

Support to Swiss NuPECC membership

Introduction

The Swiss National Science Foundation (SNSF) has asked CHIPP to take a position concerning the Swiss membership in the Nuclear Physics European Collaboration Committee (NuPECC), which is presently under discussion at the SNSF. The issue is that SNSF has decided to cease as of 2017 any funding to the European Science Foundation (ESF), which is the mother organisation of NuPECC. A direct funding from Switzerland to NuPECC is however not excluded at this stage.

Since January 2009, Switzerland is represented in NuPECC by Bernd Krusche (Uni. Basel), appointed by SNSF. Back in April 2012, the CHIPP Executive Board (in EB 2012-04) has agreed on a position paper concerning NuPECC's role in Switzerland. Almost all the arguments exposed then are still valid. Instead of repeating the content of this paper (available on-line on the CHIPP website and attached again below), a new document (attached) was prepared, which lists Swiss activities belonging to the topics covered by NuPECC and directly or indirectly benefitting from NuPECC activities and coordination. It was written under the leadership of Klaus Kirch (PSI) based on inputs of a group of about 50 people mostly from CHIPP and including many CHIPP Board members.

The CHIPP EB acknowledged the document and agreed to now invite the Board to recognise the benefits of NuPECC for Switzerland and thus to approve a CHIPP recommendation to the SNSF to continue funding the Swiss membership in NuPECC.

Proposal

The Board (applying Article 27 litt. b and litt. c) is invited

- **to recognise** NuPECC as an important organisation for particle physics in Switzerland;
- **to approve** a CHIPP recommendation to the SNSF to continue funding the Swiss membership in NuPECC.

Required majority: simple

Community statement concerning the Swiss membership in the Nuclear Physics European Collaboration Committee (NuPECC)

Input for discussion at the CHIPP Board in spring 2017 (last updated January 14, 2017, KK)

The Swiss National Science Foundation has asked CHIPP to take a position concerning the Swiss membership in NuPECC which is presently under discussion at the SNSF.

In 2012 CHIPP has produced a position paper concerning NuPECC's role and to the Swiss membership and almost all of the arguments are still valid. The 2012 paper is attached to the present statement which, instead of repeating the content of the former, lists Swiss activities belonging to the topics covered by NuPECC and directly or indirectly benefitting from NuPECC activities and coordination.

The Swiss community is heavily involved in experiments and activities at the facilities at CERN and at PSI as well as at several smaller-scale installations at universities. While CERN is coordinating the process and planning for the European Strategy for Particle Physics (ESPP), NuPECC is coordinating the Long Range Planning (LRP) for Nuclear Physics in Europe. A large overlap in topics and interests exists and is reflected in the ESPP document: "A variety of research lines at the boundary between particle and nuclear physics require dedicated experiments. The CERN Laboratory should maintain its capability to perform unique experiments. CERN should continue to work with NuPECC on topics of mutual interest." The ESPP document also supports "precision measurements at lower energies ..." which "... can be based in national laboratories" which holds true for a number of unique experiments at PSI. Vice versa, activities at CERN are playing a central role in the NuPECC LRP, including the heavy ion and hadron programs of the LHC experiments, of the fixed target experiments as well as activities at other CERN facilities. Also experimental efforts at PSI feature in the LRP section regarding fundamental physics. And clearly, the Swiss community together with CERN and NuPECC emphasize the importance of applications based on particle and nuclear physics technologies and accelerators.

The here included activities have been collected between Dec 20, 2016 and Jan 7, 2017 and are based on the explicit support of the respective group leaders for this community statement. Because of the narrow time window, the list cannot be fully complete but certainly it displays the breadth of efforts across Switzerland related to activities covered by NuPECC.

This statement is supported by the persons listed below, including also research group leaders beyond the particle physics community. It should be discussed by the CHIPP Board in its meeting in spring 2017 with the aim to obtain strong CHIPP support for the continued membership of Switzerland in NuPECC.

