

VUK-CH

17.6.07 eingereicht

418/07

Schweizerische Universitätskonferenz

Conférence universitaire suisse

Conferenza universitaria svizzera

Projektgebundene Beiträge 2008-2011

Projektantrag für ein Innovations- und Kooperationsprojekt oder -programm

Dieses Dokument ist verbindlich und wird der Verfügung beigelegt

Projekttitle:

Swiss Centre for Advanced Studies in Particle Physics in the LHC Era

1. Kurze Beschreibung und Zielsetzung des Projekts (max. eine Seite)

Starting 2008, proton-proton collisions at the CERN Large Hadron Collider (LHC) will have energies similar to those of the early universe, less than a billionth of a second after the Big Bang. Experiments at the LHC will probe mass ranges and space-time dimensions at scales well beyond the reach of any current accelerator and will thus significantly contribute to our understanding of fundamental questions related to matter, space and time. - Switzerland, also in its position of host country of CERN, has strongly supported the scientific aims of the LHC experimental program and has contributed financially and intellectually in a major way to the construction of the ATLAS, CMS and LHCb detectors.

The Swiss experimental and theoretical Particle Physics community proposes a *Centre* for Advanced Studies in Particle Physics to create scholarships of highest international reputation, which aims to attract the best young scientists worldwide to study in Switzerland. Outstanding doctoral students and post-doctoral researchers interested in the program will be selected by a committee.

This combined effort of all involved Swiss universities is essential to maintain a high quality of education for graduate and postgraduate students in a cost efficient way. Thus, the *Centre* will organize lectures and specialised courses for its members on all relevant aspects of LHC physics. The system will conform to the new master and PhD programs of the participating universities in the Bologna system. The creation of such a *Centre* is in accordance with the aims of the Swiss Institute of Particle Physics (CHIPP, www.chipp.ch).

In addition, the *Centre* will support and coordinate the creation of inter-institutional working groups for specific research items in connection with the LHC data exploitation. It will also coordinate the use of the Tier-2 computing centre, based on GRID technology, presently being set up in the Swiss National Supercomputing Centre (CSCS) in Manno, and other IT infrastructure as necessary. It will hold regular workshops on the research progress of the different groups involved.

2. Vorgesehener Bundesbeitrag 2008-2011 nach UFG (= Total der Tab. 8)

2 Millionen Franken

3. Anfangs- und Enddatum des Projekts

(Beginn frühestens 1.1.2008, Ende spätestens 31.12.2011)

1.1.2008 bis 31.12.2011

e. Andere:

Paul-Scherrer-Institut (PSI)

Swiss National Supercomputing Centre **CSCS**

6b. Meilensteine und Stellenplan des Projekts

Geben Sie für das gesamte Projekt und eventuell vorhandene Teilprojekte die jährlichen Meilensteine an und beschreiben Sie die mit Bundesmitteln zu finanzierenden Stellen.

Milestones:

Administrative Milestones:

CEO appointed	1. Sept. 2007
Organisational structure + constitution established	1. Oct. 2007
preliminary Webpage ready	1. Oct. 2007
First call for scholarship application	1. Oct. 2007
Advertise admin and IT positions	15. Oct. 2007
First deadline for scholarship applications	1. Dec. 2007
Start Admin +IT positions	1. Jan. 2008
Teaching coordination with other schools settled	1. Jan. 2008
Lecture program for first year defined	1. Feb. 2008
Start first PhD students	1. Feb. 2008
Start first lectures	Spring Semester 2008
Start first PostDocs	1. July 2008

Scientific Milestones:

First workshop on LHC physics	June 2008
First annual report	January 2009
Calibration procedures for the Swiss detector contributions established and tested with data	December 2008
Initial physics results available	January 2010

Job Descriptions:

1. Executive office administration (50%)

Supports the CEO in all administrative matters, including bookkeeping.

2. Executive office IT responsible (50%)

Responsible for all IT related activities and matters: WebPages of the *Centre*, lecture notes layout and update, publication database and annual reports. Coordination of all matters related to the Swiss Tier-2 centre at CSCS in Manno.

3. PostDoc positions (100%)

PostDocs lead the daily scientific work according to the guidelines of its university group leader. She/he supervises the activities of the PhD students (normally one or two), which have been assigned to her/him. In addition, PostDocs will contribute to the education program of the school (at most 10% of their working time), by preparing lectures on specific topics and leading exercise sessions. At the time of advertisement the positions will be assigned to a specific research group by the management board.

PostDoc contracts are limited to two or three years.

