

RECFA

Sprawozdanie z działalności RECFA w roku 2010

Aleksander Filip Żarnecki
Seminarium Fizyki Wielkich Energii

Warszawa, 10 grudnia 2010

Plan seminarium

- ECFA: zadania i struktura
- Restricted ECFA w 2010
- Plenary ECFA w 2010
- Nowe inicjatywy
 - Panel detektorowy
 - Panel neutrinowy
 - Strategia HEP w Europie
- Podsumowanie

ECFA terms of reference



ECFA

European Committee for Future Accelerators

ECFA is **advisory** to **CERN** Management, CERN Council and its Committees, and to other organizations, **national or international**.

- Aims:
- **Long-range planning** of European high-energy facilities (...) adequate for the conduct of a valid **high-energy research programme** ...
 - **international and national laboratories** and university institutes (...) relation between **research and education** in high-energy physics ...
 - Adequate **conditions for research** ...

- Activities:
1. regular **meetings** of Restricted and Plenary ECFA;
 2. ad hoc **symposia and conferences** sponsored or organized by ECFA;
 3. **study groups**, set up by ECFA for special problems;
 4. **demographic studies** of the high-energy physics community...
 5. monitoring of the ongoing implementation of the European Strategy...

- ECFA consists of:
- Plenary ECFA,
 - Restricted ECFA,
 - Chairman and Secretary and
 - permanent or ad hoc working groups.

Plenary ECFA

Plenary ECFA consists of:

- Chairman (Prof. T. Nakada) and secretary (Prof. K. Long)
- Member state representatives (~80)
 - Poland:
Prof. J. Kalinowski
Prof. P. Malecki
AFŻ
- From CERN:
 - Director-General Prof. R. Heuer
 - D. for Research and Computing Prof. S. Bertolucci
+ 6 representatives
- Ex-Officio Members
 - DESY Prof. J. Mnich
 - INFN Prof. M. Calvetti
- Observers:
 - President of Council, Chairmans of the SPC, FC, NuPPEC.
 - Israel, Russian Federation, U.S.A., EPS, ESF, JINR

Plenary ECFA

- normally holds two meetings per year
 - one at CERN
 - one at EPS-HEP Conference or DESY/Frascati
- meetings are public unless otherwise decided
- decides on all ECFA activities
 - appoints the Chairman and Secretary,
 - approves the final reports of the working groups,
 - decides on admission of new countries and observers,
 - makes recommendations to outside organizations.

Restricted ECFA

Restricted ECFA consists of:

- ECFA chairman (Prof. T. Nakada)
- **One** representative of each member state (20) + CERN
- Ex-Officio Members:
 - CERN Director-General Prof. R. Heuer
 - CERN D. for Research and Computing Prof. S. Bertolucci
 - DESY Prof. J. Mnich
 - INFN Prof. M. Calvetti
- Observers:
 - from Israel, Russian Federation and EPS

Restricted ECFA

- Restricted ECFA
 - assists and advises the Chairman and the Secretary in the current running of ECFA, and
 - acts as the **communication channel** to each participating country, its physics community and national institutes and authorities.
- normally holds five meetings per year
 - two meetings @ Plenary ECFA
 - three „**country visits**”

Restricted ECFA

R-ECFA Country visits

- One day open session with reports on:
 - Scientific activities (most)
 - Research planning, structure and funding
 - Human resources, education and outreach
+ PhD students' point of view

after discussion: RECFA feedback to the
Community
- Half a day closed meeting
 - Reports from CERN, DESY, Frascati
 - Reports from working groups
 - Planning HEP activities in Europe (eg. FP7)

Other activities

- ECFA Workshops on: (selected)
 - Developments in Particle Acceleration Techniques
 - LHC
 - European B-meson Factory
 - LHeC
- ECFA working groups/studies:
 - Physics and Detectors for a Linear e^+e^- Collider
 - Neutrino oscillations
 - Future of accelerator-based PP in Europe

2010

- R-ECFA meetings
 - Belgium (March)
 - Bulgaria (May)
 - Finland (October)

- P-ECFA meetings
 - Frascati (July)
 - CERN (November)

2010



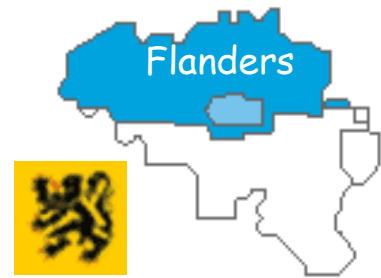
BELGIUM REPORT – RECFA VISIT

EVOLUTION SINCE THE RECFA VISIT TO BELGIUM IN MAY 2003
AN UPDATE OF THE MIDTERM REPORT BY C. DE CLERCQ IN
2007

*Catherine Vander Velde
IIHE, Université Libre de Bruxelles
For the Belgian HEP community
Brussels, 5 March 2010*

BELGIUM : FEDERAL STATE WITH DECISIONS AT DIFFERENT LEVELS

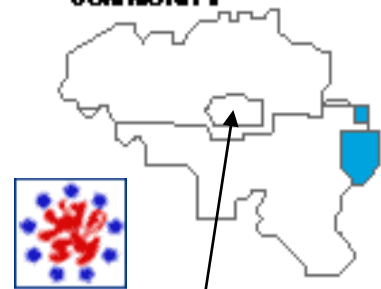
THE FLEMISH COMMUNITY



THE FRENCH COMMUNITY



THE GERMAN-SPEAKING COMMUNITY



Brussels-Capital

⤵ Federal government

⤵ 3 regions : Flanders, Wallony, Brussels-Capital
matters bound to "soil"

⤵ 3 communities : Flemish, French, German speaking
10,7 = 6,3 4,3 0.07 million people
matters bound to "people and culture"



University teaching and public research is run totally independently by the 2 main communities in the regions in which they have authority:

Flemish : Flanders, Brussels-Capital

VL[aams]

French : Wallony, Brussels-Capital

FR[ançais]

...with some noticeable exceptions for public research

Flemish community(7)

- Universiteit Gent - UGent
- Vrije Universiteit Brussel – VUB
- Universiteit Antwerpen - UA
- **Katholieke Universiteit Leuven - KUL**
- Katholieke Universiteit Leuven, campus Kortrijk – KULAK (only Ba)
- Universiteit Hasselt – UHasselt
- *Katholieke Universiteit Brussel - KUB*

Italic = no physics
Bold = HE physics

French Community(9)

2010

- **Académie Wallonie-Europe:**
 - Université de Liège – ULg
- **Académie Louvain:**
 - Université Catholique de Louvain – UCL
 - Facultés Universitaires Notre-Dame de la Paix à Namur – FUNDP
 - *Facultés Universitaires Saint-Louis – FUSL*
 - *Facultés Universitaires Catholiques de Mons – FUCaM*
- **Académie Bruxelles-Wallonie:**
 - Université Libre de Bruxelles – ULB
 - Université de Mons – UMons

9 universities deliver Master in physics diploma
8 universities train HE physicists

Federal government

Economic affairs: CERN fee - 2,82% - 31,3 M€ in 2010

Science policy: IAP networks - see later

Flemish community

FWO : fundamental research

equipment, running, personnel for experiments & theory

IWT : applied research ~~but grants for HEP PhD theses~~

Universities : mainly personel

French community

FNRS : fundamental research and IISN (HEP and LEP only)

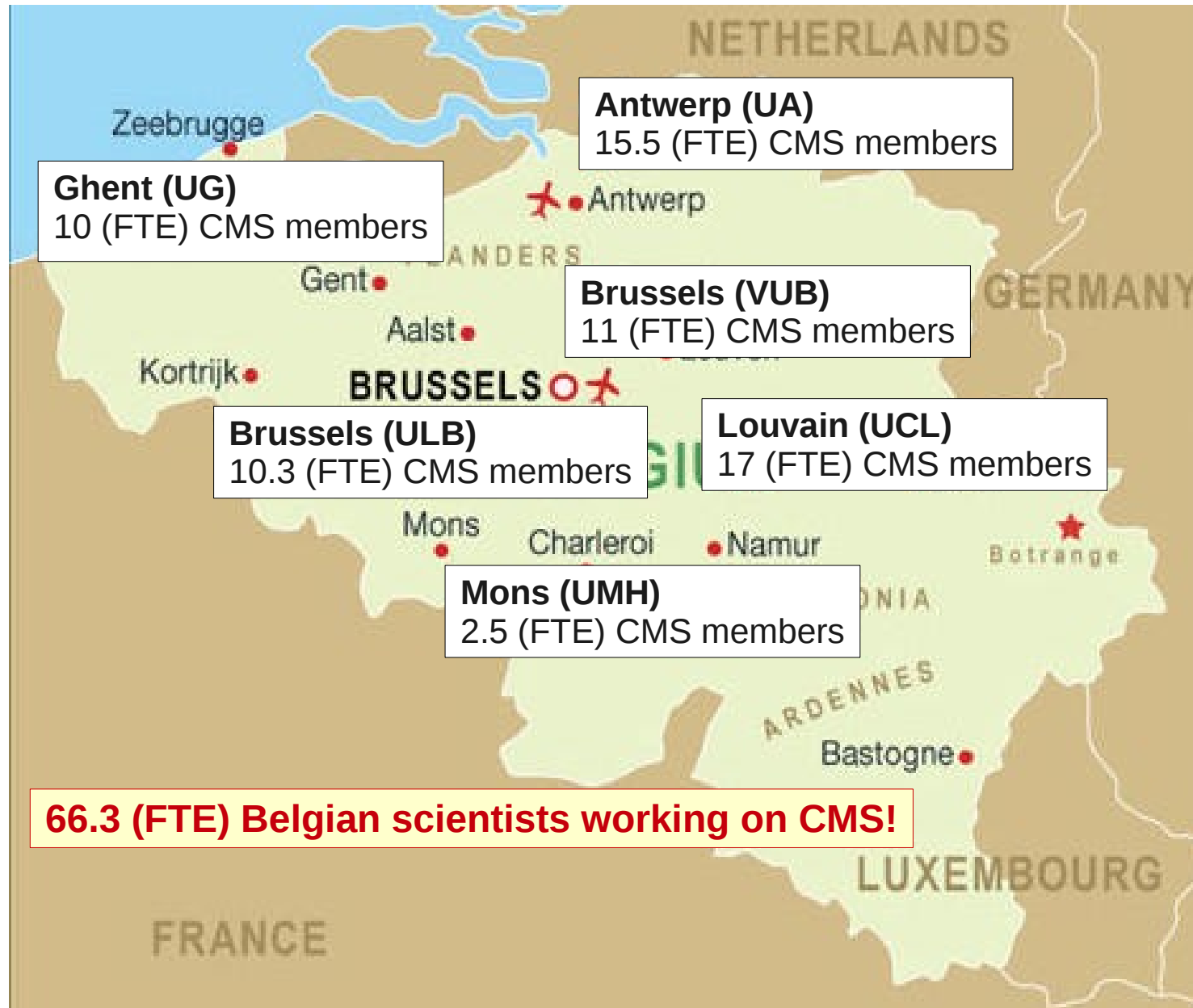
equipment, running, personnel for experiments & theory

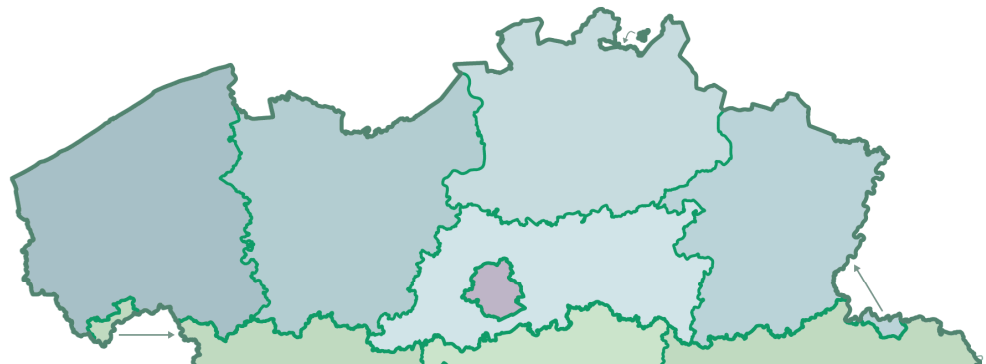
FRRIA : applied research but grants for HEP PhD theses

Universities : mainly personel

Other : EU, RW, private ...

Belgian CMS institutes





SINCE 2003 RECFA REPORT

Some problems found a solution!



