

# Application form mySNF

**Instrument**                      **Mathematics, Natural sciences and Engineering (division II)**

## Part 1: General Information

### Basic data

**Project Title**                      FORCE 2010: Maintenance & Operation for the LHC Experiments 2011

**Project title in English**        FORCE 2010: Maintenance & Operation for the LHC Experiments 2011

**Research Field**                      Mathematics, natural sciences  
**Main Discipline**                      20403 Particle Physics  
**University or college**                EPF Lausanne - EPFL

### Applicant(s)

**Main Applicant**                      **Tatsuya Nakada**  
**Other applicant(s)**                    Claude Amsler  
    Aurelio Bay  
    Alain Blondel  
    Allan Clark  
    Günther Dissertori  
    Antonio Ereditato  
    Felicitas Pauss  
    Martin Pohl  
    Olivier Schneider  
    Ulrich Straumann  
    Rainer Wallny  
    Vincenzo Chiochia

### Grant Application

**Amount requested (CHF)**                      Total                                      **1'042'000**

Related to project no.                      130045

Continuation foreseen                      Yes

Requested starting date                      **01.04.2011**

Duration (max. 36 months)                      **12**

### Attachments

**Research plan**                      FORCE\_2010\_MO\_LHC\_exp\_final\_SciSect231ATLAS.pdf  
    FORCE\_2010\_MO\_LHC\_exp\_final\_SciSect233LHCb.pdf  
    FORCE\_2010\_MO\_LHC\_exp\_final\_SciSect24-25.pdf  
    FORCE\_2010\_MO\_LHC\_exp\_final\_SciSect1-22.pdf  
    FORCE\_2010\_MO\_LHC\_exp\_final\_SciSect232CMS\_PartA.pdf  
    FORCE\_2010\_MO\_LHC\_exp\_final\_SciSect232CMS\_PartB.pdf  
    FORCE\_2010\_MO\_LHC\_exp\_final\_SciSect232CMS\_PartC.pdf

**CV and publication list**                      CV\_Publis\_Amsler.pdf  
    CV\_Publis\_Bay.pdf  
    CV\_Publis\_Clark.pdf  
    CV\_Publis\_Dissertori.pdf  
    CV\_Publis\_Ereditato.pdf  
    CV\_Publis\_Straumann.pdf

Publications

CV\_Publis\_Wallny.pdf  
CV\_Publist\_Chiochia.pdf  
CV\_Publist\_Pohl.pdf  
CV\_Publist\_Schneider.pdf  
CV\_Nakada.pdf  
CV\_Publist\_Blondel.pdf  
CV\_Pauss.pdf  
Publist\_Nakada.pdf  
Publist\_Pauss.pdf

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**Documents sent by surface mail**

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## 1. Responsible applicant

<b>Surname</b>	<b>Nakada</b>
<b>First name</b>	<b>Tatsuya</b>
<b>Function (title)</b>	Professor
<b>Academic degree</b>	Dr.
<b>Date of birth</b>	22.02.1955
<b>Gender</b>	male
<b>Civil Status</b>	Unknown
<b>Correspondence language</b>	English
<b>Nationality</b>	Japan
<b>Correspondence address of application</b>	Address of workplace

### Direct Address

<b>Address supplement</b>	
<b>Street, No.</b>	Chemin de Chantavril 3a
<b>P.O. Box</b>	
<b>Postcode / Zipcode</b>	1260
<b>Place</b>	Nyon
<b>Country</b>	Switzerland

### Address of institute

<b>Name of Institution 1 (e.g. laboratory)</b>	Laboratoire de Physique des Hautes Energies
<b>Continuation 1 (e.g. inst / dept.)</b>	SB-IPEP
<b>Continuation 2 (e.g. University)</b>	EPFL
<b>Street, No.</b>	
<b>Address supplement (e.g. building)</b>	BSP 623
<b>Address supplement (e.g. office)</b>	
<b>P.O. Box</b>	
<b>Postcode / Zipcode</b>	1015
<b>Place</b>	Lausanne
<b>Country</b>	Switzerland

### Communication

<b>Secretariat line</b>	+41 21 693 04 72
<b>Switchboard</b>	+41 21 693 11 11
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<b>Cellphone</b>	
<b>Website</b>	
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## 2. Other applicant(s)

