

TIARA contribution to the European Strategy of Particle Physics

Abstract : This letter highlights the importance of Accelerator Science and Technology for the future of particle physics and suggests some recommendations in this area for the elaboration of the update of the European Strategy for particle physics.

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World class state-of-the-art particle accelerators are vital tools for basic research in the field of Particle Physics and beyond. The development of such accelerators, ever surpassing the frontiers of reachable energy and intensity, requires a vigorous and sustained R&D programme. For example, the extraordinary success of the LHC at CERN was built up on R&D spanning over a period of more than 15 years. It is also worthwhile stressing that significant accelerator R&D synergies exist with other fields of science requiring the use of accelerators, including light sources and neutrons, as well as for many other sectors such as health, environment, energy production and industry. Exploiting these synergies and the organizational challenges this presents is one of the key objectives for TIARA.

The importance of accelerator R&D was emphasized in the European Strategy for Particle Physics established in 2006 and its update in 2013. Up to now, 19 FP6, FP7 and H2020 large projects have been launched in the past 14 years for a total budget exceeding 300 M€ out of which more than a third was provided by the EC. Though this represents a limited fraction (which would need to be increased in FP9) of the overall R&D effort carried out in Europe, it has been instrumental to enhance further the collaboration between CERN, national laboratories and universities.

New technological challenges are in front of us to study in detail recent discoveries and explore new territories. These challenges can be taken up provided a stronger collaborative and sustained European programme is set up based on the national and international R&D activities and infrastructures.

Finally, one of the key issues for the development of next generations of accelerators is to ensure a vibrant Education and Training programme in the field of accelerator science and technology. The survey carried out by TIARA (TIARA-REP-WP5-2012-006, <http://cdsweb.cern.ch/record/1442599>) sheds interesting lights on the situation in Europe and shows that there is only a handful of dedicated full-time formal training programmes in accelerator science.

In order to enable the development of a programme allowing the realization of future accelerators for particles physics on the medium and long term, it is essential that some general statements be highlighted in the coming update of the European Strategy. In particular, it is important that

- accelerator science and technology be acknowledged as a vital need with the highest priority within the update of the European Strategy of Particle Physics,
- this message be widely conveyed to the European Commission and national funding authorities with a recommendation to expand their investment effort in the area of accelerator R&D across all relevant fields of research,
- the education and training in the field of accelerator science and technology be strengthened
- the collaboration of joint R&D and co-innovation between laboratories, universities and the industry sector be strongly encouraged and supported
- a strong support be given to promote and develop further the collaborative and sustainable state-of-the-art research and innovation in Europe in the field of accelerator

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Besides these general considerations, a few specific R&D topics need to be highly visible in the update of the strategy in order to encourage the investments of research, academic and industrial actors in these areas. It includes:

- High Field Magnets (including Low and High Temperature Superconductors)
- High gradient acceleration systems (including warm, cold and novel techniques)
- High beam intensity and efficient RF systems

Should there be additional major accelerator R&D goals, which the update of European Strategy identifies, TIARA will be open to address them.

We believe that the recommendations listed above are essential to foster the effort of the community in accelerator science and technology and will allow particle physicists, and others, to address new challenges pushing further the frontiers of knowledge and innovation.

The TIARA Collaboration Council¹

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