IGN, Bruxelles - 2001
Mention obligatoire à chaque réutilisation
© NGI, Brussel - 2001
Verplicht te melden bij ieder hergebruik

- *« Recruitment of young academic staff to replace substantial fraction of community that was close to retirement »*
 - ↳ *about 20 young academics recruited over a total of ~55, both TH and EXP but less on Flemisch side*
 - > no more tenure positions at the FWO (only at universities)*
- *« Difficulties in obtaining HEP funding at FWO »*
 - ↳ *new funding program « Big Science » launched in 2006 – for participation to CERN, ESRF, ESO and EMBL research – main part went to CMS and ISOLDE*

Short history

The **Physical Institute of the Bulgarian Academy of Sciences (BAS)** was established on July 1 1946 by academician **Georgi Nadjakov** who became its first director.

A crucial factor for the nuclear research in Bulgaria became our membership at the **Joint Institute for Nuclear Research (JINR)** .

**JINR Dubna was created
26.03.1956**

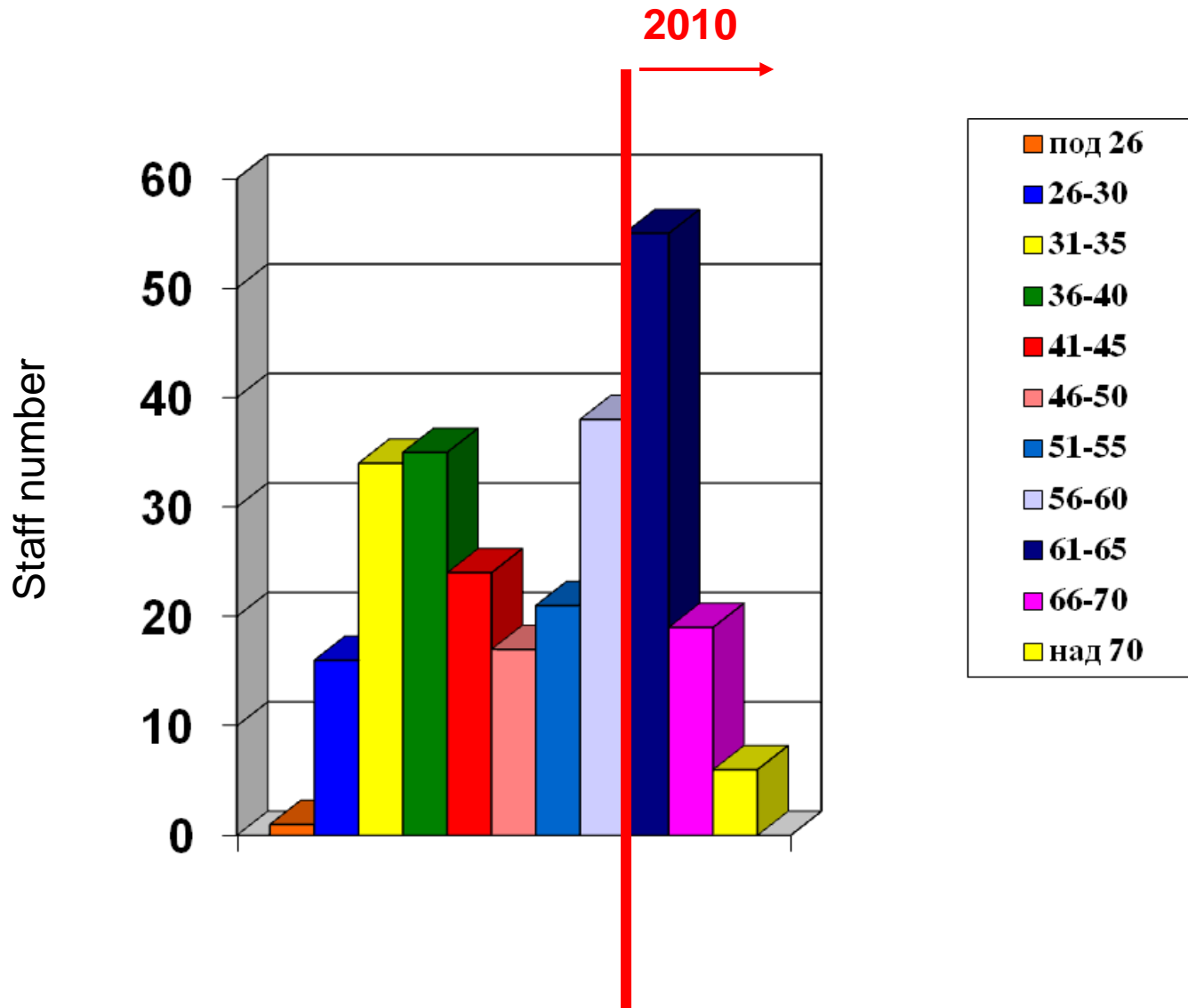


Acad. G. Nadjakov was signing the Protocol together with 10 representatives of other countries.



JINR Dubna was the institution for education and formation of the first generation of nuclear scientists and specialists in Bulgaria.

Age distribution of the INRNE staff



University of Sofia



❖ University of Sofia

- Biggest and oldest university in Bulgaria
- Covers practically all scientific fields
- 16 faculties
- 2700 staff
- 26000 students
- Faculty of Physics
- Biggest faculty of the University
- Staff – 250
- Students – 600
- 13 Departments

❖ Education in Nuclear and Particle Physics

- Atomic Physics Department
- Theoretical Physics Department
- Nuclear Engineering Department



Conclusions



□ Main problems

❖ Decreasing number of students

- Particular case of the decreasing number of students in natural and technical disciplines
- Big flow of students to other EU countries and USA
- Special program to attract young people is necessary

❖ Very old laboratory equipment

- Equipment does not correspond to the 21st century
- Strong dynamics in the technology development
- Full refurbishment of the laboratories needed

❖ Sharp decreasing of the number of PhD students during last years

- low stipendium
- brain drain problem

CMS: Express of Interest

Expression of Interest for a Compact Muon Solenoid Detector for LHC

CMS

Institut für Hochenergiephysik der Österreichischen Akademie der Wissenschaften, *Vienna*, AUSTRIA

Université Libre, *Bruxelles*, BELGIUM

Vrije Univ., *Brussel*, BELGIUM

Université Catholique de Louvain, *Louvain-la-Neuve*, BELGIUM

Univ. Instelling Antwerpen, *Wilrijk*, BELGIUM

Univ. de l'État Mons, *Mons*, BELGIUM

Institute of Physics, Acad. Sci. Byelorussia, *Minsk*, BYELORUSSIA

Institute of Nuclear Research & Nuclear Energy, *Sofia*, BULGARIA
Univ. of Sofia, *Sofia*, BULGARIA

Institute of Nuclear Physics, *Praha*, CFSR

Inst. of Chemistry and Physics, *Tallinn*, ESTONIA

SEPT, *Helsinki*, FINLAND

Physics Department, Univ. of Helsinki, *Helsinki*, FINLAND

Univ. of Technology, *Helsinki*, FINLAND

Univ. of Technology, *Tampere*, FINLAND

Åbo Akademi, *Turku*, FINLAND

Laboratoire de Physique des Particules (LAPP), *Annecy-le-Vieux*, FRANCE

Inst. Nat. Phys. Nucl. et Phys. Part., *Lyon-Villeurbanne*, FRANCE

Ecole Polytechnique, *Palaiseau*, FRANCE

CEN-Saclay, *Gif-sur-Yvette*, FRANCE

Tbilisi State University, *Tbilisi*, GEORGIA

Universität Aachen, *Aachen*, GERMANY

Universität Kiel, *Kiel*, GERMANY

University of Ioannina, *Ioannina*, GREECE

Nucl. Research Center Demokritos, *Athens*, GREECE

University of Athens, *Athens*, GREECE

Central Research Institute for Physics, Hung. Acad. Sci., *Budapest*, HUNGARY

Dipartimento di Fisica dell'Università and Sezione dell'INFN, *Milano*, ITALY

Università di Padova, *Padova*, ITALY

Università di L'Aquila, *Coppito*, ITALY

Dipartimento di Fisica dell'Università and Sezione dell'INFN, *Genova*, ITALY

Inst. of Experimental Physics, University of Warsaw, *Warszawa*, POLAND

Institute for Nuclear Studies, *Warszawa*, POLAND

CIEMAT, *Madrid*, SPAIN

CERN, *Geneva*, SWITZERLAND

JINR, *Dubna*, RUSSIA

IPEP, *Moscow*, RUSSIA

INR, *Moscow*, RUSSIA

IHEP, *Protvino*, RUSSIA

Imperial College, *London*, U.K.

Rutherford Appleton Laboratory, *Didcot*, U.K.

Univ. of California, *Davis*, USA

Univ. of California, *Riverside*, USA

Univ. of California, *Los Angeles*, USA

1991

Institute of Nuclear Research & Nuclear Energy, *Sofia*, BULGARIA
Univ. of Sofia, *Sofia*, BULGARIA

Present Activities

Maintenance and operation of the CMS detector:

- Hadron calorimeter
- Electromagnetic calorimeter
- RPC muon system

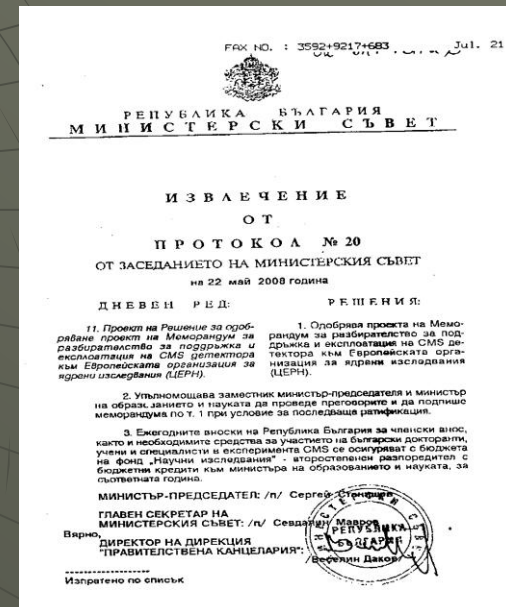
Data taking

Event processing

Physics analysis

2008: Law for CMS

MoU for the M&O of the CMS
Funding 2008 - 2011



Where is a will

there is a way!

For contacts:

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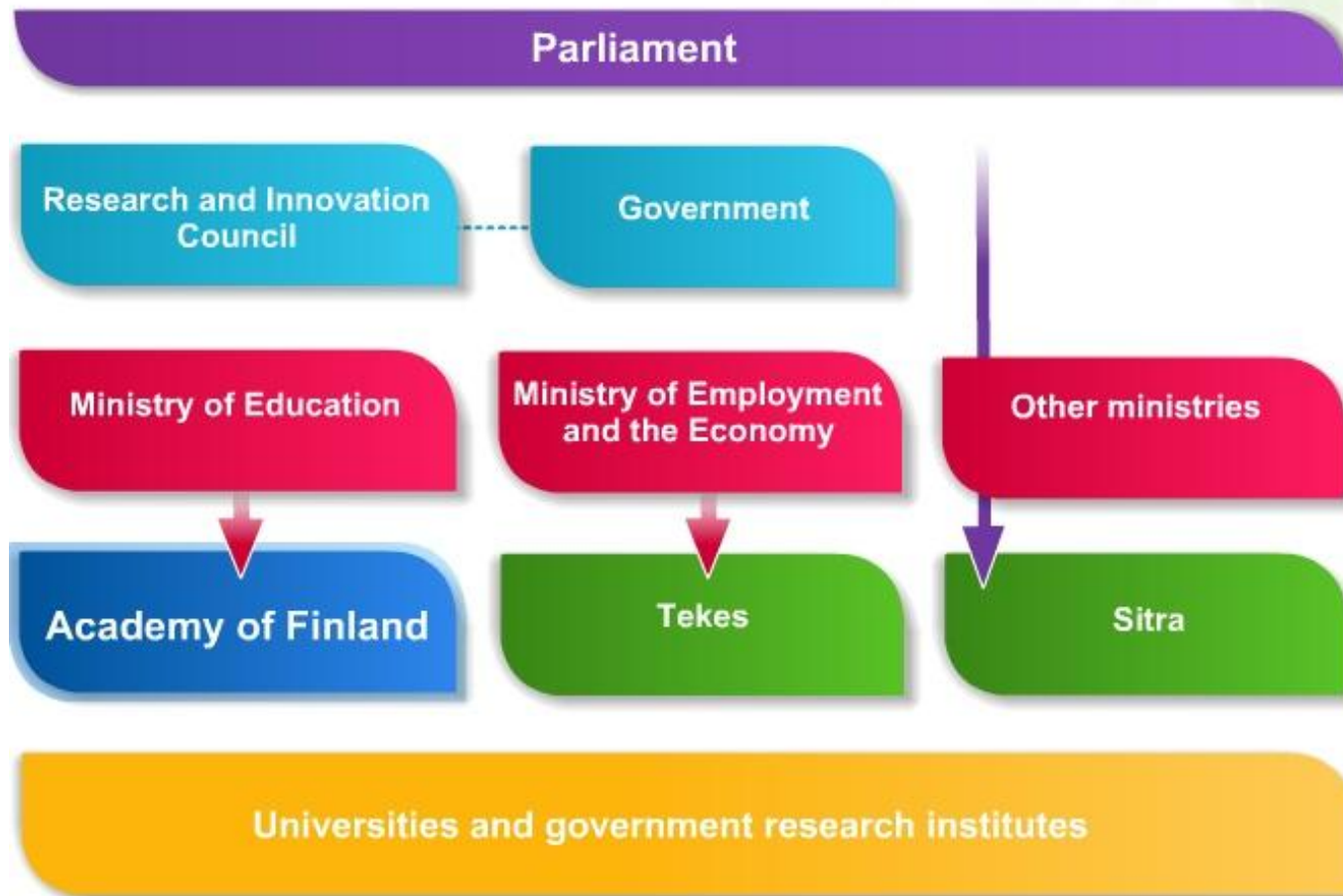
fax: (359 2) 975 36 19

