

European Strategy for Particle Physics  
Briefing Book for the European Strategy Group

The Preparatory Group

July 23, 2012



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# Chapter 1

## Introduction

Tatsuya will write something.



# Chapter 2

## Physics

### 2.1 Introduction

Tatsuya will write something.

### 2.2 Energy Frontier

Alison, Marcella, Patricia, Klaus, Manfred, Peter will write something.

#### 2.2.1 Physics at the TeV Scale

Blah blah

#### 2.2.2 Accelerators for Exploring the TeV Scale

Blah blah

##### 2.2.2.1 Hadron Colliders

Blah blah

##### 2.2.2.2 Lepton Colliders

Blah blah

##### 2.2.2.3 Lepton-Hadron Colliders

Blah blah

#### 2.2.3 Energy Frontier Physics at LHC

Blah blah

#### 2.2.3.1 Current Status

Blah blah

#### 2.2.3.2 Prospects with Designed Performance

Blah blah

#### 2.2.3.3 Prospects with Luminosity Upgrade

Blah blah

### 2.2.4 Physics at Linear Colliders

Blah blah

#### 2.2.4.1 ILC and Higgs Factories

Blah blah

#### 2.2.4.2 CLIC

Blah blah

### 2.2.5 Physics at Other Projects

Blah blah

### 2.2.6 Detector R&D

Blah blah

**2.2.6.1 LHC**

Blah blah

**2.2.6.2 Linear Colliders**

Blah blah

**2.2.7 Summary**

Blah blah

**2.3 Physics of Flavour and Symmetries**

Roger, Yoshitaka and a bit of Tatsuya will retie something

**2.3.1 Theory of Flavour Physics and Symmetries**

Blah blah

**2.3.2 Quark Flavour Physics**

Blah blah

**2.3.2.1 Current Status**

Blah blah

**2.3.2.2 Expected Progress in Near Future**

Blah blah

**2.3.2.3 Long Term Prospects**

Blah blah

**2.3.3 Charged Lepton Flavour Physics**

Blah blah

**2.3.3.1 Current Status**

Blah blah

**2.3.3.2 Expected Progress in Near Future**

Blah blah

**2.3.3.3 Long Term Prospects**

Blah blah

**2.3.4 Fundamental Symmetries**

Blah blah

**2.3.4.1 Current Status**

Blah blah

**2.3.4.2 Expected Progress in Near Future**

Blah blah

**2.3.4.3 Long Term Prospects**

Blah blah

**2.3.5 Summary**

Blah blah

**2.4 Neutrino Physics**

Dave and Enrique will write something.

**2.4.1 Theoretical Introduction**

Blah blah

**2.4.2 Status of Neutrino Experiments**

Blah blah



**2.4.2.1 Long Baseline Experiments**

Blah blah

**2.4.2.2 Reactor Experiments**

Blah blah

**2.4.2.3 Short Baseline Experiments**

Blah blah

**2.4.2.4 Auxiliary Experiments**

Blah blah

**2.4.2.5 Absolute Mass and Fundamental Property Measurements**

Blah blah

**2.4.3 Future Prospects**

Blah blah

**2.4.4 Summary**

Blah blah

**2.5 Strong Interaction Physics**

Filipe, Krzysztof, and Peter will write something.

**2.5.1 Introduction**

Blah blah

**2.5.2 Parton Densities and QCD Tools for High Energy Frontier**

Blah blah

**2.5.2.1 Deep Inelastic Scattering and Parton Densities**

Blah blah

**2.5.2.2 Tools for LHC, LC, and Beyond**

Blah blah

**2.5.3 QCD Studies at LHC and Future Accelerators**

Blah blah

**2.5.3.1 Jet Production**

Blah blah

**2.5.3.2 Diffraction and Forward Physics**

Blah blah

**2.5.3.3 Spectroscopy**

Blah blah

**2.5.3.4 Heavy Quark Production and Spectroscopy**

Blah blah

**2.5.3.5 LHeC**

Blah blah

**2.5.4 Relativistic Heavy-Ion Collisions**

Blah blah

**2.5.4.1 Soft probes and Flow and Hydrodynamic Response of the Medium**

Blah blah

**2.5.4.2 Hard probes and Quarkonia**

Blah blah

**2.5.4.3 Future Opportunities for Colliders and Fixed Target Experiments**

Blah blah

**2.5.5 Summary**

Blah blah

**2.6 Astro and Non-accelerator Particle Physics**

Catherine and Philippe will write something.