### General information

Surname	<b>Amsler</b>
First name	<b>Claude</b>
Function (title)	Professor
Academic degree	Dr.
Date of birth	21.07.1947
Gender	male
Civil Status	Unknown
Correspondence language	French
Nationality	Switzerland
Address(es)	Enter my own working address

### Address of institute

Name of Institution 1 (e.g. laboratory)	Physik-Institut
Continuation 1 (e.g. inst /dept.)	University of Zurich
Continuation 2 (e.g. University)	
Street, No.	Winterthurerstrasse 190
Address supplement (e.g. building)	
Address supplement (e.g. office)	
P.O. Box	
Postcode / Zipcode	8057
Place	Zurich
Country	Switzerland

### Communication

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### General information

Surname	<b>Bay</b>
First name	<b>Aurelio</b>
Function (title)	Professor, Director of Laboratory
Academic degree	Dr.
Date of birth	18.04.1955
Gender	male
Civil Status	Unknown
Correspondence language	English
Nationality	Switzerland
Address(es)	Enter my own working address

### Address of institute

Name of Institution 1 (e.g. laboratory)	Lab. de physiques des Hautes Energies - LPHE
Continuation 1 (e.g. inst)	SB-IPEP

/dept.)	
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Street, No.	
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**General information**

Surname	<b>Blondel</b>
First name	<b>Alain</b>
Function (title)	Professor
Academic degree	Dr.
Date of birth	26.03.1953
Gender	male
Civil Status	Unknown
Correspondence language	French
Nationality	France
Address(es)	Enter my own working address

**Address of institute**

Name of Institution 1 (e.g. laboratory)	DPNC
Continuation 1 (e.g. inst /dept.)	Section de Physique
Continuation 2 (e.g. University)	Université de Genève
Street, No.	
Address supplement (e.g. building)	24, Quai Ansermet
Address supplement (e.g. office)	
P.O. Box	
Postcode / Zipcode	1211
Place	Genève 4
Country	Switzerland

**Communication**

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**General information**

Surname	<b>Clark</b>
First name	<b>Allan</b>
Function (title)	Professor
Academic degree	Dr.
Date of birth	03.01.1947
Gender	male
Civil Status	Unknown
Correspondence language	English
Nationality	Australia
Address(es)	Enter my own working address

**Address of institute**

Name of Institution 1 (e.g. laboratory)	DPNC
Continuation 1 (e.g. inst /dept.)	Section de Physique
Continuation 2 (e.g. University)	Université de Genève
Street, No.	
Address supplement (e.g. building)	24, Quai Ansermet
Address supplement (e.g. office)	
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Place	Genève 4
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**General information**

Surname	<b>Dissertori</b>
First name	<b>Günther</b>
Function (title)	LHP Project Manager for CMS Experiment
Academic degree	Prof. Dr.
Date of birth	24.11.1969
Gender	male
Civil Status	Unknown
Correspondence language	English
Nationality	Italy
Address(es)	Enter my own working address

**Address of institute**

Name of Institution 1 (e.g. laboratory)	Laboratory for High Energy Physics
Continuation 1 (e.g. inst /dept.)	Institute for Particle Physics

Continuation 2 (e.g. University)	ETH Zürich
Street, No.	
Address supplement (e.g. building)	Schafmattstrasse 20
Address supplement (e.g. office)	
P.O. Box	
Postcode / Zipcode	8093
Place	Zürich
Country	Switzerland

**Communication**

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E-mail	dissertori@particle.phys.ethz.ch

**General information**

Surname	<b>Ereditato</b>
First name	<b>Antonio</b>
Function (title)	Ordinary Professor
Academic degree	Dr.
Date of birth	02.06.1955
Gender	male
Civil Status	Unknown
Correspondence language	English
Nationality	Italy
Address(es)	Enter my own working address

**Address of institute**

Name of Institution 1 (e.g. laboratory)	Laboratorium für Hochenergiephysik (LHEP)
Continuation 1 (e.g. inst / dept.)	Albert Einstein Centre
Continuation 2 (e.g. University)	for Fundamental Physics
Street, No.	
Address supplement (e.g. building)	Universität Bern
Address supplement (e.g. office)	Sidlerstrasse 5
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Place	Bern
Country	Switzerland

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Home telephone number	
Cellphone	
Website	

E-mail

### General information

Surname	<b>Pauss</b>
First name	<b>Felicitas</b>
Function (title)	
Academic degree	Prof. Dr.
Date of birth	26.03.1951
Gender	female
Civil Status	Unknown
Correspondence language	German
Nationality	Austria
Address(es)	Enter my own working address