<http://www.inrne.bas.bg>

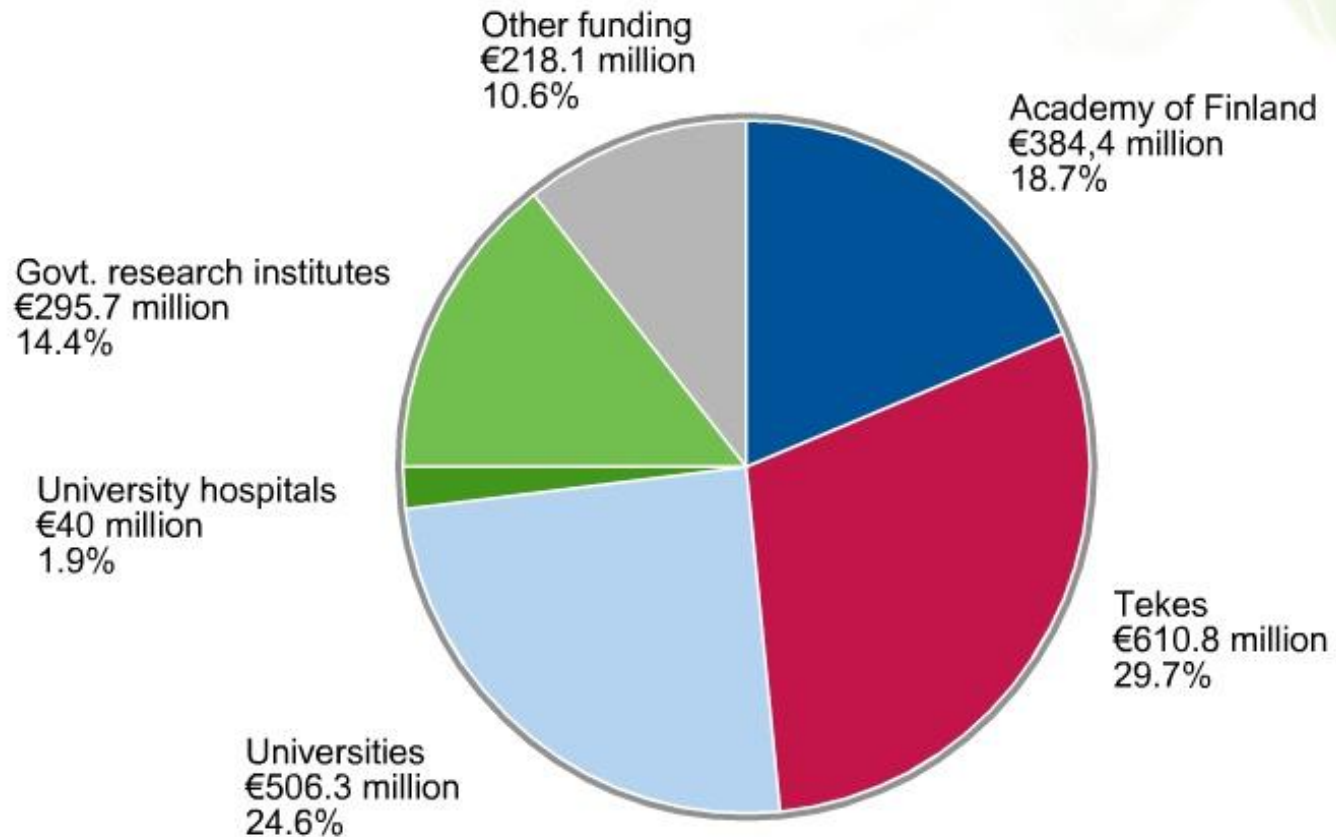
<http://www.beo.inrne.bas.bg>

<http://beo-db.inrne.bas.bg>

Public research funding in Finland

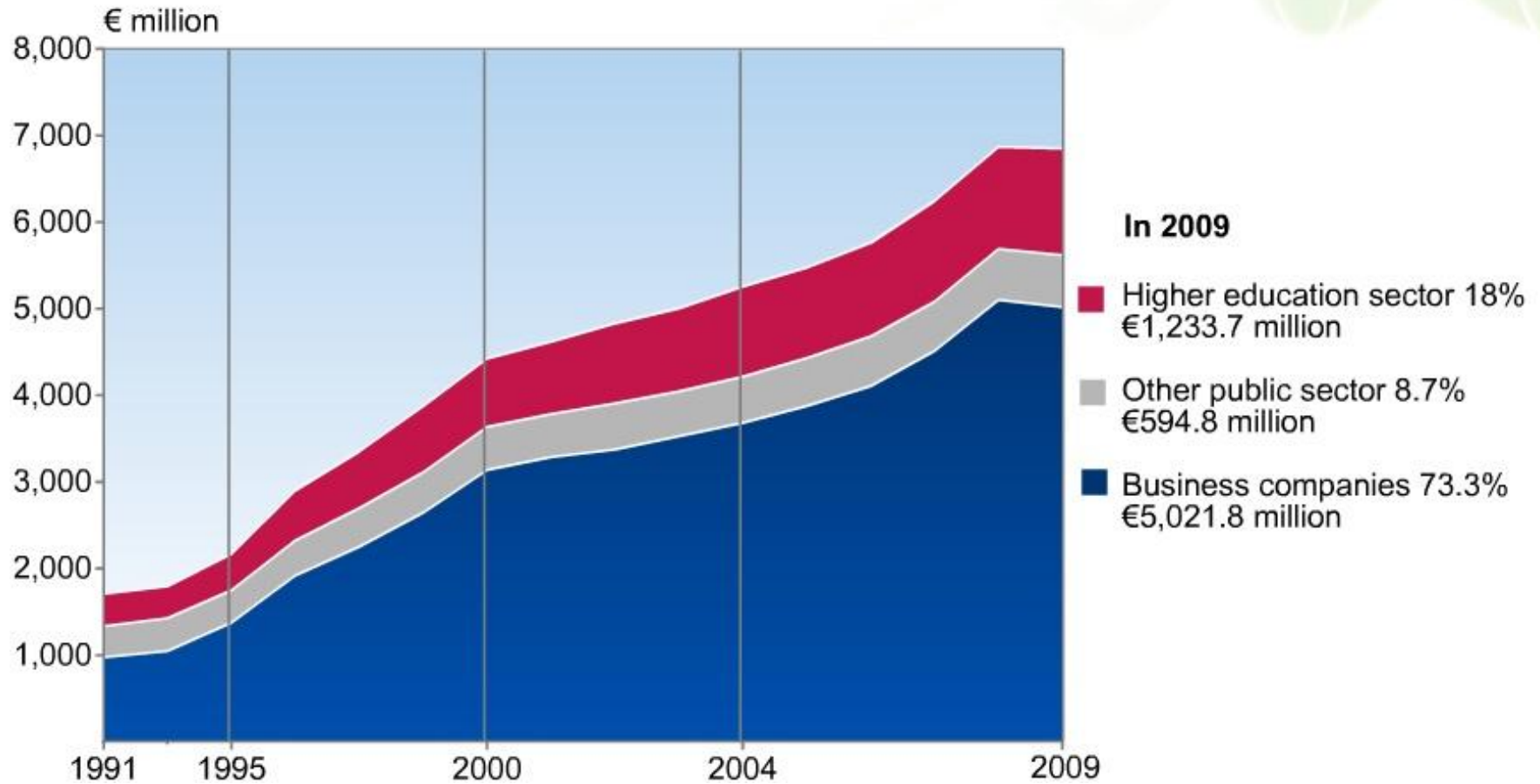


Government research expenditure 2010



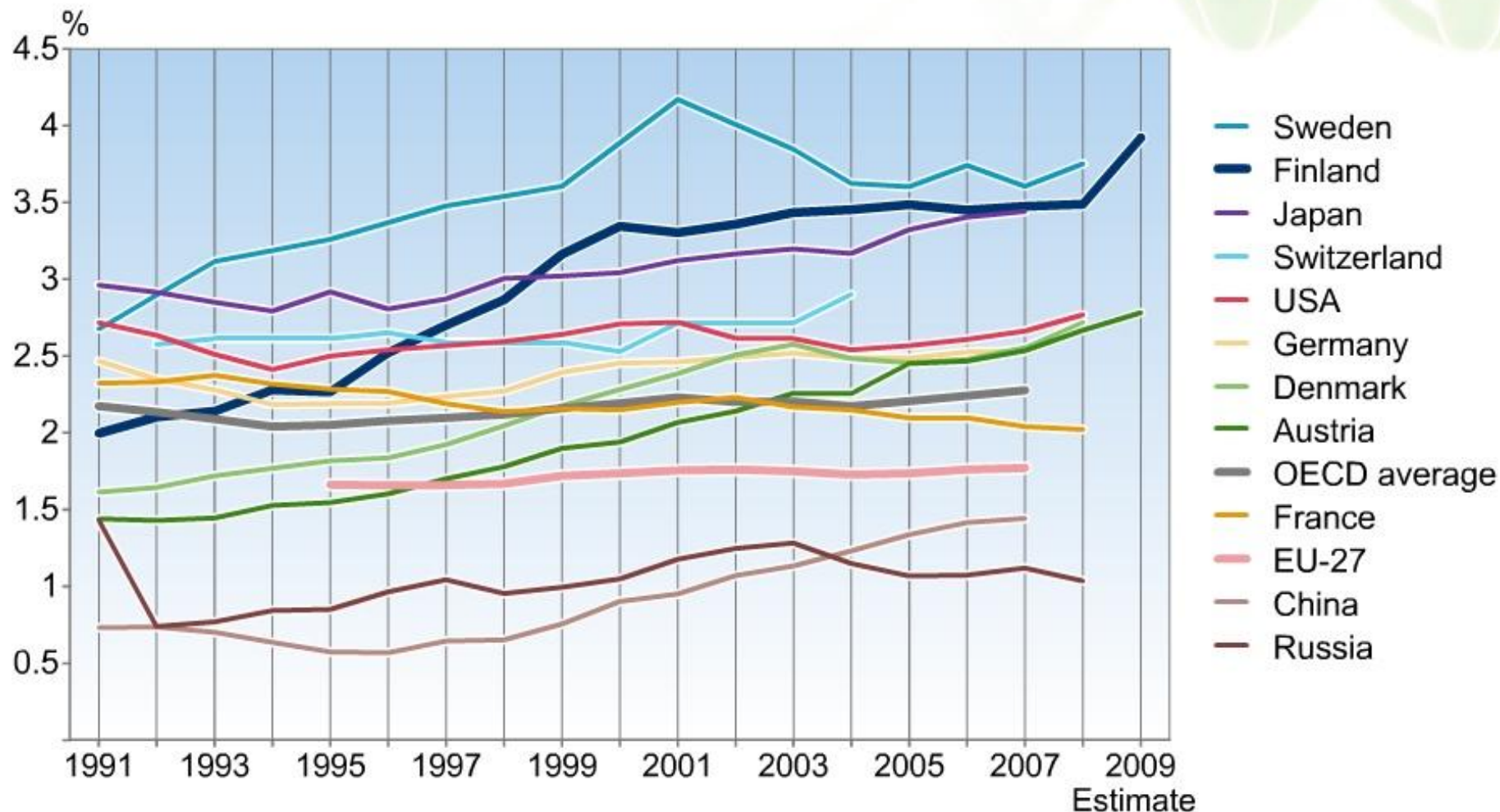
Total €2.05 billion

R&D expenditure in Finland 1991–2009, by sector

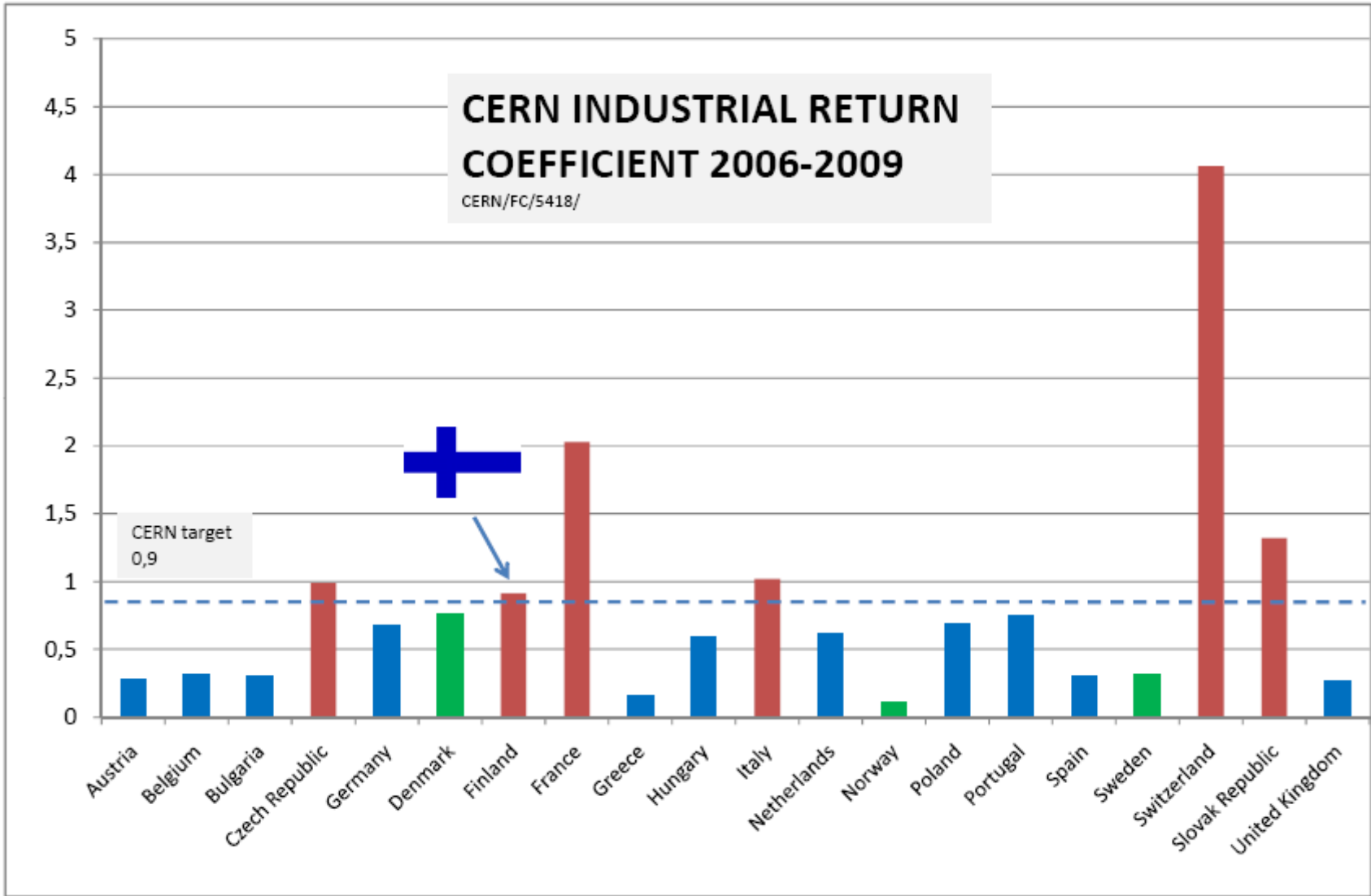


Total €6.9 billion

R&D investment in selected OECD countries, and in China and Russia (% of GDP)



Source: OECD, Main Science and Technology Indicators 2009
Statistics Finland, 2010



Finnish National CERN Strategy (2003)

- High profile international collaboration in forefront nuclear and particle physics
 - Applied research in accelerator, detector and computation technology
 - Research training in competitive international project teams
-
- Development of technology know-how of Finnish industry and business applications
 - Exploitation of CERN research results in science education and public awareness

HELSINKI INSTITUTE OF PHYSICS 1997 -



- **NATIONAL RESEARCH INSTITUTE OPERATED BY**
Helsinki (1997) & Aalto University (1997)
Jyväskylä Universities (2002)
Lappeenranta University of Technology (2007)
Tampere University of Technology (2008)
- **MANDATE**
basic & applied physics related to international accel. labs
technology development at accelerator labs
graduate training in physics & technology
- **HIP COORDINATES FINNISH ACTIVITIES AT
CERN, GSI/FAIR**

- **HIP MODE OF OPERATION:**

Project oriented; no permanent research staff

- **GENERAL "SOCIETAL" IMPACT:**

GRID computation technology applications

Detector R&D

Technology transfer & industrial collaboration
between CERN and Finland

OUTREACH:

17 3-day training sessions for Finnish high school students at
CERN & 2-3 training sessions for high school teachers annually

- **STAFF & BUDGET:**

~ 92 p*y/a & ~ 4.1 M€/a (2009)



Helsinki Institute of Physics 2010

Scientific Advisory Board

Philippe Bloch
Wilfried Buchmüller
Jos Engelen

Mats Larsson
Aarne Oja
Johanna Stachel

Board

Johanna Björkroth
Heikki Mannila
Kari J. Eskola
Jaakko Härkönen
Juhani Keinonen

Antti Kupiainen
Matti Manninen
Risto Nieminen
Ulla Ruotsalainen
Veli-Matti Virolainen

Steering Group

DOR, KE, HS, JT, JÄ, AH, MS, TS

Director

Dan-Olof Riska

Administrative Manager

Mikko Sainio

Theory

Kari Enqvist

String Theory

Esko Keski-Vakkuri

LHC

Phenomenology

Kimmo Tuominen

Cosmophysics

Kimmo Kainulainen

Low-dim. Quantum

Systems

Ari Harju

Rad. dam. acc.

mat.

Kai Nordlund

High Energy Physics

