High Energy Physics funding

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Research funding - overview

Resources for R&D in 2012	% GDP	% total
Total	1.88	100
Government	0.68	**36.8**
Public foreign (EU)	**0.30**	**16.1**
Bussiness domestic	0.68	**36.4**
Bussinnes foreign	0.19	9.9

Expenditures on R&D in 2012	% of total
Government sector	18.4
Higher Education sector	**27.5**
Domestic Bussiness sector	**53.6**
Non for profit sector	0.5

1% GDP=
1.5 BEUR

Government sector:

- Public Research Organisations (Academy of Sciences et al.)
- State Research Organisations
- Organisational units of the State

Structure

CERN Membership:

1.03 % of CERN budget, **11.4 MCHF** in 2014

1.10 % of Government R&D expenditures

second only to UN Membership

much more than membership in **ESO**, **ESA** or **EMBL** of which we are also members.

Core funding of Universities as well as Institutes of the Academy of Sciences provides means for wages of most of the researchers as well as technical and other personnel, but **NOT for the actual research. Difficult to calculate.**

Project funding: almost all the research depends on the means obtained in the form of **grants or projects** from various agencies, national as well as European.

Project Funding - Resources

National

- Ministry of Education (dominant source)
- Czech Science Foundation
- Czech Technological Agency

European

- 7th Framework
- Horizon 2020?

From my 2012 Midterm report, all numbers per annum

Centers (supporting most of particle physics activities)

- **Center for Particle Physics** (2005-2011), **0.6 MEUR**
- **Center for Heavy Ion Collisions** (2007-2011), **0.3 MEUR**

EURYI award from ESF, **M. Schnabl**, 2008-2013, 0.16 **MEUR**

Grants from Ministry of Education

ATLAS	2008-2012, **1.2 MEUR**
Other exps. at CERN	2008-2012, **1.4 MEUR**
D0	2008-2012, **0.16 MEUR**
H1	2009-2012, **0.16 MEUR**
STAR	2009-2012, **0.1 MEUR**
Auger	2008-2012, **0.2 MEUR**
Nova	2012-2014, **0.16 MEUR**
Belle II	2009-2012, **0.11 MEUR**
Total:	**3.3-3.5 MEUR**

Most of the Particle physics activities, including Astroparticle Physics had been supported by **two Centers** within the frame-work of the program of **Centers of Fundamental Research** of the Ministry of Education:

- **Center for Particle Physics** (2005-2011), **0.6 MEUR/y**
- **Center for Heavy Ion Collisions** (2007-2011), **0.3 MEUR/y**

These Centers were to large extent continuation of the **Center for Particle Physics** of a similar previous Programme of the Ministry of Education (2000-2004) and played crucial role in maintaining the teams involved in various experiments.

Unfortunately this programme **terminated in 2011** and has been replaced with programme of the **Czech Science Foundation** oriented on **multidisciplinary research**.

Funding - Present situation (all numbers per annum)

Grants from Ministry of Education and Czech Science Foundation

ATLAS	2013-2015, **1.00 MEUR**
Other exps. at CERN	2013-2015, **1.20 MEUR**
D0+NOvA	2012-2014, **0.17 MEUR**
H1	2010-2014, **0.03 MEUR**
STAR	2014-2016, **0.16 MEUR**
Heavy ions general	2012-2015, **0.16 MEUR**
Auger	2013-2015, **0.18 MEUR**
CTA	2013-2015, **0.10 MEUR**
Belle II	2014-2016, **0.10 MEUR**
Theory	2014-2016, **0.23 MEUR**
7th FP: Detectors (Aida)	2012-2014, **0.08 MEUR**
Marie Curie	2013-2016, **0.03 MEUR**
Neuron Foundation: Theory	2014-2015, **0.02 MEUR**
Total:	**3.45 MEUR**

Problems: bright past, uncertain future

For two decades **we have enjoyed stable funding of HEP activities** at CERN and elsewhere. To maintain current level of funding for the next decade is vital for our active participation in the next phase of **LHC experiments and in their HL upgrade**.

However, **we now face uncertain future** as funding of most of the important projects **ends December 2015**.

This is aggravated by the plans to overhaul the way R&D is governed and funded by creating the **Ministry of Research.** This in principle welcome step **threatens to disrupt the funding of longterm projects in HEP** coming at very inopportune time.

The existing Programme which has provided most of the funds for HEP has reduced funding and **will be terminated in 2017**. New program is being prepared, but it aimes at **funding infrastructures**, rather than research itself.

There is strong pressure by business lobby to further **increase Government funding of**

- innovations
- research in the business sector entities

despite the fact that **20 %** of Government expenditures on R&D goes to business sector, **twice the EU average**.

Another, though smaller, problem affecting public funding of HEP concerns **the evaluation methodology** used to determine core funding of Universities, Institutes of the Academy of Sciences and other Research Organizations, which takes into account the **the number of coauthors from given institution.**

This methodolgy, when applied down to faculties of Universities and Chairs **disadvantages big international Collaborations**, typical for HEP experiments.

Bright Future again?

We have been forced to frame the main part of HEP activities into several longterm projects of **Research Infrastructures**:

- **CERN-CZ**
- **BNL-CZ**
- **FERMILAB-CZ**
- **FAIR-CZ**
- **AUGER-CZ**
- **CTA-CZ**

complemented with a few short term (**2 years only!**) projects covering **research using these infrastructures**.

The above **RI** have been assessed by international committee and have a good chance to be funded **provided the financial framework of the program will be adequate**.

So, **IF** all goes well we may have