

FORUM OF SWISS HIGH ENERGY PHYSICISTS

CHIPP - Swiss Institute for Particle Physics

I. PREAMBLE

Following a suggestion of the Swiss State Secretary for Science and Research, the Forum of Swiss High Energy Physicists decided at its annual session on 22 June 2002 at CERN to create a National Institute for particle, astroparticle and nuclear physics. The purpose of this body is to coordinate the participation of Swiss physicists in international research projects in these fields, ensuring an optimum use of resources. On the other hand the institute will promote the education and public awareness in these fields at the national level.

The creation of a national institute (or a scientific council) for experimental particle physics and astroparticle physics was recommended by the Committee for Future Accelerator (ECFA) whose restricted panel (RECFA) evaluated particle physics in Switzerland during its visit at the University of Zurich on 1-2 March 2002. The Forum of Swiss High Energy Physics was also mandated by the Secretary of State to investigate this possibility and to establish such a body. Several informal discussions had already taken place over the years. A more detailed proposal was worked out by the "Arbeitsgruppe Teilchenphysik" of the ETH-Council¹.

A panel was nominated at the Forum meeting to prepare a draft constitution for this institute. The panel consisted of one representative from each experimental institute and representatives from various theory institutes, chaired by the Forum coordinator². The present document was established following discussions of the panel that took place on the premises of the Swiss National Science Foundation in Bern on 23 September, 29 October, 22 November 2002, 17 May 2003 at CERN, and 30 June 2003 at the University of Zurich.

This document was approved by the Forum on 2-3 October 2003, to be sent to the Swiss Secretary for Science and Research. He will distribute it further to the BBW/OFES, the ETH-Rat, the SUK/CUS, the Presidents of ETHZ and EPFL, the Director of PSI, the University Rectors and the SNSF for information.

Purpose of a National Institute for Particle Physics

The aim of particle physics is to study the fundamental (microscopic) constituents of our universe and their interactions. At very high energies one expects to reproduce the conditions prevailing at the time of the big bang which determined the time evolution of our universe and its macroscopic objects. Thus particle and astroparticle physics are closely related and the common problems they address are part of the relatively new science of astroparticle physics.

¹ Vorschlag zur Errichtung eines virtuellen Schweizerischen Instituts für Teilchen- und Astroteilchenphysik, 25. Juni 2002,

² A. Bay (LS), A. Clark (GE), K. Gabathuler (PSI), F. Pauss (ETHZ), K. Pretzl (BE), L. Schaller (FR), U. Straumann (ZH), L. Tauscher (BS), J.L. Vuilleumier (NE), for the experimentalists, J.P. Derendinger (NE), R. Durrer (GE), J. Gasser (BE), M. Shaposhnikov (LS), D. Wyler (ZH), for the theorists, C. Amsler as Forum coordinator, and M. Steinacher as BBW consultant.

Huge experimental, technological and theoretical progresses have been made in nuclear and particle physics in the 20th century. These developments also led to spectacular spinoffs (e.g. in cryogenics, computing, metrology and electronics). The discovery of many new particles (such as hadrons) started in the 1950's with the development and construction of large accelerators (such as cyclotrons). Particle physicists quickly realized that competences and resources had to be pooled if progress was to be achieved in this field. National and international collaborations were set up to build accelerator facilities and particle detectors. There are numerous cases of successful collaborations between Swiss institutions at accelerators facilities like CERN, DESY and PSI.

Coordination in Swiss High Energy Physics dates back to 1974 when high energy physicists involved in CERN experiments decided to organize regular meetings to present and discuss their research projects. The Forum of Swiss High Energy Physicists was then founded in 1988 by the "Sous-commission de physique nucléaire et corpusculaire" of the "3e Cycle de la Physique en Suisse Romande", with the purpose of coordinating large projects at CERN. This body was instrumental in the coordination of Swiss research at LEP, in advising the Swiss authorities on a participation in the LHC programme and, more recently, on the FORCE programme. Initially restricted to universities in the Romandie, it was soon extended to all Swiss groups working in particle and nuclear physics. Physicists holding a PhD working in these fields for a Swiss Institution, and Swiss nationals employed by CERN, are members of the Forum which meets once a year to elect its representatives to international committees like ECFA and to discuss items of common interest. However, this body has no official mandate nor decision power, nor is it supported by even a minimum infrastructure such as a secretariat. Financial support for participating in national and international coordination activities (for instance promotion of particle physics in the schools and media) is also not available.