### Address of institute

Name of Institution 1 (e.g. laboratory)	Laboratory for High Energy Physics
Continuation 1 (e.g. inst /dept.)	Institute for Particle Physics
Continuation 2 (e.g. University)	ETH Zurich
Street, No.	
Address supplement (e.g. building)	Schafmattstrasse 20
Address supplement (e.g. office)	
P.O. Box	
Postcode / Zipcode	8093
Place	Zurich
Country	Switzerland

### Communication

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### General information

Surname	<b>Pohl</b>
First name	<b>Martin</b>
Function (title)	Professor
Academic degree	Dr.
Date of birth	18.09.1951
Gender	male
Civil Status	Unknown
Correspondence language	German
Nationality	Germany
Address(es)	Enter my own working address

### Address of institute

Name of Institution 1 (e.g. laboratory)	DPNC
Continuation 1 (e.g. inst /dept.)	Section de Physique
Continuation 2 (e.g. University)	Université de Genève

University)	
Street, No.	
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Postcode / Zipcode	1211
Place	Genève 4
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**General information**

Surname	<b>Schneider</b>
First name	<b>Olivier</b>
Function (title)	PhD
Academic degree	Prof.
Date of birth	21.05.1961
Gender	male
Civil Status	Unknown
Correspondence language	French
Nationality	Switzerland
Address(es)	Enter my own working address

**Address of institute**

Name of Institution 1 (e.g. laboratory)	Lab. de Physique des Hautes Energies - LPHE
Continuation 1 (e.g. inst /dept.)	SB-IPEP
Continuation 2 (e.g. University)	EPFL
Street, No.	
Address supplement (e.g. building)	BSP 623
Address supplement (e.g. office)	
P.O. Box	
Postcode / Zipcode	1015
Place	Lausanne
Country	Switzerland

**Communication**

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**General information**

Surname	<b>Straumann</b>
First name	<b>Ulrich</b>
Function (title)	Professor
Academic degree	Prof.
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Gender	male
Civil Status	Unknown
Correspondence language	German
Nationality	Switzerland
Address(es)	Enter my own working address

**Address of institute**

Name of Institution 1 (e.g. laboratory)	Physik-Institut
Continuation 1 (e.g. inst / dept.)	Universität Zürich-Irchel
Continuation 2 (e.g. University)	Winterthurerstrasse 190
Street, No.	
Address supplement (e.g. building)	
Address supplement (e.g. office)	
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Country	Switzerland

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Home telephone number	
Cellphone	
Website	
E-mail	strauman@physik.uzh.ch

**General information**

Surname	<b>Wallny</b>
First name	<b>Rainer</b>
Function (title)	
Academic degree	Prof.
Date of birth	12.08.1969
Gender	male
Civil Status	Unknown
Correspondence language	German
Nationality	Switzerland
Address(es)	Enter my own working address

**Address of institute**

Name of Institution 1 (e.g. laboratory)	Laboratory for High Energy Physics
Continuation 1 (e.g. inst / dept.)	Institute for Particle Physics
Continuation 2 (e.g. University)	ETH Zurich

Street, No.	
Address supplement (e.g. building)	Schafmattstrasse 20
Address supplement (e.g. office)	HPK E26
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Place	Zurich
Country	Switzerland

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Home telephone number	
Cellphone	
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E-mail	rainer.wallny@cern.ch

### General information

Surname	<b>Chiochia</b>
First name	<b>Vincenzo</b>
Function (title)	Professor
Academic degree	Dr.
Date of birth	04.01.1975
Gender	male
Civil Status	Unknown
Correspondence language	English
Nationality	Italy
Address(es)	Enter my own working address

### Address of institute

Name of Institution 1 (e.g. laboratory)	Physik-Institut
Continuation 1 (e.g. inst / dept.)	University Zurich-Irchel
Continuation 2 (e.g. University)	Winterthurerstrasse 190
Street, No.	
Address supplement (e.g. building)	
Address supplement (e.g. office)	
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Postcode / Zipcode	8057
Place	Zürich
Country	Switzerland

### Communication

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Switchboard	
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Website	
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### 3. Basic data I

Original project title	FORCE 2010: Maintenance & Operation for the LHC Experiments 2011
Project title in English	
Requested starting date	01.04.2011
Duration (max. 36 months)	12
Research field	Mathematics, natural sciences
Main discipline	20403 Particle Physics

### 4. Basic data II

#### Summary (Exerpt of the research plan, chapter 1)

The new large hadron collider (LHC) at CERN, which ultimately will collide protons with a centre of mass energy of 14 TeV, restarted its operations in mid-November 2009. The first collisions were at injection energy of 900 GeV and took place early December. In February 2010 the collision energy was increased from 900 GeV to 7 TeV. For the whole year, the machine has run for physics data taking by increasing its luminosity at a regular pace and without any incident.