8. Antrag auf projektgebundene Beiträge nach UFG, aufgeschlüsselt nach Rubriken

	2008	2009	2010	2011	Total
Ortsübliche Saläre (Bruttosaläre)	150'000	323'000	454'000	298'000	1'225'000
Apparate und Anlagen					
Betriebsmittel	100'000	100'000	100'000	100'000	400'000
Kosten für spez. angemietete Räumlichkeiten					
Tagungs- und Reisekosten	50'000	75'000	150'000	100'000	375'000
Total	300'000	498'000	704'000	498'000	2'000'000

Bei den Apparaten und Anlagen müssen diejenigen Vorhaben ausgeschieden werden, zu deren Unterstützung Gesuche um Investitionsbeiträge beim Staatssekretariat für Bildung und Forschung eingereicht werden können, d.h. Vorhaben mit Kosten über Fr. 300'000.- (siehe Art. 18 Abs. 2 Buchst. b UFG).

11. Zusammenfassung Finanzierung

	2008	2009	2010	2011	Total
Projektgebundener Beitrag nach UFG (= Total Tab. 9)	300'000	498'000	704'000	498'000	2'000'000
Eigenleistungen der UFG-Projektpartner*	3'297'200	3'100'800	3'254'000	3'119'680	12'771'680
Projektgebundener Beitrag ETH-Rat bzw. ETH-Leitung	149'200	280'200	574'000	335'200	1'338'600
Projektgebundener Beitrag BBT					
Eigenleistungen von ETH	3'000'000	3'000'000	3'000'000	3'000'000	12'000'000
Eigenleistungen von FH					
Andere Kredite des Bundes (z.B. SNF, KTI o.ä.): PRO*DOC	313'600	996'000	1'068'000	727'120	3'104'720
Leistungen Dritter					
Projektkosten total (=Tab. 7)	7'060'000	7'875'000	8'600'000	7'680'000	31'215'000

* Universitätskantone, Universitäten oder Universitätsinstitutionen, die an den Projekten teilnehmen, erbringen in der Regel eine Eigenleistung in der Höhe des erwarteten Bundesbeitrages (in *real money* und/oder *virtual money*); siehe UFV Art. 45 Abs.1.

Addendum to the request to SUK

Considerations and Explanations

Version 17.6.2007 / US

This paper describes the present view of the participating institutions on how the *Centre* will be organized. Based on further discussions and on the first experience in running the *Centre*, we will reoptimize the operational aspects as necessary in order to make optimal use of the resources available. This paper is attached as an appendix to the official SUK request form (for information only).

Contents:

1. Purpose of the Centre
2. Members
3. Structure of Organisation
4. Teaching
5. Research Activities and Workshops
6. Timeplan
7. PostDoc and PhD student assignment to research groups
8. Required Resources

1. Purpose of the *Centre*

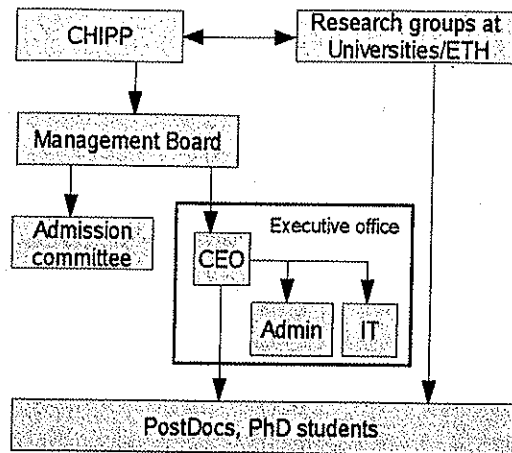
The *Centre* is an organisation introduced by the Swiss Institute for Particle Physics, CHIPP (www.chipp.ch) in order to coordinate education and support research activities to optimally exploit and interpret the data, which will be collected by the Atlas, CMS and LHCb experiments, operating at the Large Hadron Collider (LHC) at CERN. More specifically the *Centre* seeks to

- attract outstanding PhD students and PostDocs
- organize education for all Swiss PhD students working in LHC research fields.
- organize regular workshops on items of common interest in LHC physics and technical aspects of the LHC data analysis, including computing.
- explain the LHC physics and research results to the media and the general public, with special emphasis on the contributions of the participating Swiss groups

The *Centre* maintains a professional web site of high quality covering all its activities.

In order to monitor the quality and the success of the *Centre*, regular presentations to the CHIPP plenary will be required. Annual reports will be published on the web site.