The concentration of activities on a few large experiments, currently mainly ATLAS, CMS and LHCb, requires a thorough discussion in the community and even stronger coordination efforts among Swiss groups. Strong coordination will also be required for possible future facilities like TESLA, CLIC, neutrino factories or future astroparticle physics projects. An example is the need to share expensive R&D facilities such as electronics development laboratories (for example bonding machines for silicon detectors) and mechanical workshops. Another example is the establishment of a national computing grid based on the Manno and CERN computing centers, to analyze the huge data sets expected from LHC.

On the other hand, the ever increasing time scale of particle physics experiments requires long term financial commitments. For example, several million CHF will be required from Swiss groups each year to complete the detectors for LHC until 2007, beyond which computing and detector maintenance costs will have to be covered³. Feasibility studies for new projects also require participants to plan and commit funds over several years. However, contributions from the Swiss National Science Foundation (SNSF) are usually granted for one year at a time and, often, international commitments exceed the available SNSF resources. Even though funding continuity may be expected, the usual contracts (memoranda of understanding) between collaboration partners in particle physics projects cannot be signed by Swiss institutions, much at odds with other European participants.

In view of the forthcoming vacant professorships in the Swiss nuclear, particle and astroparticle physics community, some coordination should also be introduced among the Universities/ ETH when appointing professors and deciding on priorities and posteriorities in these fields.

There is therefore an urgent need to extend the current Forum of Swiss High Energy Physicists into a recognized advisory council for particle physics, as is available in several European

³ see "Particle Physics in Switzerland between 2002 and 2009", 27.3.02, submitted to the BBW.

countries, taking however into account the limitations imposed by our federal system and the independence of our universities in research and education.

The participation of theory institutes is important for universities having particle physics and graduate programmes. The involvement of theory institutes is also essential for coordinating education in particle and nuclear physics at universities without research groups in these fields (in the near future Basel and Fribourg). We also note in this respect that research in nuclear physics will soon vanish in Switzerland, even though the country still relies partly on nuclear power technologies.

The investments into large facilities such as LHC can only be exploited, if enough PhD students are available to work on the experiments and on the analyses of the data in the long term future, i.e. in 10 years from now. A national institute would help to define the level of education required in this field at the Bachelor, Master and Doctorate levels. It would also ensure that particle physics is being taught at all universities in Switzerland. It could propose graduate courses, for example and, if required by our universities, could organize the exchange of “travelling” professors at the national level.

II. CONSTITUTION

1 Purpose

The purpose of CHIPP is to coordinate the involvement of Swiss institutes in particle, astroparticle and nuclear physics research and teaching, and to recommend priorities within available resources. CHIPP may also advise on vacant professorships in these fields to promote synergies and well balanced programmes in Switzerland.

CHIPP replaces the Forum of Swiss High Energy Physicists and extends its functions and responsibilities. It is the officially recognized discussion partner between the particle, astroparticle and nuclear physics community, on one hand, and the federal, cantonal and academic authorities, on the other hand.

2 Research projects

CHIPP actively helps towards a successful participation of Swiss groups in particle, astroparticle and nuclear physics projects, and towards the fulfilment of their commitments. In this context

1. CHIPP makes recommendations on projects or activities on request. Such recommendations may be requested by the proponents of a project themselves, or by an external body such as a funding agency (for example the SNSF, BBW/OFES or SUK/CUS). CHIPP may also recommend policy or may suggest priorities related to more general issues of a scientific programme. CHIPP may initiate a study (such as a roadmap) and/or express an independent viewpoint on issues relevant to the particle, astroparticle and nuclear physics community in Switzerland.
2. CHIPP actively helps to secure the financial resources needed to fulfil the Swiss obligations of an approved or existing project in particle, astroparticle and nuclear physics, by submitting corresponding funding requests to SUK/CUS or to other appropriate funding agencies.

In its recommendations CHIPP takes into account the required long term commitments and the expected available resources. The priorities and recommendations laid out by CHIPP should allow flexibility for the funding of small or innovative projects.

3 Teaching and education

Particle, astroparticle and nuclear physics belong to the basic education at the bachelor level. Hence CHIPP gives recommendations for the curricula in Switzerland for nuclear, particle and astroparticle physics at the level of the Bachelor, and also for the Master and Doctorate levels. CHIPP helps to ensure that appropriate courses in these fields are taught at all Swiss universities. Common PhD teaching programmes (graduate courses) will be proposed and organized at the national level.

CHIPP participates in the national and international efforts to promote public awareness of particle physics. In particular, it participates in the European outreach activities.

4 Academic appointments

CHIPP may advise the Universities/ETH on forthcoming vacancies and academic strategy in nuclear, particle and astroparticle physics and in any opening professorship in related fields, with the aim of promoting synergy and to create well balanced programmes in the country. CHIPP should be invited to comment on priority changes in nuclear, particle and astroparticle physics at the Universities and ETH, in order to achieve well balanced curricula.