Heimo Saarikko

Linear Collider Research

Kenneth Österberg

LHC-Forward

Risto Orava

CMS

Paula
Eerola

CMS Experiment

Paula Eerola

CMS Upgrade

Jaakko Härkönen

Nuclear Matter

Juha Äystö

ALICE

Jan Rak

ISOLDE

Ari Jokinen

FAIR

Juha Äystö

Technology

Ari-Pekka Hameri

Data Grid

Miika Tuisku

Grid Cluster

Tomas Lindén

PLANCK

Hannu Kurki-
Suonio

CLOUD experiment

Markku Kulmala



CMS Collaboration



36 Nations, 160 Institutions, 2008 Scientists and Engineers (November 2003)

TRIGGER & DATA ACQUISITION

Austria, CERN, Finland, France, Greece, Hungary, Italy, Korea, Poland, Portugal, Switzerland, UK, USA

TRACKER

Austria, Belgium, CERN, Finland, France, New Zealand, Germany, Italy, Japan*, Switzerland, UK, USA

CRYSTAL ECAL

Belarus, CERN, China, Croatia, Cyprus, France, Ireland, Italy, Japan*, Portugal, Russia, Serbia, Switzerland, UK, USA

PRESHOWER

Armenia, Belarus, CERN, Greece, India, Russia, Taipei, Uzbekistan

RETURN YOKE

Barrel: Czech Rep., Estonia, Germany, Greece, Russia
Endcap: Japan*, USA, Brazil

SUPERCONDUCTING MAGNET

All countries in CMS contribute to Magnet financing in particular:
Finland, France, Italy, Japan*, Korea, Switzerland, USA

HCAL

Barrel: Bulgaria, India, Spain*, USA
Endcap: Belarus, Bulgaria, Russia, Ukraine
HO: India

FEET

Pakistan
China

FORWARD CALORIMETER

Hungary, Iran, Russia, Turkey, USA

MUON CHAMBERS

Barrel: Austria, Bulgaria, CERN, China, Germany, Hungary, Italy, Spain,
Endcap: Belarus, Bulgaria, China, Korea, Pakistan, Russia, USA

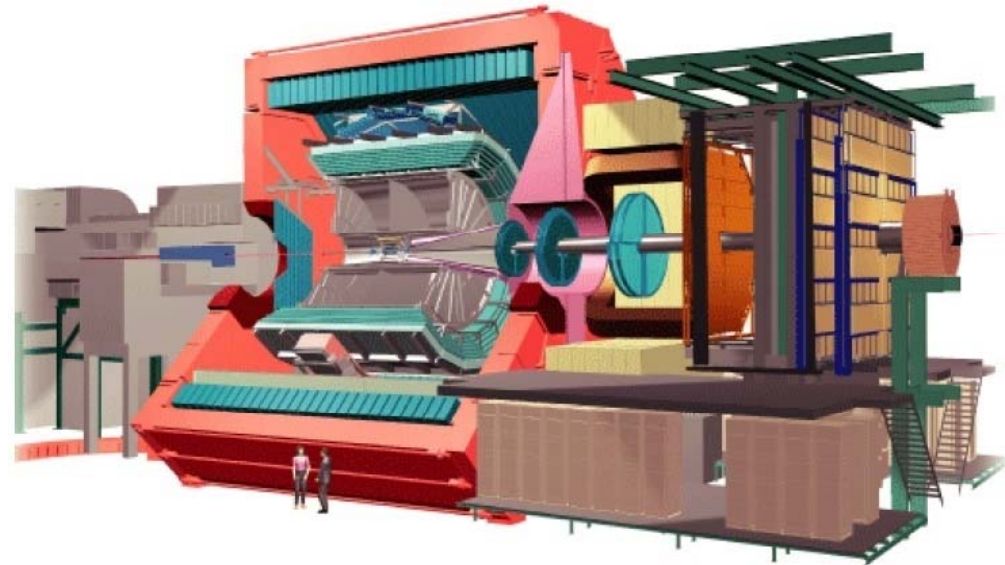
* Only through industrial contracts

Total weight : 12500 T
Overall diameter : 15.0 m
Overall length : 21.5 m
Magnetic field : 4 Tesla

tracker
trigger

TO
Silicon strip

ALICE Collaboration



P-ECFA, July 2010

- Reports from CERN, DESY, Frascati
- Midterm reports: Netherlands and Denmark
- Status of LC projects (ILC, CLIC, ECFA workshop)
- Status of Super-B factories

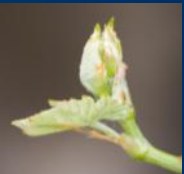
- Proposals:
 - European Detector R&D Committee
 - European Neutrino Review Panel

P-ECFA, Nov. 2010

- Reports from CERN, DESY, Frascati
- Midterm reports: France and Hungary
- Aproval of ECFA survey results
- Reports on τ/c factories
- New ECFA pannels (detector and neutrino)
- Changes in EPPOG
- Extensions of ECFA studies on LC and LeHC
- Update of European Strategy

**ECFA review panel:
for future large infrastructures
for neutrino oscillation
experiments**

- possible way for ECFA to help in the coordination of neutrino activities



Options for next generation facility:

■ Second generation (i.e. post T2K/NOvA) super-beam

■ CERN, FNAL, BNL, J-PARC II

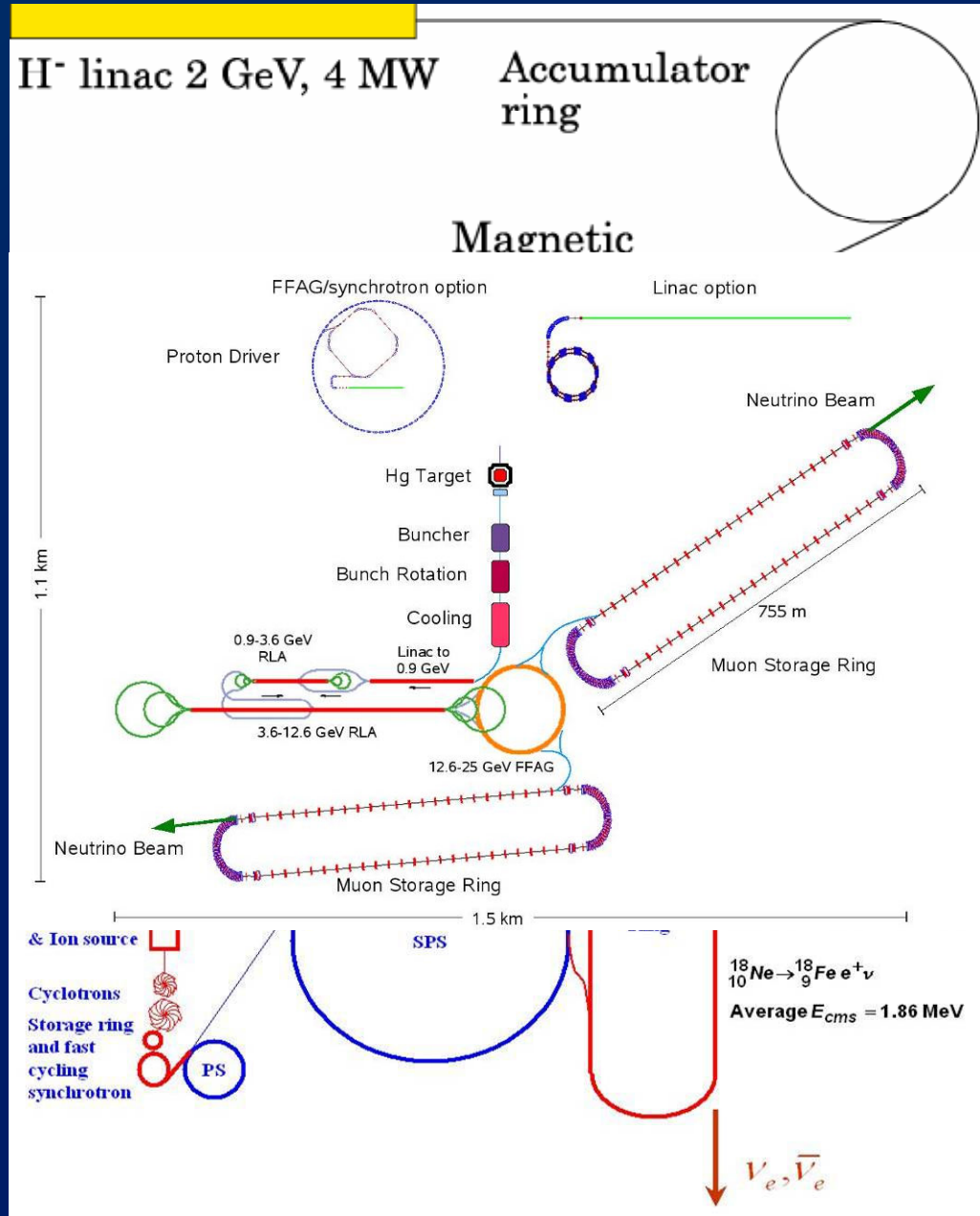
- Mton H₂O Cherenkov or LAr

■ Neutrino Factory

- Magnetised detector

■ Beta-beam

- Mton H₂O Cherenkov, liquid argon, T ASD



R&D activities generated:

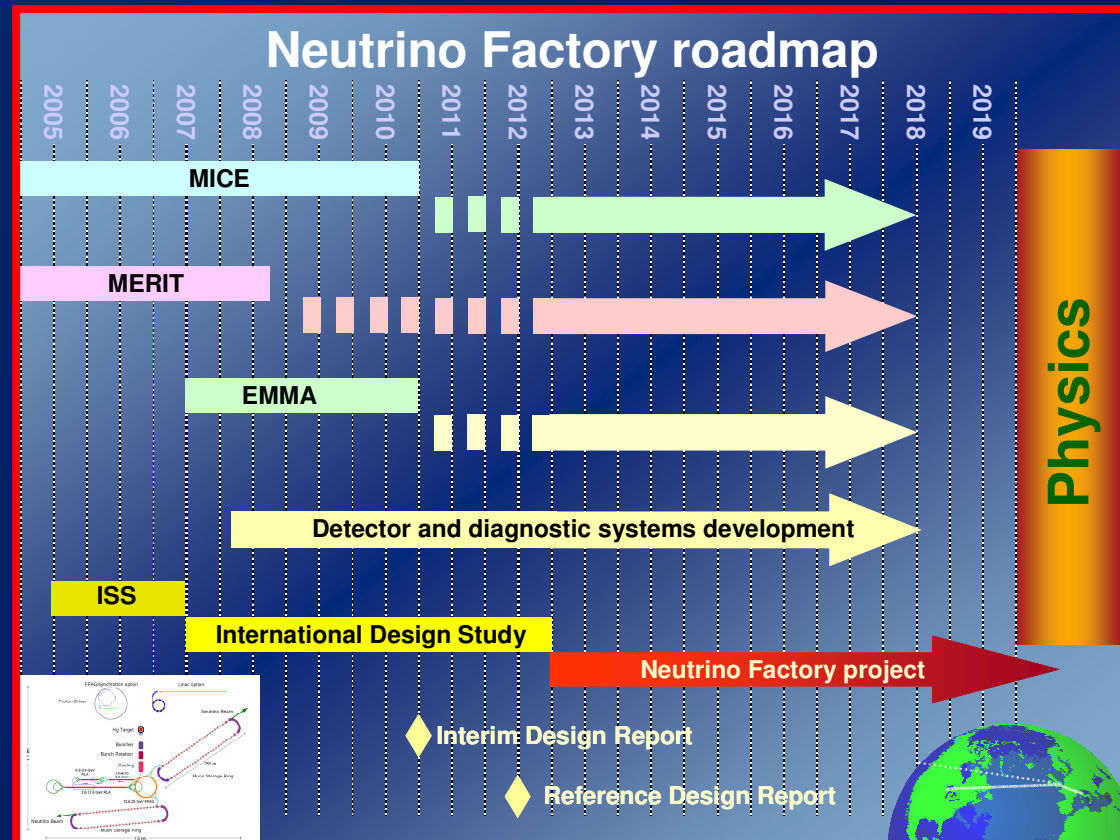
- **HARP**
 - Measure particle production spectra to allow target optimisation
 - Took data at CERN
- **MICE**
 - Engineering demonstration of ionisation cooling of muon beams
 - Under construction at RAL
 - Step I data taking underway!
- **MERIT**
 - Proof of principle of the mercury-jet target technique
 - Took data at CERN
- **EMMA**
 - Proof of principle of rapid acceleration of muons using non-scaling FFA
 - Under construction at DL

European Commission programmes:

- FP6:
 - BENE [Beams for European Neutrino Experiments]:
 - NA, part of CARE [Coordinated Accelerator R&D in Europe]
 - Beta-beam: conceptual design of 'CERN baseline scheme'
 - Part of EURISOL Design Study
- FP7:
 - EUROnu Design Study:
 - Super beam, Beta beam, and Neutrino Factory
 - Conceptual design, cost, performance, risk, and schedule
 - Covers *aspects* of super, beta beams and Neutrino Factory
 - >> **Resources limited!**
 - IDS-NF leverages additional effort into Neutrino Factory w/p
 - Not clear that production of CDR for all three facilities is feasible given available resources
 - Laguna Design Study
 - Underground laboratory, large H₂O, or Lar detector
 - APEC[ASPERA] – relationship with ECFA?
 - Neu2012 Networking Activity:
 - Part of EUCARD [European Coordinated Accelerator R&D]
 - Transnational Access to MICE:
 - Also part of EUCARD
 - LAGUNA Design Study
 - Water Cerenkov, Liquid Argon & Scintillator Detectors

For example: could ECFA:

- Recognise and endorse of Design Study initiatives:
 - EUROnu, IDS-NF, ...
- Help set and create conditions for timely completion of Design Study initiatives:
 - Request/receive and comment on design reports:
 - In case of IDS-NF:
 - IDR in 2010
 - RDR in 2012/13
 - Set intermediate milestones:
 - Annual follow-up workshops along the lines of the CERN workshop





Time line

- First discussion: RECFA meeting in Moscow, Oct 2009
- Idea of setting-up a review panel presented by Ken Long:
RECFA meeting in Brussels, Feb 2010, positive reaction
- Start contacting with neutrino communities for their reactions
- Start testing the reaction from the other regions
- If reactions are positive, presentation of a concrete plan:
RECFA meeting in Sofia, May 2010
- Ask for an endorsement to set-up a review panel by
Plenary ECFA in Frascati, July 2010
- If endorsed,
Nominate the panel members and chair for an
endorsement by Plenary ECFA at CERN in Nov 2010

Community consultation; steps taken:

- **EUROnu:**
 - **Concept explained to Management Board**
 - Welcomed proposed review panel
 - **Concept presented to delegates at EUROnu costing w/s, CERN, 15/16 March 2010:**
 - Positive reception
 - **Note:**
 - **Formally, EUROnu reports to the Strategy Session of CERN Council:**
 - So, if the review of the IDR and EUROnu interim reports is deemed to be a success and the process moves on to the review of the RDR and the EUROnu final reports, it will be important that the review is included as part of the Strategy Session of CERN Council reporting process
- **IDS-NF**
 - **Concept explained to Steering Group**
 - Proposed review panel was welcomed
 - Comment:
 - » Ensure review panel is manifestly international
 - **Concept presented to IDS-NF plenary meeting, FNAL 08—10 April 2010**
 - Positive reception
- **Neu2012 (NA in EUCARD IA)**
 - **Concept presented by T. Nakada to Neu2012 community**
 - Positive reception

Conclusion:

community welcomes proposed review panel.



Towards the terms of reference:

- Noting the timescale defined by the Strategy Session of CERN Council, the ECFA review panel will:
 - Receive IDS-NF IDR and EUROnu interim report, supported by appropriate presentations from the proponents
 - Review and comment on the IDS-NF IDR:
 - The robustness of the physics case;
 - The specification of the baseline for the Neutrino Factory;
 - The analysis of cost and schedule presented in the IDR; and
 - The plans of the IDS-NF collaboration for the RDR.
 - Review and comment on EUROnu interim report:
 - The strengths of the super-beam, beta-beam, and Neutrino Factory facilities
 - The development of baseline super-beam and beta-beam facilities;
 - The plans of the EUROnu collaboration for the completion of the study.
 - Report to ECFA:
 - Also to ICFA etc. if successful in forming such partnerships



Steps taken since June 2010:

- Nominations for panel members solicited from:
 - ECFA members;
 - Future accelerator-based neutrino community:
 - Specifically via EUROnu Management Board, Nue2012 Workpackage managers, and IDS-NF Steering Group
- Extended discussion of nominees at R-ECFA meeting in Helsinki (October 2010) at which it was agreed that:
 - The panel required expertise in neutrino experimentation, neutrino theory, and accelerator systems. Panel would be composed of three recognised experts in each of these categories, plus a chair person;
 - The panel would be independent, i.e.:
 - Those who would be authors of either the Interim Design Report (IDR) of the IDS-NF or the mid-term report of EUROnu would be deemed to ineligible to serve on the panel; and
 - Those who presently served the IDS-NF or EUROnu in an advisory capacity would be deemed ineligible to serve.

Proposed composition of the panel:

- Chair:
 - Prof. Francis Halzen (US, Wisconsin)
- Accelerator specialists:
 - Terence Garvey (CH, PSI)
 - David Findlay (UK, STFC/RAL)
 - Philippe Lebrun (CERN)
- Experimental physicists:
 - Koichiro Nishikawa (JP, KEK)
 - Patrick Decowski (NL, NIKHEF)
 - Ewa Rondio (PL, INS)
- Theoretical physicists:
 - Gianluigi Fogli (IT, INFN/Bari)
 - Pepe Bernabeu (ES, Valencia IFIC)
 - Jukka Maalampi (FI, Jyi)

ZATWIERDZONE

Detector R&D

- High Energy physics relies heavily on detector R&D developments.
- Every significant improvement on detection techniques opens a new area for fundamental physics.
- The R&D effort for new detectors is an important part of all the experimental laboratories and university teams activities.
- Considerable amount of manpower and financial resources are committed to this field across Europe and all around the world.

Evaluation today

- R&D programs related to approved and well established scientific projects and collaborations, e.g. LHC, are evaluated and followed up by well-known and existing committees, run naturally by the host laboratories.
- What about important large scale project in its preliminary and preparatory phase, not yet approved and not supported by a unique leading or host lab.
 - ILC R&D European effort evaluated today by the DESY PRC
- Having a truly European panel, reviewing and evaluating emerging 'orphans' R&D projects, is clearly desirable.

ECFA Detector R&D Panel

EDRDP

- Receive R&D proposals and make recommendations after evaluation.
- Evaluate and monitor the progress of R&D programs on request.
- Help to create a coherence of the global R&D effort by encouraging synergy between different activities and advising funding agencies.
- Overview the European effort for detector R&D

EDRDP tasks

- The panel has a reviewing and advisory role and does not initiate or assume any coordination of the R&D programs.
- Is primarily concerned with large R&D projects involving many laboratories and requiring significant resources.
- The panel reports to ECFA and the ECFA chairman informs of the R&D activities the European session of the CERN council.
- It primarily examines R&Ds related to accelerator experiments.. However it may expand its field of expertise to R&Ds on non accelerator particle physics detectors, if requested.
- After the presentation to ECFA, panel's reports become available to the public including funding agencies.
- It is proposed to form a single panel composed by world detector experts. The chairman as well as its members are to be nominated by RECFA. The panel should be hosted and operated by a European laboratory.

