and the physics and detector studies to be authored by the same list.

We looked at how others had dealt with

this dilemma and found that in some cases, such as in the early studies for LHC experiments, protocollaborations were taken as a basis for authoring, while others, such as the TESLA and Super-B projects, have invited anyone who supports the study to sign. For the CLIC conceptual design report we opted for a list of “signatories”. Those who have contributed to the development are invited to sign alongside those wishing to express support for the study and the continuation of the R&D. Here non-exclusive support is meant: signing-up for CLIC is not in contradiction with supporting other major collider options under development.

The advantage of the signatories list is that it provides the opportunity to cover a broader range of personal involvements and avoids excluding anyone who feels associated or has been associated with the study. The drawback of our approach is that the signatories list does not pay tribute in a clear way to individual contributions to the study. This recognition has to come from authoring specialized notes and publications that form the basis of what is written in the report.

The signatories list covers both the CLIC accelerator and the report for the physics and detector conceptual design. Already exceeding 1300 names in February, it demonstrates that – even if all eyes are on LHC results – simultaneous R&D for the future is considered important.

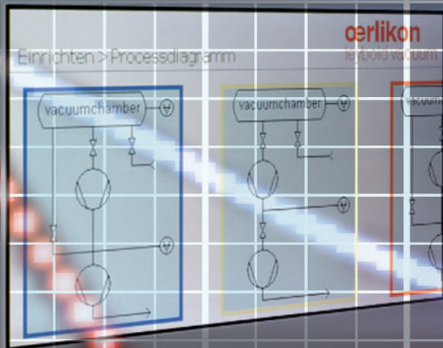
Are there better ways of doing this? As the projects develop, the teams are becoming more structured and this helps – at least partly – towards creating appropriate author lists. The size of the teams and the particular timescale of the projects will, however, remain much larger than the first accelerator projects in our field, and it is likely that striking the right balance between openness and inclusiveness and, on the other hand, restrictions and procedures in this matter will continue to be a difficult subject.

● Further reading

See <https://indico.cern.ch/conferenceDisplay.py?confId=136364>, with links to both CLIC conceptual design reports.

● *Steinar Stapnes is CERN's Linear Collider study leader and Lucie Linssen leads CERN's Linear Collider Detector project.*

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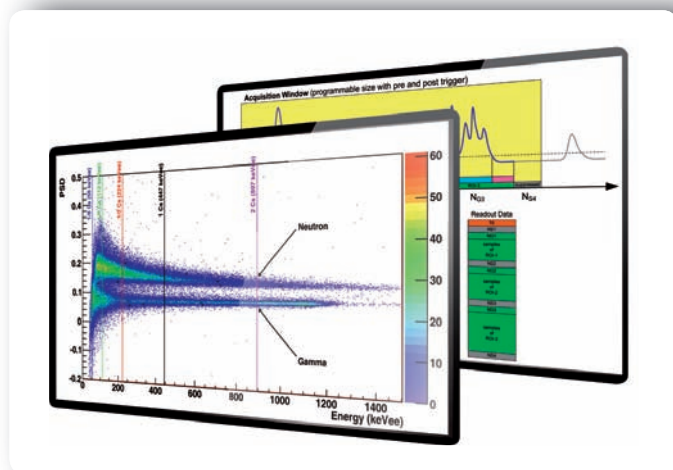
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