Swiss Institute of Particle Physics

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Swiss contribution to the Update of the European Strategy for Particle Physics (Part 2)

15 October 2012

The document adds a more focused strategic part to the July 2012 input of CHIPP, emphasizing future activities that are expected to represent a major priority of the Swiss particle physics community.

After the CERN Council's Open Symposium on the European Strategy for Particle Physics in Krakow, CHIPP wishes to provide an additional, focused input to the update of the European strategy for Particle Physics. CHIPP acknowledges a number of breakthroughs that have been achieved in the field over the course of last year, most prominently the discovery of a Higgs-like particle and the measurement of a non-zero value for the third mixing angle in the neutrino sector. In general terms, CHIPP supports a strategy that is strongly oriented towards both an optimization of return on investment (intellectually, scientifically and financially) and new investments into long-term sustainable efforts. Switzerland intends to continue providing internationally visible contributions to an experimental and theoretical particle physics programme.

Recommendations:

1. The full exploitation of the LHC with operation at its design parameters, especially at the design energy, is the top priority for the years to come. The LHC is performing both as a discovery machine and as a precision measurement facility. Decisions concerning its upgrade path will be made once design performance has been reached and the first physics results from operations at 14 TeV have been obtained. Presently, the high luminosity upgrade HL-LHC seems to be the natural next step and all necessary preparations should be made to move along the presently planned timeline. The Swiss particle physics community, with its sizeable and leading involvement in the LHC experiments, is committed to the full exploitation of the LHC and to the studies for its future upgrade.
2. Presently, an opportunity for a path to a linear electron-positron collider appears to open up with the Japanese intention to bid for the ILC. This should be welcomed and strongly supported by the European particle physics community. CERN should coordinate a possible European participation without compromising the LHC activities.
3. CHIPP proposes to include in the European Strategy vigorous accelerator and detector R&D activities. Such a programme should be coordinated carefully between the university institutes and the national and international laboratories. Both CERN and ECFA could play an important role in this process.
4. The European neutrino community together with a sizeable and a leading Swiss participation is putting forward the LAGUNA-LBNO proposal. CHIPP is convinced that this project offers considerable synergies on the accelerator side with the ongoing consolidation and upgrade of the CERN complex in view of the future LHC operation. The full assessment of the project should be performed over the next two years. CERN should be ready to strongly engage in this effort and work on an international coordination of the various activities. The astroparticle physics community and the host country should make substantial commitments towards the support of the construction and operation of the detector infrastructure at the far site.

5. A number of smaller but important ‘single purpose’ experiments have been highlighted in the Krakow meeting. Among these there are the EDM searches and cLFV experiments with muons, which are being pursued by international collaborations at PSI. Other examples are the running and planned direct dark matter searches and neutrino-less double-beta decay experiments. The importance of these projects with unique physics reach should be emphasized and cooperation of universities and national laboratories fostered.
6. The European astroparticle physics community together with a sizeable Swiss participation is putting forward the CTA project, a worldwide priority in gamma astronomy. Within this context, but also in view of the need to regionally and globally coordinate future large steps in searches for dark matter (as e.g. the DARWIN project) or neutrino-less double beta decay, we recommend CERN to install an ‘Astroparticle Physics Forum’ at CERN as a centre of exchange of ideas and as a focus of discussion of common projects between astroparticle and particle physics. CERN should closely cooperate with ApPEC and offer a coordinating role of the participation of European particle physics groups in large astroparticle physics projects.
7. We acknowledge the fact that the simultaneous realization of all these projects requires funds beyond what is currently available; this ambitious programme will thus have to cover an extended time period. We appeal to European and especially Swiss funding agencies to maintain and enhance funding for particle physics in this crucial period where new horizons are opening up.
8. Additionally, we suggest studying how the scientific scrutiny of future large-scale particle and astroparticle experiment proposals and the monitoring of running experiments could be organized. This could be possibly accomplished by creating new scientific committees dealing with each of the future projects, or by a suitable enlargement of the terms of reference of the existing CERN Scientific Committees.

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