ECFA survey

ECFA/RC/10/388

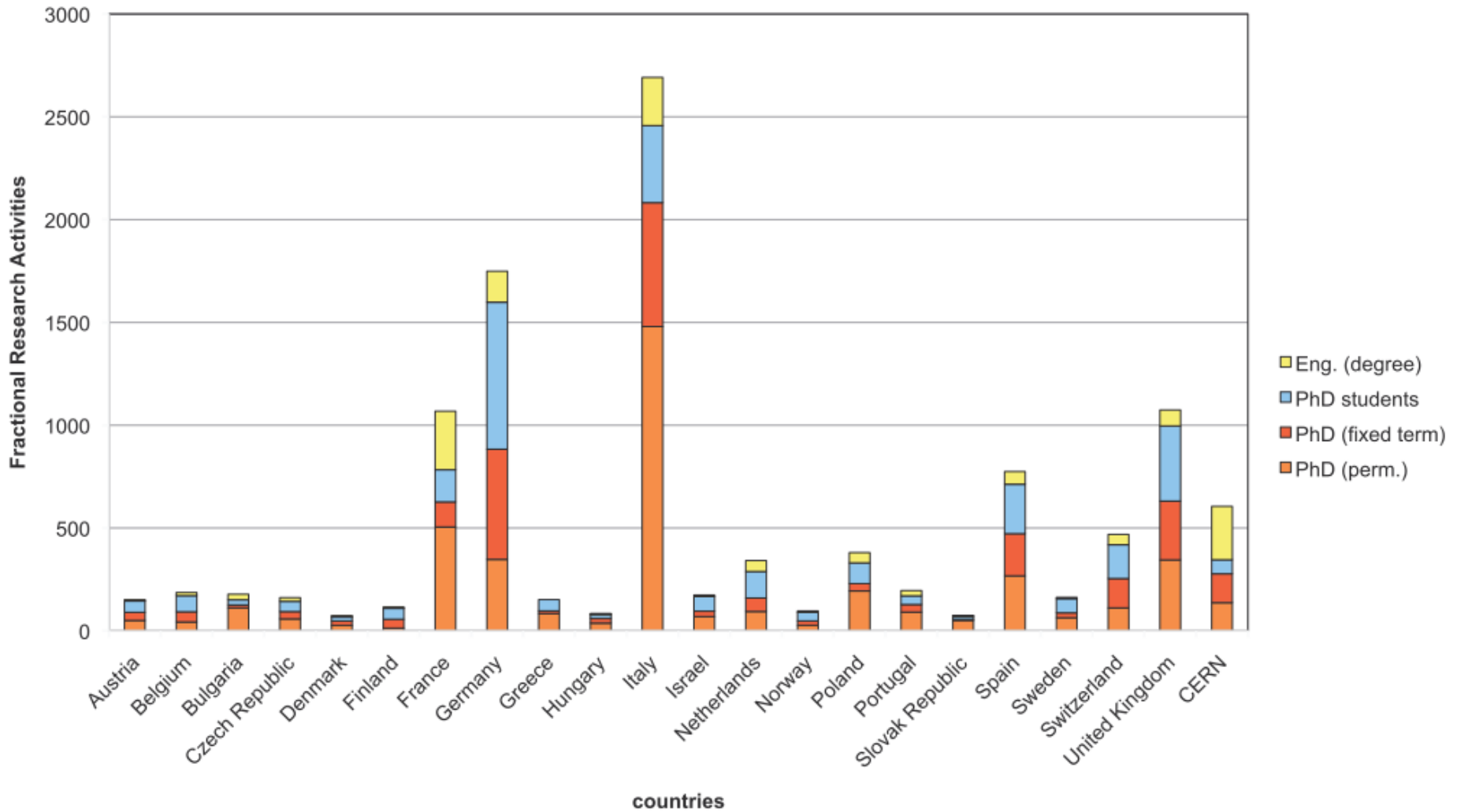
Background

- **A snapshot survey** was conducted in 2005 (ECFA-2006-324-REV2) in order to assist the European Strategy.
- It is time for an ***update*** to assist the scheduled update of the European Strategy.
- Both the old and new surveys have point-to-point uncertainties of order 10%.
- The new survey is furthermore different in design.

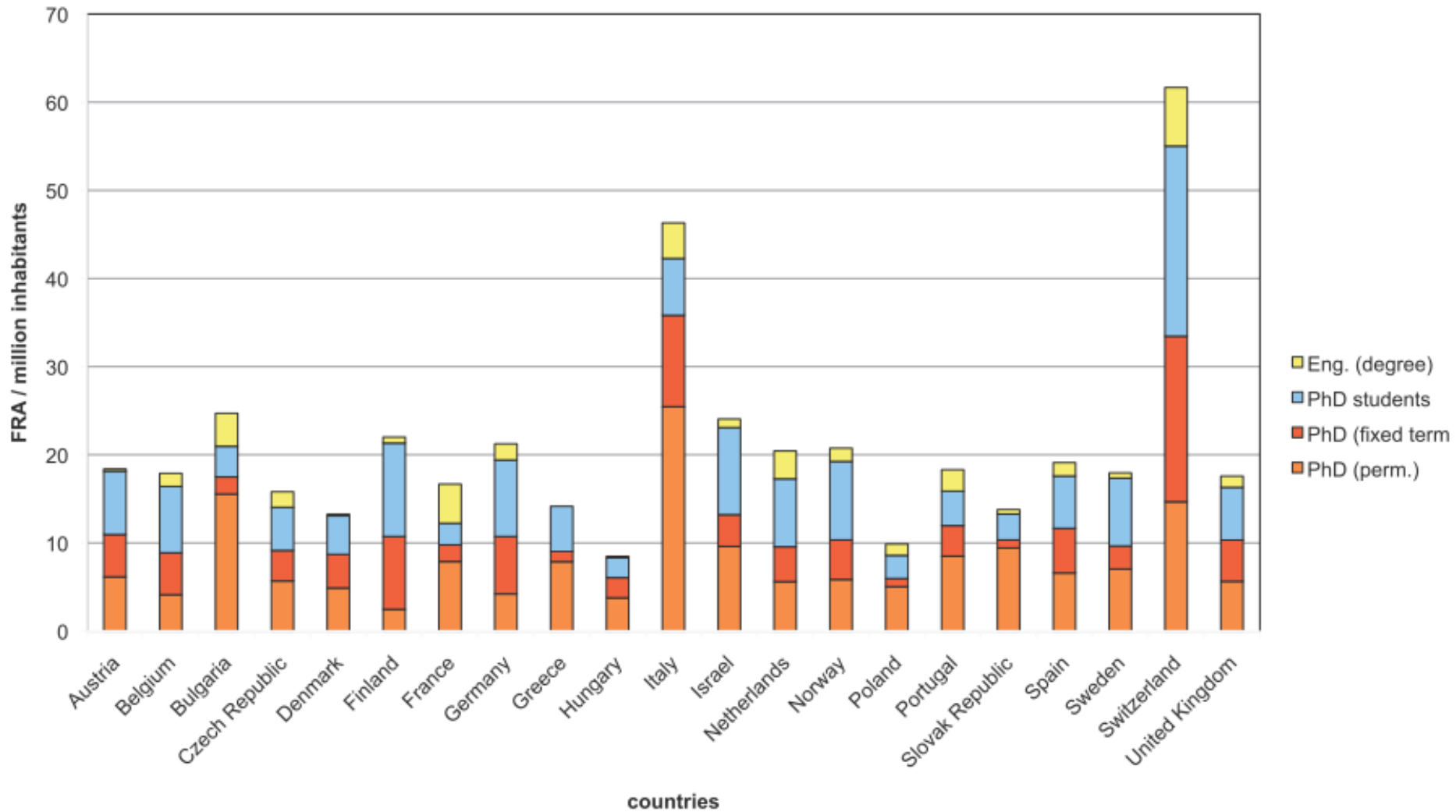
Definitions:

- Survey counts persons:
 - Fractional research activities (FRAs):
 - Person who spends at least 20% of his/her time on PP research was counted with a weight of 1
 - The split of a persons time between two or more projects is counted as fractions which add up to 100%, i.e.:
 - Individual with 50% of his/her working time to spend on research and who splits this research time 75% on ATLAS and 25% on DØ would 'score':
 - » 1 FRA; 0.75 attributed to ATLAS, 0.25 attributed to DØ