With an enormous effort over more than 15 years, the world-wide particle physicist community has designed, developed, constructed and installed four large and three small detectors, in order to exploit the physics at the TeV scale, which will shed light on the nature of electro-weak symmetry breaking and where physics beyond the Standard Model, such as supersymmetric particles or extra special dimensions may be discovered. Switzerland significantly contributed to three of the large experiments.

The experiments are run by the collaborations which measure the reaction products at the interaction regions of LHC and analyse the data to extract physics. CERN in its role as the host laboratory of the LHC accelerator provides the operation of the LHC accelerator complex, and infrastructure and basic service for the experiment. However, operation of the experiment is under the responsibility of the collaborations. This includes covering the specific cost associated to it, referred as "Maintenance and Operation cost" (M&O), which is composed of the following two categories:  
 A) contribution to the daily running and maintenance expenses of the detector and collaboration, and  
 B) provision of the scientific and technical manpower to ensure operations and the good working order of the sub-detector systems they have provided for the whole lifetime of the experiment of about 10 years.

The M&O requests and the distribution of these costs (A and B above) among the institutes, which is proportional to their participation, were approved by the Ressources Review Board RRB during its meeting on 11-13 October 2010, where all funding agencies are present. It must be noted that the M&O requests had been examined by a scrutiny group whose members were nominated by the RRB.

This FORCE request is coordinated by CHIPP (Swiss Institute for Particle Physics) and is a common request from of all institutes active in the LHC detector construction and operation. It summarises the Swiss contributions to the three LHC detector's design, construction, commissioning, operation and physics exploitation. It explains CERN's concept of maintenance and operation (including funding mechanisms) and gives an overview of the costs for 2011, which Switzerland is supposed to cover (according to the RRB agreement).

#### Keywords

LHC Experiment
ATLAS
Higgs
Supersymmetry
CP Violation
New Physics
Standard Model
CMS
LHCb

<b>Language of correspondence</b>	German
<b>Financial administration</b>	Finanzabteilung der Universität Zürich

## 5. Continuation of

<b>Application</b>	130045
<b>Remarks</b>	Maintenance and Operation for the LHC experiment at CERN
<b>Continuation foreseen?</b>	Yes

## 6. Indirectly related to other research projects

<b>Application</b>	129890
<b>Type of relationship</b>	FORCE: GRID Infrastructure for LHC experiments

<b>Application</b>	129914
<b>Type of relationship</b>	FORCE: Construction of LHCb experiment

<b>Application</b>	130218
<b>Type of relationship</b>	FORCE: High Precision CP Violation Physics at LHCb

<b>Application</b>	130240
<b>Type of relationship</b>	FORCE: The CMS experiment at the LHC

<b>Application</b>	130236
<b>Type of relationship</b>	FORCE: Proton-Proton Collider Physics with the ATLAS experiment at CERN

<b>Application</b>	130054
<b>Type of relationship</b>	FORCE: Physics at the Large Hadron Collider at CERN

<b>Application</b>	129653
<b>Type of relationship</b>	FORCE: Particle Physics at CERN

## 7. Revision of

## 8. University and institutional statement

<b>University or college</b>	EPF Lausanne - EPFL
<b>Remarks</b>	This request is implemented at CERN. The application is written by one of the Vice-Chairs of CHIPP (Nakada), which coordinates this joint M&O request on behalf of all Swiss institutes concerned (see section 9 below).
<b>Institutional declaration (FC)</b>	< None >
<b>Remarks</b>	This is a common request from the Swiss Particle Physics community; therefore, there is no national Forschungskommission responsible for an institutional statement.