Summary of the community statement:

- We strongly recommend that NuPECC should continue its work as expert committee. The adequate representation of the scientific community is of great importance.
 - We strongly recommend Switzerland to remain in NuPECC because of many existing links, benefits and activities at the interface of nuclear and particle physics.
 - We strongly recommend that the Swiss NuPECC membership is continued to be guaranteed by the SNSF. A closer coordination and exchange of information between the Swiss NuPECC representative, SNSF, CHIPP and other interested parties should be implemented.
-

NuPECC and the European Science Foundation ESF:

At the time of the 2012 position paper it was uncertain whether NuPECC would be moved from the European Science Foundation (ESF) to ScienceEurope which was planned to take over most of the ESF tasks. In fact, CHIPP emphasized the importance of community expert committees and that NuPECC should continue its role, independent of the question under which roof organization. Switzerland is not an ESF member and reservations concerning a Swiss membership to ESF exist. While the ESF organization has changed, it is not even needed for Switzerland to be a member of the ESF when being a member and supporter of NuPECC. Probably a similar constellation exists in the space science expert committees ESSC which are also under the roof of ESF and also supported by Switzerland. We note that also the German funding organization DFG which together with Switzerland and probably for similar reasons left the ESF decided to continue its support and membership to NuPECC.

Swiss activities related to activities of and physics covered by NuPECC:

- The Swiss Community has a direct representative in NuPECC (presently Bernd Krusche, Basel). As with other committees of interest for CHIPP, the CHIPP Plenary requests and receives oral reports annually.
- The Swiss Community has in the past been involved with the development of the NuPECC Long Range Plans (LRPs) for Nuclear Physics in Europe which are worked out roughly every seven years, and is heavily involved in the presently ongoing work on the new LRP. The NuPECC LRPs address past successes, the present status and coordinate future directions in fields like hadron structure and spectroscopy, phases of strongly interacting matter, nuclear structure and dynamics, nuclear (and particle) astrophysics, fundamental interactions, tools and applications (like in medicine, accelerator and detector technology and other areas).
- The 2010 LRP included working group and committee members from Basel, Zurich, PSI, and CERN, the 2004 LRP members from Zurich, PSI, and CERN, the 1997 LRP members from Basel, Neuchatel, Zurich, PSI, and CERN.
- For the 2017 LRP, members of the working groups and committee are from Basel, Geneva, Zurich, PSI, and CERN. Switzerland is strongly involved by the participating members, as well as acting as NuPECC liaison for hadron physics (Bernd Krusche) and as convenor of the working group on symmetries and fundamental interactions (Klaus Kirch).
- Through its active participation to the LRP process, the Swiss Community has managed to inject its important projects into the report and gained considerable visibility. While certain overlap exists with other communities and the respective community planning processes (e.g. with the CERN coordinated European Strategy for Particle Physics or the APPEC Astroparticle Physics Road Map) it is of great importance to cover the interfaces and overlap regions.
- The visibility of the Swiss researchers, projects and facilities on the European level is of utmost importance also in view of possibilities and options for European funding of some of the activities with Swiss involvement and with the activities of international groups at facilities in Switzerland. One should emphasize that the latter even includes the activities at CERN to which Swiss researchers are not directly contributing.

- Here we compile a list of Swiss groups with activities linked to topics of NuPECC including CHIPP and non-CHIPP activities. The group leaders listed have explicitly agreed to the content of this community support paper. This list is not yet exhaustive and more activities exist which could be included later. Besides that, many of the groups at universities and at PSI are active in technology development, in particular for particle detection and specialized electronics, and application of the technology in neighbouring fields.

Paul Scherrer Institute:

- Laboratory for particle physics (Kirch)
- Theoretical particle physics (Signer)
- Muon physics (Ritt)
- Ultracold neutron physics (Kirch)
- Detectors (Hildebrandt)
- Applied Particle Physics and Irradiations, Proton irradiation facility PIF (Hajdas)
- Space radiation monitors (Hajdas)
- Laboratory of Radio-chemistry (Türler, Eichler)
- Radionuclides for preclinical/medical purposes (Van der Meulen, Türler, Schibli)
- Center for Radiopharmaceutical Sciences (Schibli)
- RadwasteAnalytics: isotope production, sample preparation, target manufacturing (Schumann)
- Proton therapy (Lomax)
- Accelerator (Rivkin, Garvey)
- Neutron imaging at SINQ (Lehmann)
- Dynamic nuclear polarization (van den Brandt, Hautle)
- Nuclear Energy, Laboratory for reactor physics and systems behaviour (thermal/fast reactor safety analyses, nuclear data and reactions: TENDL library and uncertainties, experimental reactor physics) (Pautz, Ferroukhi, Vasiliev, Mikityuk, Rochman, Perret)
- Radiation safety and security (nuclide specific analysis, calibration of radiation protection equipment, dosimetry) (Mayer, Luescher, Fuchs)