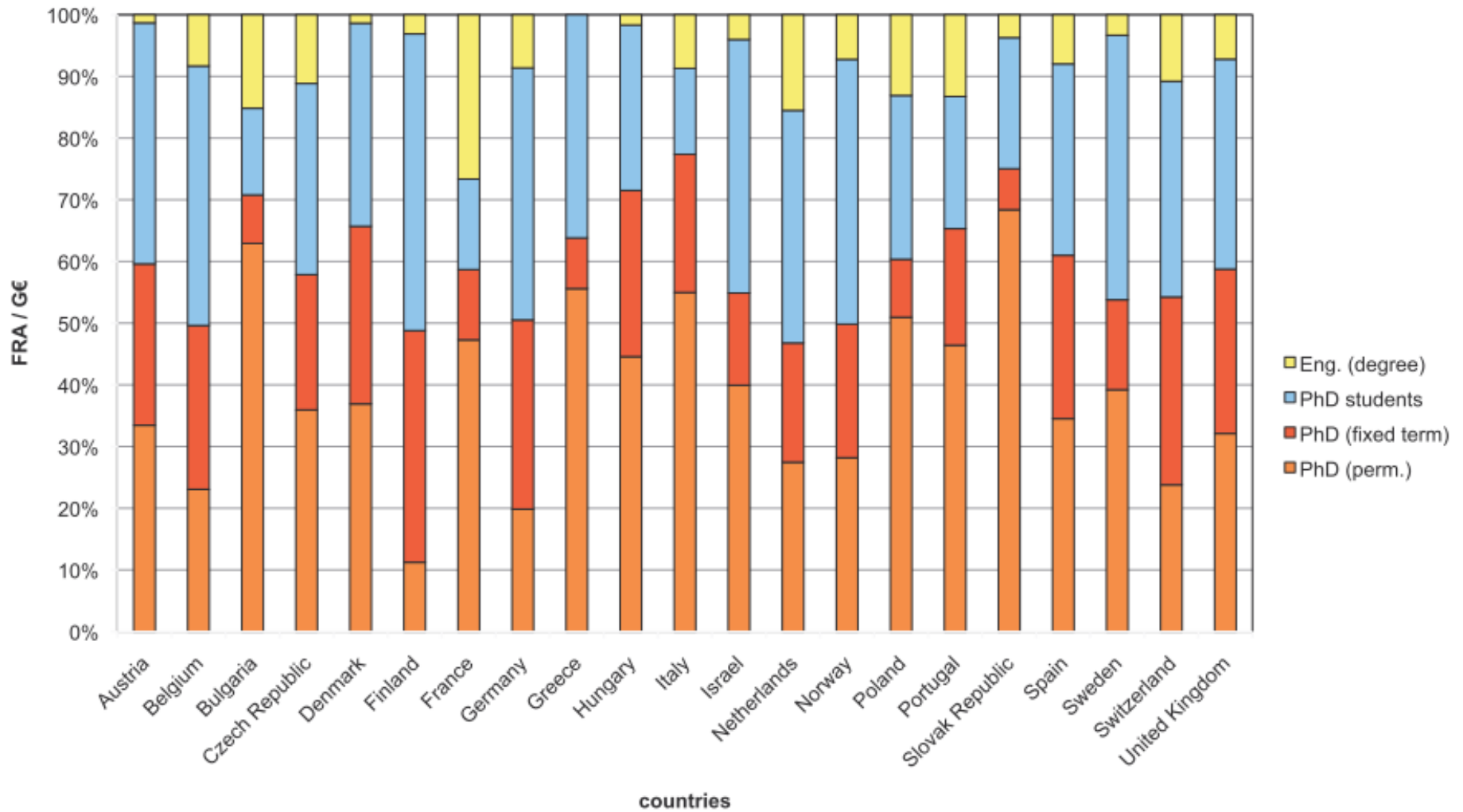
researchers in particle physics



researchers normalized with the population of the countries

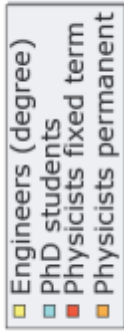


researcher categories in the countries



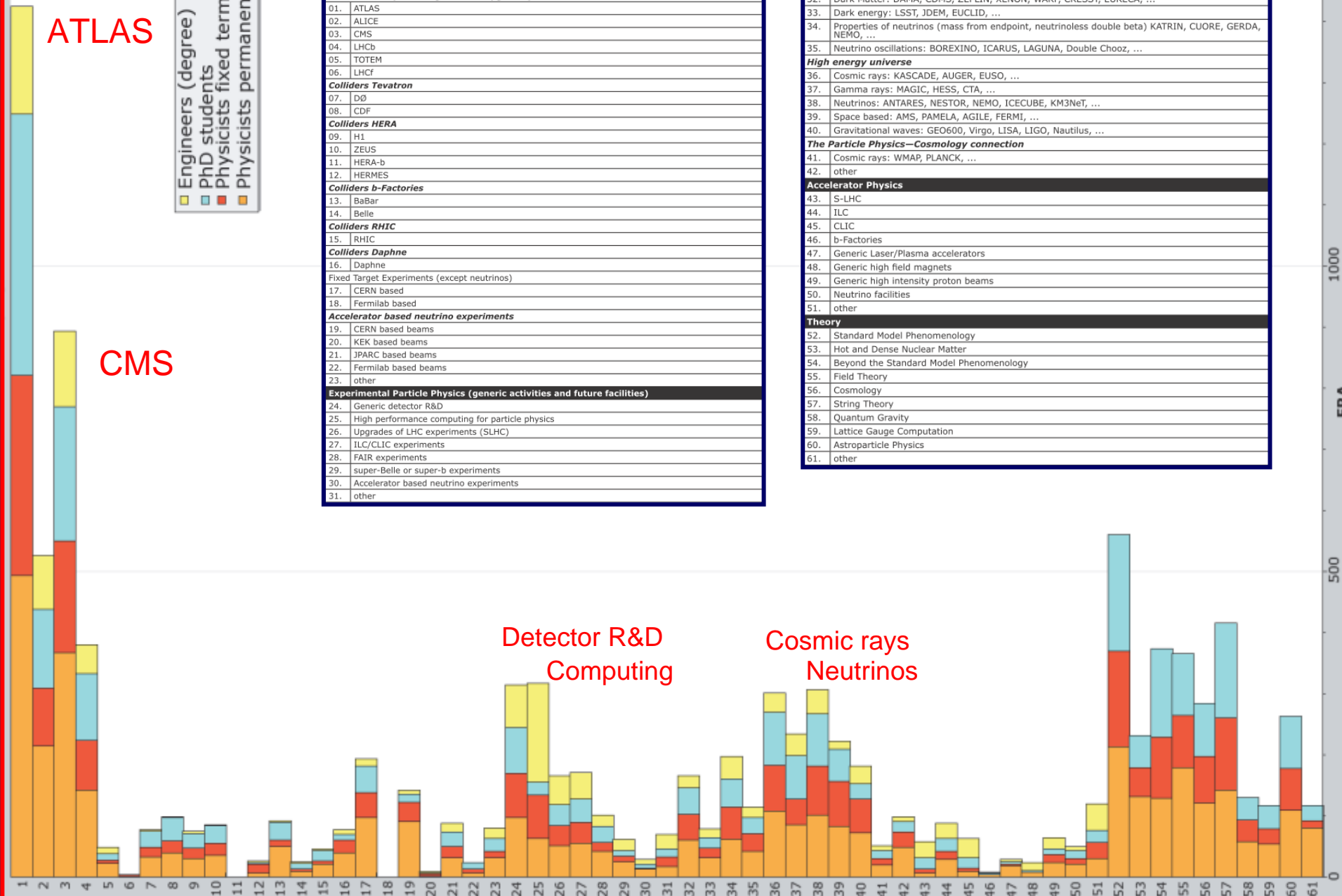
ATLAS

CMS



#	Project
Accelerator-based Experimental Particle Physics (running or analysis phase)	
Colliders LHC (excluding detector upgrades)	
01.	ATLAS
02.	ALICE
03.	CMS
04.	LHCb
05.	TOTEM
06.	LHCf
Colliders Tevatron	
07.	D0
08.	CDF
Colliders HERA	
09.	H1
10.	ZEUS
11.	HERA-b
12.	HERMES
Colliders b-Factories	
13.	BaBar
14.	Belle
Colliders RHIC	
15.	RHIC
Colliders Daphne	
16.	Daphne
Fixed Target Experiments (except neutrinos)	
17.	CERN based
18.	Fermilab based
Accelerator based neutrino experiments	
19.	CERN based beams
20.	KEK based beams
21.	JPARC based beams
22.	Fermilab based beams
23.	other
Experimental Particle Physics (generic activities and future facilities)	
24.	Generic detector R&D
25.	High performance computing for particle physics
26.	Upgrades of LHC experiments (SLHC)
27.	ILC/CLIC experiments
28.	FAIR experiments
29.	super-Belle or super-b experiments
30.	Accelerator based neutrino experiments
31.	other

#	Project
Astroparticle Physics	
32.	Dark Matter: DAMA, CDMS, ZEPLIN, XENON, WARP, CRESST, EURECA, ...
33.	Dark energy: LSST, JDEM, EUCLID, ...
34.	Properties of neutrinos (mass from endpoint, neutrinoless double beta) KATRIN, CUORE, GERDA, NEMO, ...
35.	Neutrino oscillations: BOREXINO, ICARUS, LAGUNA, Double Chooz, ...
High energy universe	
36.	Cosmic rays: KASCADE, AUGER, EUSO, ...
37.	Gamma rays: MAGIC, HESS, CTA, ...
38.	Neutrinos: ANTARES, NESTOR, NEMO, ICECUBE, KM3NeT, ...
39.	Space based: AMS, PAMELA, AGILE, FERMI, ...
40.	Gravitational waves: GEO600, Virgo, LISA, LIGO, Nautilus, ...
The Particle Physics—Cosmology connection	
41.	Cosmic rays: WMAP, PLANCK, ...
42.	other
Accelerator Physics	
43.	S-LHC
44.	ILC
45.	CLIC
46.	b-Factories
47.	Generic Laser/Plasma accelerators
48.	Generic high field magnets
49.	Generic high intensity proton beams
50.	Neutrino facilities
51.	other
Theory	
52.	Standard Model Phenomenology
53.	Hot and Dense Nuclear Matter
54.	Beyond the Standard Model Phenomenology
55.	Field Theory
56.	Cosmology
57.	String Theory
58.	Quantum Gravity
59.	Lattice Gauge Computation
60.	Astroparticle Physics
61.	other



Detector R&D
Computing

Cosmic rays
Neutrinos

ECFA conclusions (I)

- ECFA Review Panel for future large infrastructures for neutrino oscillation experiments
 - mandate and term of reference agreed
 - chair and members ratified
- ECFA Review Panel for Detector R&D
 - mandate and term of reference agreed
 - start to search chair and members
- Change of EPPOG to IPPOG
 - ECFA endorses the general idea of the transformation and encourages the globalisation effort. Concrete organisational issues and exact mode of operation need still clarification, by the next PECFA.

ECFA conclusions (II)

- ECFA Study of Physics and Detector for a Linear Collider
 - Study period extended till the end of 2013
 - Juan Fuster appointed as Chair
- ECFA Study of LHeC
 - ECFA will set-up a review panel for CDR and report to PECFA
 - ECFA extend the Study till the end of 2012 in order to ensure the TDR review, proper input to the European Strategy Update and to plan the future direction including a list of R&D activities with a clear priority.
- Tau-charm factory initiatives
 - Homework for us.

The European Strategy – 2005-2010



- **2006:** The CERN Council, in a special meeting held the 14th of July in Lisbon, agreed on the European strategy for particle physics.
- **2008:** Council appointed a Strategy Secretariat with four members to prepare the European Sessions of Council and follow up the Strategy in a continuous manner – since then (Sept 2008) there has been regular European Strategy Sessions of Council prepared by the Strategy Secretariat
- **Strategy Secretariat:**
 - Four regular members: the **Scientific Secretary**, elected by the Council at the European Strategy Session to lead the secretariat, the **SPC Chair**, the **ECFA Chair**, the **representative of the European Laboratory Directors' meeting** elected by the latter to attend the European Strategy Sessions.
 - In addition, the **CERN Director-General** is closely associated with the Strategy Secretariat's work.
- **The Strategy Sessions of Council agendas** are at:
 - <http://indico.cern.ch/categoryDisplay.py?categId=1697> (papers normally available (open) after the meeting)
 - Typical “standing/standard” items:
 - Presidents report, Scientific Secretaries Report, Possibility for members states to bring up issues.
 - FALC and ICFA reports if applicable.
 - ECFA report every September (note that ECFA also reports in Open Council in December).
 - Reports of the CERN communication and the CERN Technology Transfer Networks – yearly.
 - News from and relations with the ESFRI process (when appropriate)
 - **Special presence:** European Commission (from September 2009), ApPEC* representatives (from September 2008), three observes: Israel, Russia and Turkey.

The European strategy for particle physics

Particle physics stands on the threshold of a new and exciting era of discovery. The next generation of experiments will explore new domains and probe the deep structure of space-time. They will measure the properties of the elementary constituents of matter and their interactions with unprecedented accuracy, and they will uncover new phenomena such as the Higgs boson or new forms of matter. Long-standing puzzles such as the origin of mass, the matter-antimatter asymmetry of the Universe and the mysterious dark matter and energy that permeate the cosmos will soon benefit from the insights that new measurements will bring. Together, the results will have a profound impact on the way we see our Universe; *European particle physics should thoroughly exploit its current exciting and diverse research programme. It should position itself to stand ready to address the challenges that will emerge from exploration of the new frontier, and it should participate fully in an increasingly global adventure.*

General issues

1. European particle physics is founded on strong national institutes, universities and laboratories and the CERN Organization; *Europe should maintain and strengthen its central position in particle physics.*
2. Increased globalization, concentration and scale of particle physics make a well coordinated strategy in Europe paramount; *this strategy will be defined and updated by CERN Council as outlined below.*

Scientific activities

3. The LHC will be the energy frontier machine for the foreseeable future, maintaining European leadership in the field; *the highest priority is to fully exploit the physics potential of the LHC, resources for completion of the initial programme have to be secured such that machine and experiments can operate optimally at their design performance.* A subsequent major luminosity upgrade (SLHC), motivated by physics results and operation experience, will be enabled by focussed R&D; *to this end, R&D for machine and detectors has to be vigorously pursued now and centrally organized towards a luminosity upgrade by around 2015.*
4. In order to be in the position to push the energy and luminosity frontier even further it is vital to strengthen the advanced accelerator R&D programme; *a coordinated programme should be intensified, to develop the CLIC technology and high performance magnets for future accelerators, and to play a significant role in the study and development of a high-intensity neutrino facility.*
5. It is fundamental to complement the results of the LHC with measurements at a linear collider. In the energy range of 0.5 to 1 TeV, the ILC, based on superconducting technology, will provide a unique scientific opportunity at the precision frontier; *there should be a strong well-coordinated European activity, including CERN, through the Global Design Effort, for its design and technical preparation towards the construction decision, to be ready for a new assessment by Council around 2010.*
6. Studies of the scientific case for future neutrino facilities and the R&D into associated technologies are required to be in a position to define the optimal neutrino programme based on the information available in around 2012; *Council will play an active role in promoting a coordinated European participation in a global neutrino programme.*
7. A range of very important non-accelerator experiments take place at the overlap between particle and astroparticle physics exploring otherwise inaccessible phenomena; *Council will seek to work with ApPEC to develop a coordinated strategy in these areas of mutual interest.*



The European Strategy Update

- The update should not happen more often than every 5 years. Usually 2011 was assumed, but it is too early to have LHC results (and in as planned today in the middle of the long 2010-11 run)
- Given the status and plans for LHC data-taking in 2010-2011, followed by a long shut-down in 2012 and preparation work in several major areas (e.g. sLHC, Linear Colliders, Neutrinos, Astroparticle Physics, Accelerator and Detector R&D), the Strategy Secretariat believes that the next Strategy Update **should be concluded by the middle of 2012**.
- If the provisional timescale for the conclusion of the Strategy Update by the middle of 2012 is confirmed the Strategy Secretariat would prepare the **proposed remit and composition** of the European Strategy Group, together with those of the Preparatory Group, for approval by the European Strategy Session of Council in **March 2011**.
- The exact timescale will need to be confirmed in the second half of 2010 in the light of the progress of the LHC and any other relevant new information at that time.
- The composition of the extended Strategy Group including Preparation Group that need to be set up to prepare the Strategy Update is described in the Council documents from 2007-2008 (Secretariat, members from SPC, ECFA, Director's Meeting and Member State Representation).
- In addition to these actors, the remits and detailed compositions of the forthcoming Strategy Group and Preparatory Group, will also need to **accommodate the involvement of the European Commission, ApPEC, NuPECC, FALC, ESFRI, Observers, Associate Members and non-Member States**



Scientific Issues

- **LHC, Accelerator R&D and Linear Collider.**
- The LHC machine is now operating at 3.5+3.5 TeV and increasing luminosity, and clear plans are made for future operation, including a High Luminosity period 2020-30.
- Detector R&D is urgent as the detector changes, in 2020 in particular, are significant.
- The FP7 SLHC-PP project supports the first upgrade phase, a Design Study is being prepared for the High Luminosity changes.