5 Relation to other bodies

The competence to elect Swiss representatives to the relevant international committees such as plenary ECFA (European Committee for Future Accelerators), Restricted ECFA, the CERN users' committee (ACCU), the computing committees and the outreach committee, is transferred from the Forum to CHIPP. CHIPP serves as a consulting body for the Swiss delegation at CERN and provides the required information exchange. It may propose candidates for the scientific member of the Swiss CERN delegation.

6 Structure and operation of CHIPP

CHIPP consists of two bodies:

1. the CHIPP **Plenary**,
2. the CHIPP **Board**.

The official language of CHIPP is English.

The CHIPP **Plenary** consists of particle, astroparticle and nuclear physicists holding a diploma in physics and working for a Swiss institution, and Swiss PhD nationals working at CERN (hence it extends the former Forum membership to graduate students). The CHIPP Plenary meets as required but at least once per year.

The CHIPP Plenary hears presentations on new projects and progress reports. It hears and discusses reports from the CHIPP Board. The CHIPP Plenary also elects Swiss representatives to the relevant international committees, for instance Plenary ECFA, Restricted ECFA and ACCU.

Members of the CHIPP **Board** are the elected professors with activities in experimental or theoretical particle, astroparticle and nuclear physics, and the heads of the experimental and theoretical particle physics groups at PSI. Universities without activities in particle, astroparticle or nuclear physics may nominate one representative in the CHIPP Board. The CHIPP Board may decide to include further temporary or permanent members, as required (for instance external advisers). Observers from the BBW/OFES, SNSF, ETH-council and CUS/SUK are invited to the CHIPP Board meetings.

The CHIPP Board meets as required but at least twice per year. The CHIPP Board elects an **Executive Board** consisting of a **Chair** and one to three **Deputy Chairs**. The term of office is two years and is renewable.

The CHIPP Board takes all decisions and formulates all recommendations in its fields of activity (as listed under item 7 below) by simple majority.

7 Operations

7.1 Procedure for research projects

Particle, astroparticle and nuclear physics related projects in Switzerland are dealt with by CHIPP in a three-level procedure, as follows:

1. The CHIPP Board has to be informed of any particle, astroparticle and nuclear physics project seeking funding from Swiss sources. The information should be sufficient for a global evaluation of its impacts on particle physics in Switzerland, if required.
2. New large projects need to be presented to the CHIPP Plenary, but small projects (with minor financial impacts) are only presented if requested by the proponents or the CHIPP Board. Progress reports are periodically presented to the Plenary.
3. An evaluation will be made and a recommendation issued if requested by the proponent or by an external agency.

CHIPP is not responsible for the execution of research projects (or parts thereof), unless requested by the project proponents and agreed by the CHIPP Board. However, in particular cases of common interest to the particle physics community (for example LHC maintenance and operation activities or computing) CHIPP may on request play a direct management role.

CHIPP helps towards ensuring appropriate funding resources for recommended projects and reasonable long term planning for large international collaborations.

7.2 Procedure for teaching coordination

CHIPP will periodically review the requirements for the Bachelor and Master degrees in nuclear, particle and astroparticle physics and will formulate corresponding recommendations to the Universities/ETH with the aim of harmonising the curricula throughout the country. In addition, CHIPP will seek to adapt the current PhD programmes in these fields to a common national PhD teaching programme. CHIPP will also examine the lectures offered in nuclear, particle and astroparticle physics at the Universities/ETH and formulate recommendations for their short, medium and long term harmonisation, as well as for the exchange of programmes and teachers among the Universities/ETH.

7.3 Procedure for advising on academic appointments

CHIPP will offer its advice and competence in particle, nuclear and astroparticle physics to the Universities/ETH, whenever priorities are to be redefined in these fields. This includes evaluating forthcoming vacancies at an early stage, discussing possible actions and formulating recommendations to the faculty/university, taking into account the needs of the Swiss nuclear, particle and astroparticle physics community, as well as past investments.

CHIPP expects to be associated with the selection process as a representative of the scientific community. The CHIPP recommendation is meant to assist in the selection process and is not meant to interfere with the prerogatives of the Universities/ETH regarding nominations.

7.4 Logistics

Funds are required for the infrastructure of the Institute. In particular, a part-time secretary will be appointed. CHIPP will also cover the travel expenses in connection with the activities of the

Chairperson, Deputies, and its Swiss Delegates to the international committees mentioned under 5. PSI, in its role as a federal laboratory, will administer the funds.

Paul Scherrer Institut, Villigen, 2 October 2003

(signed)

Prof. C. Amsler, chairman, for the CHIPP working group:

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