ETH Zürich:

- Muon physics at PSI (Dissertori, Grab, Kirch, Wallny)
- Ultracold neutron physics at PSI (Kirch)
- Laboratory for Ion beam Physics (Synal)
- Positron and positronium physics (Crivelli, Rubbia)
- Dark matter and neutrino physics (Rubbia)
- PET detector development (Dissertori)
- Center for Radiopharmaceutical Sciences (Schibli, Ametamey)

EPF Lausanne:

- LHCb (Aurelio, Nakada, Schneider)
- Laboratory for Particle Accelerator Physics (Rivkin, also PSI)
- Laboratory of reactor physics and systems behaviour (Pautz, also PSI)

University of Basel:

- Hadron physics (Krusche)
- Nuclear Astrophysics (Thielemann)
- Cosmology and Particle Physics (Antusch)

University of Bern:

- Effective Field Theories (Colangelo)
- Neutron physics (Piegsa)
- Neutrino physics (Ereditato, Weber)
- Medical applications of particle physics (Ereditato, Kreslo, Weber)
- Radiochemistry, Environmental nuclides, Radiopharmaceutical R&D (Türler)
- Laboratory for the Analysis of Radiocarbon with AMS, LARA (Szidat)
- Physics Applications in Security (Ereditato, Kreslo)

University of Geneva:

- Muon physics at PSI (Bravar, Iacobucci)
- Detector development for medical applications (Iacobucci, Nessi)
- Theoretical physics (Riotto)
- Hadro-production and neutrino interactions in nuclear targets (Blondel, Bravar)

University of Zurich:

- Dark matter and neutrinoless beta decay (Baudis)
- LHCb (Serra, Straumann)
- SHiP (Serra)
- Theory (Isidori, Signer)

Conclusions concerning the Swiss membership in NuPECC:

A large and very diverse community in Switzerland has multiple benefits from international networking with according visibility of the Swiss activities. We strongly recommend to make sure that a Swiss scientific representation is continued in expert committees like NuPECC, thereby making sure that the important link between the scientific communities in Switzerland and in Europe can be maintained efficiently and beneficially. Continuity in these activities can be best guaranteed with the SNSF continuing to support the Swiss membership in NuPECC.

CHIPP statement concerning the future of the Nuclear Physics European Collaboration Committee (NuPECC)

April 03, 2012/KK
Approved by the CHIPP EB April 20, 2012

The Swiss National Science Foundation (email of Paul Burkhard of March 23rd, 2012) has asked CHIPP to take a position concerning the Swiss membership in NuPECC and provide input for the discussion of the SNF Research Commission on the topic in May 2012.

Summary of the CHIPP statement:

- CHIPP recommends that NuPECC should continue with its present tasks, if necessary under a new roof. The adequate representation of the scientific community is of great importance.
 - CHIPP recommends Switzerland to remain in NuPECC because of many existing links and benefits and activities at the interface of nuclear and particle physics.
-

NuPECC's role in general:

The Nuclear Physics European Collaboration Commission, NuPECC, was founded in 1988 as an autonomous committee by directors of European national laboratories engaged with basic nuclear physics research. Since 1997 it is an associated committee of the European Science Foundation ESF. It is supported by its subscribing institutions that are usually member organisations of ESF as well. Switzerland has one member in NuPECC and the annual subscription fee per member is 5.6 kEuro. Information about NuPECC is available at www.nupecc.org.

Recently, the ESF has published a Statutory Review of the Expert Boards and Committees (available at www.esf.org under publications, dated November 23rd, 2011). The review report contains a brief, concise and up-to-date description of the mission, the operations, the performance, the achievements and the weaknesses of NuPECC. The Statutory Report on NuPECC mentions as a basic guideline: *"NuPECC has provided a valuable role for the European nuclear physics community. NuPECC's advice and strategy, as being from the community itself, must continue. It should continue to advise the various European institutions and funding agencies."* Because significant changes to ESF are expected, the Review report states among others:

- *"it is highly desired that NuPECC is converted into a new high-level strategic scientific organisation in Europe together with ScienceEurope";*
- *"NuPECC wishes to continue its strategic and scientific work in this new organisation";*
- *"NuPECC wishes to have direct access to, and participation in, the new organisation. NuPECC feel that direct transfer of expert advice and information to the top-level management and governance is important."*