**2.6.1 Introduction**

Blah blah

**2.6.2 Dark Matter**

Blah blah

**2.6.3 Large Underground Detectors**

Blah blah

**2.6.4 Transversal Activities**

Blah blah

**2.7 Particle Physics Theory**

Katri, Fabio and Pietro will write something.

**2.7.1 General Assessment**

Blah blah

**2.7.1.1 Implementation of the Current Strategy**

Blah blah

**2.7.1.2 Status and Impact of Theoretical Physics**

Blah blah.

**2.7.2 Organizational Aspects**

Blah blah.

**2.7.2.1 Role of CERN Theory Group**

Bula bula

**2.7.2.2 Relation with EU Programme**

Blah blah

**2.7.2.3 Relation with Experiments**

Blah blah

**2.7.3 Special Topics**

Bula bula

**2.7.3.1 Lattice Field theory**

Blah blah

**2.7.3.2 Development of Software Packages**

Blah blah

**2.7.3.3 Role of Formal Theory**

Blah blah

## 2.8 Accelerator Science and Technology

Frank and Roy will write something.

### 2.8.1 Energy Frontier Challenges

#### 2.8.1.1 Introduction

Blah blah.

#### 2.8.1.2 High Energy Hadron Colliders

Blah blah

#### 2.8.1.3 High Energy Lepton Colliders

Blah blah

#### 2.8.1.4 High Energy Hadron-Lepton Collider

Blah blah

### 2.8.2 Intensity Frontier Challenges

#### 2.8.2.1 Introduction

Blah blah.

#### 2.8.2.2 High Intensity Neutrino Facilities

Blah blah

#### 2.8.2.3 High Luminosity Flavor Factories

Blah blah

#### 2.8.2.4 High Intensity Beam Lines

Blah blah

### 2.8.3 Organization of Accelerator R&D for HEP in Europe

#### 2.8.3.1 Accelerator R&D Coordination and Collaborative Programmes

Blah blah.

#### 2.8.3.2 Synergies with Other Fields of Science

Blah blah

#### 2.8.3.3 Education and Training

Blah blah

#### 2.8.3.4 Applications to societal Challenges

Blah blah

#### 2.8.3.5 Relation with industry

Blah blah.

## 2.9 Instrumentation, Computing, and Infrastructure

Erika, Patricia, Peter, and Philippe will write something.

### 2.9.1 Introduction

Blah blah

### 2.9.2 Detector R&D

Blah blah

#### 2.9.2.1 Technologies for the Next Generation Experiments

Blah blah

**2.9.2.2 Generic Detector R&D**

Blah blah

**2.9.2.3 Interface to other fields and Industry**

Blah blah

**2.9.2.4 Test Facilities**

Blah blah

**2.9.3 Outlook for Construction of Large Scale Projects**

Blah blah

**2.9.3.1 Facilities for Construction of Large Systems**

Blah blah

**2.9.3.2 Integration and Project Management**

Blah blah

**2.9.3.3 Preserving Knowledge and Technical Skills**

Blah blah

**2.9.3.4 Training**

Blah blah

**2.9.4 Computing and Data Management**

Blah blah

**2.9.4.1 Computing Models**

Blah blah

**2.9.4.2 R&D**

Blah blah

**2.9.4.3 Network and Data Management**

Blah blah

**2.9.4.4 Data Preservation and Data Access**

Blah blah

**2.9.4.5 Particle Physics Software Libraries**

Blah blah

**2.9.5 Summary**

Blah blah

## Chapter 3

# Open Symposium Programme

Emmanuel and Tatsuya will write something.



## Chapter 4

# Written Inputs from the Community

Emmanuel and Tatsuya will write something.