- The FP7 EUCARD and TIARA projects are key activities in the accelerator R&D area, and for next year a new Integrating Activity project after EUCARD will need to be submitted, and TIARA will start up. We aim to discuss joint programming with the EC in the area of accelerator R&D, as outlined in the TIARA proposal, relevant for next framework programme.

- The [CLIC/CTF3](#) collaboration aims for a Conceptual Design Report (CDR) in 2011 and [Common activities](#) have been taken up with ILC. The [ILC](#) TDR is being prepared for 2012.
- The Council Paper on [Global Projects](#) addresses European Participation in global projects.
- The [ILC-HiGrade Preparatory Phase](#) project is addressing the industrialization of high-gradient RF-cavities, and worked to develop a Governance Model for a future linear collider.
- The [AIDA](#) FP7 Integrating Activity project focusing on R&D infrastructures is close to start-up.

- Reduction in CLIC resources in the 2010 CERN MTP makes it mandatory to increase the collaborative effort for the next phase of the project.
- It is important to develop further, as part of the Strategy update, the possibility of a linear collider at and hosted by CERN.



Scientific Activities

■ **Neutrino, Astroparticle and Flavour physics.**

- The [EUROν FP7 project](#), which is a Design Study for a High Intensity Neutrino Oscillation Facility in Europe, studies options a future neutrino facility and is hence central for future planning.
- The International Design Study (IDS-NF) for a Neutrino Factory, including studies at test facilities such as MICE in the UK, has a very significant European participation.
- The [ECFA-CERN Neutrino Strategy Workshop](#) at CERN in October 2009, and the report of the [SPC Neutrino panel](#) were other important events of the last year.
- A new important element is the initiative to establish an [ECFA committee to receive and review the intermediate design reports](#) for possible future neutrino facilities as developed in the EUROν and IDS-NF frameworks.

- As reported in the Frascati meeting a workplan has been prepared with ApPEC. The main elements of this workplan were presented to Council and the ApPEC SC in June and the document has now been sent to both.
- Council has some comments to the document (clarification asked concerning one point), and ApPEC might also have comments, but hopefully the document can be agreed on both sides in future meetings. The main areas of contact remain and the combined work is quite well defined ...

- Two flavour factories aiming for very high luminosities are currently being planned, SuperB in Italy and SuperKEKB in Japan. The [SuperB project](#) was presented to the Council in Sept. 2009 and the Council will follow its development in the TDR phase. The [SuperKEKB project](#) in Japan has received important initial funding and European physicists have central responsibilities in the detector upgrade.
- It is important to follow the flavour factories in the next period, and also to make sure precision experiments are properly considered in the Strategy update.



Scientific Activities

- **Nuclear physics/Fixed target and Theory.**
- NuPECC is in the process of developing a [Long Range Plan \(LRP2010\)](#) for the area of European Nuclear physics. The plan will be presented and discussed at the ECFA meeting at CERN at the end of November.
- [The Diversity Workshop at CERN in May 2009](#) was the forum for many presentations and ideas about future projects at CERN, including also neutrino projects (3.4) and precision experiments (3.6).
- This is an area where more work is needed, and it will be important to follow up this after the ECFA presentation in November.
- While the Theory Strategy point itself is very general, the Strategy discussion document mentions several specific areas, i.e. promoting interactions between theory and experiments, the importance of CERN's visitor programme, support of lattice field theory and role/use of EU networks. It is possible to identify positive developments in these areas during the period covered by the present Strategy. However, no systematic assessment has been made.



FP7 projects in 2009-10

- Two key projects submitted in December 2009
 - AIDA (Integrating Activity addressing the topic: Infrastructures for Detector R&D)
 - 4 years, EU support requested 10 MEURO, **8 MEURO granted.**
 - TIARA (Invited preparatory phase project from the European Strategy: Infrastructures for Accelerator R&D)
 - 3 years, EU support requested 6 MEURO, **3.9 MEURO granted.**
- New calls expected in July 2010 – with submission end Nov 2010
 - Most relevant for us: Design Studies (bottom up, not targeted) and Integrating Activities:
 - Topical but less suited for us than last time, however contains an interesting opening for high energy cosmic rays, multi-messenger project for astroparticle physics.
 - New type of projects: “Implementation of common solutions for a cluster of ESFRI infrastructures in the field of "Physics and Analytical Facilities". Synergies in the development of key critical components common to the ESFRI Infrastructures in the field of Physics and Analytical Facilities such as, for example, accelerator elements, targets, detectors, or radiation protection and safety components, that are needed for their implementation.





ESFRI text draft

- The ESFRI report will be updated during 2010/early 2011 and we have been asked to start preparing our input – assuming a format similar to our 2008 input
- A proposal was tabled in the SPC and Council in June and September
- Changes in text since 2008:
 - Mentions “our” Preparatory Phase Projects started since 2006 (SLHC-PP, ILC-HiGrade and TIARA)
 - Mentions R&D for HE-LHC
 - Mentions Global Projects (possibly at CERN) beyond LHC
 - Several smaller updates ...
- A general wish to make European Strategy Preparatory Phase projects (current ones and future ones) more visible – at a level similar to the ESFRI projects
- This will be one of the main points to discuss with ESFRI during the Strategy update ... can only be considered with common efforts from ESFRI, EC and the Council

European Strategy Forum
on Research Infrastructures

ESFRI

EUROPEAN ROADMAP
FOR RESEARCH
INFRASTRUCTURES

Roadmap 2008

UPDATE 2008

> Structure of the report

>ESFRI and its mission	3
>Foreword.....	5
>Structure of the report.....	7
>Achievements of ESFRI.....	9
>The Updated Roadmap – what is new?	11
>The Roadmap: the landscape and its Projects	14
>Social sciences and Humanities	17
>Environmental Sciences	25
>Energy	39
>Biological and Medical Sciences.....	47
>Materials and Analytical Facilities.....	61
>Physical Sciences and Engineering	71
>e-Infrastructures	85
>What next?	88
>Glossary.....	89
>Roadmap Working Group Members, Experts, Drafting Group and Review Group Members	92
>ESFRI National Delegates.....	94
>References	98
>Notes.....	99



CERN-EC Memorandum of Understanding (MoU)

- Signed in July 2009
- Very important recognitions of the role of CERN Council as responsible for definition and follow up of the European Strategy for Particle Physics
- The European Commission is represented in the European Strategy Sessions of Council – from September 2009
- A number of important point to point contacts between the Particle Physics area and EC, annual meetings to monitor progress
 - First annual meeting in Brussels early September
- Future development of the MoU (an “action plan for 2010-11”) approved in Council meeting in March:
<http://indico.cern.ch/materialDisplay.py?contribId=31&materialId=0&confId=85784>
 - Covers a number of common activities 2010-11 ranging from research infrastructures, e-infrastructures and international co-operation to technology transfer, open access, careers and mobility, science communication, etc





The CERN - ApPEC connection

- The European Strategy for Particle Physics point 7 (from 2006):
 - “A range of very important non-accelerator experiments take place at the overlap between particle and astroparticle physics exploring otherwise inaccessible phenomena; Council will seek to work with ApPEC to develop a coordinated strategy in these areas of mutual interest” <http://council.web.cern.ch/council/en/EuropeanStrategy/ESStatement.pdf>

- Discussions in Council in 2009 and in the March Session:
 - The work with and with participation of ApPEC representatives in the Council and Strategy Secretariat has lasted more than a year and is successful
 - ECFA chair Prof. Nakada and the Scientific Secretary have been invited to the ApPEC meetings since the middle of 2009, CERN is observer in ApPEC (represented by Research Director Sergio Bertolucci)
 - The leader of the ApPEC SAC Christian Spiering works with the Strategy Secretariat as needed to prepare issues with relevance for ApPEC for European Strategy Sessions of Council

- The next step discussed in Council is to consider in more detail how projects and issues of common interest are addressed in practice, and what these issues are – covering the period until the next Strategy Update (2012)



Timeline for Strategy Update

- Start in March 2011 Council week, remit, composition of Strategy Group and Prep. Group, procedures/steps and timescales
 - Preparation group has 4 members nominated by RECFA in addition to the Chair
- June 2011 Council: A (fairly) complete name list for the Strategy Group
- July 2011 EPS: “Kick off” meeting, review status, raise (some) main questions (half a day), discussion
- From July 2011: Be prepared for and encourage/collect input from community, international interactions and consultancy – for Briefing Books or equivalent
- Sept 2011 Council: Final implementation plans discussed
- October 2011 (3-6.10.2011): ICFA seminar at CERN, “global” perspective on roadmap(s)
- An “Orsay like” meeting ~Feb-March 2012 (~2-3 days) – maybe wait for winter conferences
- A “Zeuthen like” meeting ~May-June 2012 (~a full week)
- Approval in ~September 2012 Council session in Brussels, arranged with the help of the EC

ECFA-EPS joint session

„kick-off” meeting for Strategy Update

Proposed outline:

- Introduction to the European Strategy and its update
- General theory talk (the big questions, five-year progress report, ...)
- General accelerator talk (five-year progress report, realism of different options, ...)
- General experimental talk on the energy frontier (challenges of different options, ...)
- General experimental talk on neutrino physics (accelerator & non-accelerator)
- Overall discussion and concluding remarks

...we would like to ask the speakers addressing questions which we would like to collect from the particle physics community beforehand.

Nasze „To Do”

W najbliższym czasie:

- wysuwanie kandydatów na speakerów do Grenobl
- zbieranie pytań do speakerów
- wysuwanie kandydatów do Preparatory Group

w dalszej perspektywie czasowej

- zbieranie propozycji i uwag do European Strategy
- przygotowanie polskiego stanowiska
- zapewnienie szerokiego i aktywnego uczestnictwa w pracach polskiego środowiska (kolejne spotkania)
- zapoznanie polskich władz z wynikami tych prac (!?)

Podsumowanie

- 2010: ważny rok dla LHC \Rightarrow CERN \Rightarrow HEP
- Pracowity rok ECFA
 - dużo nowych inicjatyw
 - przygotowania do opracowania nowej strategii
- Powinniśmy jak najszerzej włączyć się w te prace
powołanie Polskiej Grupy Strategicznej ?
- Wizyta RECFA w Polsce w 2012 *WF UW?*

ECFA terms of reference



ECFA

European Committee for Future Accelerators

1. AIMS (2008 revision)

- **Long-range planning** of European high-energy facilities - accelerators, large-scale facilities and equipment - adequate for the conduct of a valid **high-energy research programme** by the community of physicists in the participating countries and matched to the size of this community and to the **resources** which can be put at the disposal of high-energy physics by society. Duplication of similar accelerators should be avoided and international collaboration for the creation of these facilities should be encouraged if essential and efficient for attaining the purpose.
- Equilibrium between the roles of **international and national laboratories** and university institutes in this research, and a close relation between **research and education** in high-energy physics and other fields.
- Adequate **conditions for research** and a just and equitable sharing of facilities between physicists, irrespective of nationality and origin, as conducive to a successful collaborative effort.

ECFA terms of reference

2. ACTIVITIES

To achieve these aims ECFA can engage in - among others - the following activities:

1. regular **meetings** of Restricted and Plenary ECFA;
2. ad hoc **symposia and conferences** sponsored or organized by ECFA;
3. **study groups**, set up by ECFA, or jointly with other organizations, for special problems;
4. **demographic studies** of the high-energy physics community and resources in the ECFA countries, repeated at regular intervals.
5. monitoring of the ongoing implementation of the European Strategy for Particle Physics in the CERN Member States under activity (d), presentation of corresponding status reports to the European Strategy Session of Council.

3. STATUS

ECFA is **advisory** to **CERN** Management, CERN Council and its Committees, and to other organizations, **national or international**.

ECFA terms of reference



ECFA

European Committee for Future Accelerators

4. PARTICIPATING COUNTRIES

Traditionally, physicists from the countries which were **Members of CERN** in 1966 participate in ECFA. CERN is also considered as a "country". Plenary ECFA may on request extend participation to physicists from other countries. Any participating country is free to leave ECFA on six months' notice given at a Plenary ECFA meeting. Admission of a **new participating country** is decided by Plenary ECFA.

5. STRUCTURE

ECFA consists of:

- Plenary ECFA,
- Restricted ECFA,
- Chairman and Secretary and
- permanent or ad hoc working groups.