Like NuPECC itself, CHIPP is generally of the opinion that such an expert committee, networking and representing the scientific community is highly necessary. Especially if ESF is to be discontinued it will be important to make sure – and not only for nuclear physics – that the scientific communities are heard in ScienceEurope, in case this organism is to take over the ESF's tasks. ScienceEurope (www.scienceeurope.org) has as one of its goals to "establish the scientific community as a third voice in the European Research Area, together with national government and the European Commission." However, at present it is not clear to CHIPP how ScienceEurope is going to implement this aim in its structure. Given the existing and well established links of NuPECC with ,and the acceptance in, the community, as demonstrated e.g. in the successful bottom-up process for the NuPECC Long Range

Plan 2010 (available at www.nupecc.org) or in the “Nuclear Physics News”, a magazine which is issued every 3 months and distributed worldwide, CHIPP sees it as a necessity that the tasks of NuPECC are continued. This continuation is best assured by NuPECC itself, perhaps under a new roof.

CHIPP position on the Swiss membership in NuPECC:

Taking into account the above statement regarding CHIPP’s general support of the existence of NuPECC, the remaining issue is the cost/benefit situation of the Swiss membership:

The Swiss membership fee amounts to 5.6 kEuro per annum. On the cost side, there is also the effort of the Swiss representative, presently Bernd Krusche from Basel.

As benefits for the Swiss Community, CHIPP mentions the following items:

- Despite the fact that classic nuclear spectroscopy appears to be retracting in Switzerland (SNF letter: “... da die Kernphysik-Forschung in der Schweiz kaum mehr präsent ist.”) there is a sizeable community in Switzerland with activities represented in NuPECC. It is important to note that there are a number of subfields belonging to different communities in the different European countries. Exact definitions of “Nuclear Physics”, “Particle Physics”, “High Energy Physics”, “Fundamental Physics” etc. do not really exist and vary throughout the scientific communities and funding agencies in Europe. As an example one can mention the presence of “Fundamental Interactions” in the NuPECC Long Range Plan 2010, covering also, e.g., low energy precision physics, symmetry violations, and neutrino physics, all very well established in the Swiss research landscape and within CHIPP and its roadmap. Also “Hadron Physics”, “Nuclear Astrophysics” and “Nuclear Physics Tools and Applications” (see separate bullet below), constituting Scientific Themes of the Long Range Plan, contain research areas covered in Switzerland, in experiment and/or theory, and represented also in CHIPP. As examples, we mention the involvement of the University of Basel in leading experiments in hadronic structure physics, internationally leading theory contributions to hadron physics from University of Bern and to nuclear astrophysics. It is important to maintain and even improve the networking at the European level. CHIPP is aware that some themes are predominantly dealt with in the CERN Process for updating the European Strategy for Particle Physics. However, it is of great importance to cover the interfaces between the different fields of research, even more so as they overlap to a certain extent.
- CHIPP participated in and contributed to the community efforts for the NuPECC Long Range Plan 2010 and was able by that to achieve some visibility of the Swiss research in the European context. We consider this visibility very important also for the future and also in view of possibilities and options for European funding of some of the activities with Swiss involvement.
- Within NuPECC, and also covered in its Long Range Plan, are the “Nuclear Physics Tools and Applications”, which often are synonymous for “Particle Physics and Applications” in the Swiss context. It is important to mention specific Swiss strength and activities in this field, e.g. the proton therapy at PSI, the accelerator mass spectrometry and isotope analysis capabilities at the Laboratory for Ion Beam Physics (LIP) at ETH Zürich, the development of imaging techniques for medical applications, e.g. the AxPET project of an international collaboration including ETHZ and CERN or nuclear polarization imaging MRI techniques developed at EPFL and PSI, to name a few.
- A common area of development and applications at the interface of nuclear physics and particle physics is also accelerator and detector development. As an example, LIP is a leader in the development of small accelerators for AMS, and PSI has unique developments, e.g. for proton therapy, for high power machines and for light sources, in this domain. Several Swiss university labs within CHIPP are highly active and successfully developing detector technology with various applications. One should necessarily also mention radioprotection as a common theme, for instance with detector developments, and applications in environmental or non-proliferation activities.

Conclusion:

We conclude that the list of benefits by far exceeds the costs and highly recommend to make sure that a Swiss scientific representation is continued in expert committees like NuPECC, thereby making sure that the important link between the scientific communities in Switzerland and in Europe can be maintained efficiently and beneficially.