The cooperation through the *Centre* concentrates on all aspects listed above. But, in all matters of research activities and dealing with results of the experiments, the groups continue to act as normal members of their research collaborations at CERN.



4. Teaching

The *Centre* runs a graduate school on fundamental particle physics with special emphasis on LHC physics. It seeks to become a recognised doctoral school for all five cooperating schools: the Universities of Bern, Geneva and Zurich as well as EPF Lausanne and ETH Zurich. In accordance with the rules of the participating universities, each student has to acquire at least 12 credits (ECTS), where 1 credit corresponds to 14 hours of lectures, including exercises and examinations.

The *Centre* will organize courses for the PhD students in the following fields:

1. Quantum field theory (≥ 2 ECTS),
2. Particle Physics Phenomenology (≥ 2 ECTS),
3. Statistical Analysis Methods (≥ 2 ECTS),
4. Experimental methods of particle physics (≥ 2 ECTS)
5. Other more specialised scientific topics
6. scientific writing and other non-scientific courses

Furthermore, at least once during the PhD program participation at one of the international schools for particle physics (e.g. CERN School of Physics, Zuoz school) will complement the education part. Presently there is already such a one-week CHIPP school for PhD students in particle physics in preparation.

As indicated in the list of courses above, the graduate school anticipates to educate their PhD students in advanced particle physics in general. Thus, PhD students from other research groups in particle physics, for example in neutrino physics, dark matter search or low energy precision physics are highly welcome to participate in the courses as well.

Courses will be given by the Swiss professors and by invited international experts. For suitable topics PostDocs will contribute to special lectures as well. The courses will be organised in cooperation with the existing PhD lecture programs (block courses in Zurich, troisieme cycle, etc.). Courses can be organised as block seminars or as normal lectures during the university terms on a single fixed day of the week. The education program and lecture schedule is defined yearly by the management board on the basis of proposals prepared by the CEO. The executive office is responsible for all administrative aspects of the lectures; it invites external lecturers in consulting with the management board.

Lecture notes will be published on the web site of the *Centre*, using a common layout, under the title "Swiss *Centre* for advanced Studies in Particle Physics in the LHC Era: Lecture Notes".

Once a year, there will be a two-day retreat of all PhD students (second-year and later). A poster presentation of the research work of each participant is compulsory. Some students will be selected to give oral presentations. Invited guest speakers will give a few talks on selected topics. The retreats are planned and organized by the students themselves with administrative help by the executive office of the *Centre*.

Group	PhD 2008	PostDocs 2008	PhD 2009	PostDocs 2009/10
ATLAS UniGe	1	1	2	1
ATLAS Berne	1	1	2	
CMS ETH	1	1	1	1
CMS UniZH	1		1	1
CMS PSI	1		1	
LHCb EPFL	1	1	1	1
LHCb UniZH	1		1	1
Theory Berne	1			
Theory EPFL	1			
Theory UniZH	1		1	
Sum	10	4	10	5

The distribution of personnel to the research groups in this table represents a compromise between equal distribution to the experiments and equal distribution to the participating institutions.

8. Required Resources

The PhD student salaries will be based on the standard SNF graduate student salary. Since these are rather low, it is customary to supplement the salaries by resources from the universities and ETH. Presently the total PhD student salaries vary from institution to institution according to the table below (100% = SNF salary). Since the rules of the institutions for these salaries are mostly beyond our control, it is foreseen, that these supplements will be payed as well and according to the affiliation of the students of the *Centre*. This will represent part of the "real money" contributions from the participating institutions to the SUK project.

Uni Bern	118%
Uni Geneve	151%
Uni Zurich *)	157%
Uni Zurich (theory)	133%
ETH (particle Physics)	144%
EPFL	150%

*)At University of Zurich, experimental physics, the total salary amounts presently to 176%, but it is planned to reduce this to 157% before the *Centre* will start operating.

The salaries for PhD Students according to the SNF are 34200, 37200 and 40200 for the first, second and third year of employment respectively.

For the time being we assume salaries for the new PostDoc positions according to the rules of the University of Geneva, assuming that the PostDocs will stay a significant fraction of their time at CERN, and thus will need financial support according to the living standards in Geneva. The salaries for PostDocs in Geneva amount to 83000, 86000 and 90000 for the first, second and third year of employment, respectively.

For all positions social overhead costs of 20% are assumed.

In order to be able to visit conferences and collaboration meetings and to travel between CERN and the home institutes, significant travel money is needed. From earlier experience we know, that we need about 15% of the salaries for travel and conferences.