## 9. Collaboration (national and international)

<b>Research group/institution</b>	almost 400 institutions from all over the world
<b>Country</b>	Switzerland
<b>Context</b>	- CERN - University of Berne, University of Geneva, University of Zurich, ETH Zurich, EPF Lausanne, PSI (coordinated by CHIPP)

## 10. Available or requested funds

<b>Do you have access to additional funds?</b>	Yes
<b>Personnel and staff available</b>	none
<b>Available equipment</b>	none
<b>Amount allocated for apparatus, consumables, travelling expenses and other expenditure</b>	Total 1'042'000 CHF  ATLAS: sub-total: 258'000 CHF Cat. A: 187 kCHF Cat. B: Silicon strip tracking (SCT) 41 kCHF Cat. B: Liq. Argon Calorimeter (LAr) 9 kCHF Cat. B: Inner detector (IDGEN) 21 kCHF  CMS: sub-total: 525'000 CHF Cat. A: 344 kCHF Cat. B: Pixel tracking 118 kCHF Cat. B: El.magn. calorimeter (ECAL) 63 kCHF  LHCb: sub-total 259'000 CHF Cat. A: 171 kCHF Cat. B: Vertex locator (VELO) 40 kCHF Cat. B: Silicon tracking (ST) 48 kCHF
<b>Infrastructure</b>	none
<b>Have you as applicant and co-applicant requested additional funds at the SNSF or at another funding body?</b>	Yes
<b>Please list what you have applied for: jobs, personnel, apparatus, infrastructure, consumables, expenses etc.</b>	- other detector projects and GRID infrastructure see section 6 above;  - in the context of its "Projektgebundene Beiträge", the SUK has approved the project "Swiss Centre for Advanced Studies in Particle Physics in the LHC Era", submitted by the CHIPP (Swiss Institute for Particle Physics). SUK and ETH granted funding to allow CHIPP the hiring of excellent PostDocs for LHC data exploitation over the period 2008-2011. 9 PostDocs have been selected (from 106 candidates) in international competition; they are working at the five institutes concerned (Universities of Berne, Geneva and Zurich, EPFL, ETHZ) and are fully involved in the LHC data exploitation;

- a ProDoc request for “Particle Physics in the LHC Era”, which has been accepted in summer 2009 is in full swing and complements with this effort at PhD level the SUK/ETH PostDoc programme in an ideal way.

## 11. Requested positions, salaries and social security contributions

### Overview positions (full time equivalents)

Allotment	Total %	Year 1
Academics		
Doctoral students		
Technician		
Assistant		
<b>Total %</b>	<b>0</b>	<b>0</b>

### Details

Last name	Nationality	Academic degree	Function	Salary class	Salary others, 1st year	Salary SNF, 1st year
First name	Gender	Since	Employment as a percentage (%)	Since	2nd year	2nd year
Date of birth	Number of children	Doctoral cand. since	Paid by SNF	Type of position	3rd year	3rd year
Subprojekt					4th year	4th year
					5th year	5th year

### Total positions CHF

Allotment	
Academics	
Doctoral students	
Technician	
Assistant	
<b>Total CHF</b>	

## 12. Requested Funding

### Budget per year (overview)

#### Project

Allotment	Total SNSF (CHF)	Year 1
Scientific equipment and components	1'042'000	1'042'000
Consumables and Maintenance		
Travel, field expenses		
Other costs		
Salaries		
Social security contributions		
<b>Total SNSF (CHF)</b>	<b>1'042'000</b>	<b>1'042'000</b>
<b>Total SNSF (CHF)</b>	<b>1'042'000</b>	<b>1'042'000</b>

### Budget per year (detail)

Values in brackets represent items requested from other sources than SNF

#### No subprojects

	Total SNSF (CHF)	Year 1
<b>Project</b>		
<b>Scientific equipment and components</b>		
Category A and Category B expenses for M&O for the LHC experiments 2011	1'042'000	1'042'000
<b>Total SNSF (CHF)</b>	<b>1'042'000</b>	<b>1'042'000</b>

### 13. Research requiring authorisation or notification

Research on humans	No
Research on human embryonic stem cells	No
Research on animals	No
Research on GMO or pathogens	No
Relevant regulations noted and accepted	Yes

### 14. General remarks to the project

Abbreviated designation Communication	<p>1. The Lenkungsausschuss FORCE - in agreement with the SNF - has recognized the mandatory character of the M&amp;O contributions.</p> <p>2. The SNF has instructed the applicants to submit this request only after the RRB, i.e. on 29 October 2010.</p>
Confidential	No