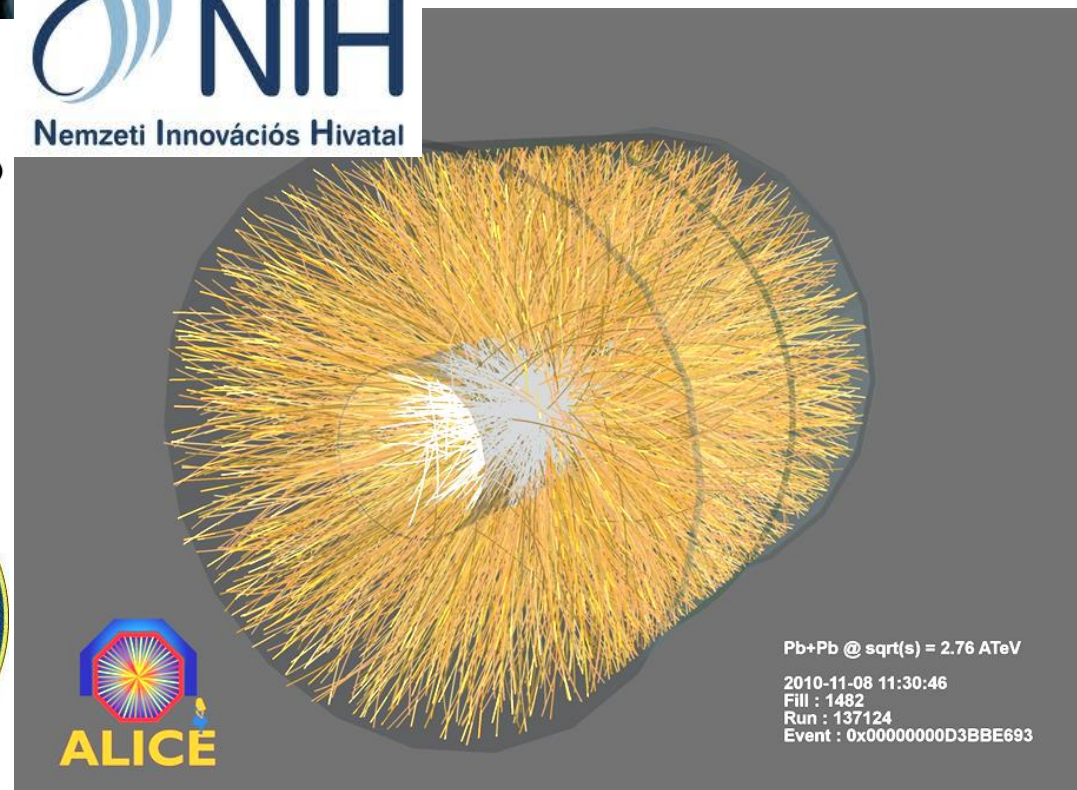
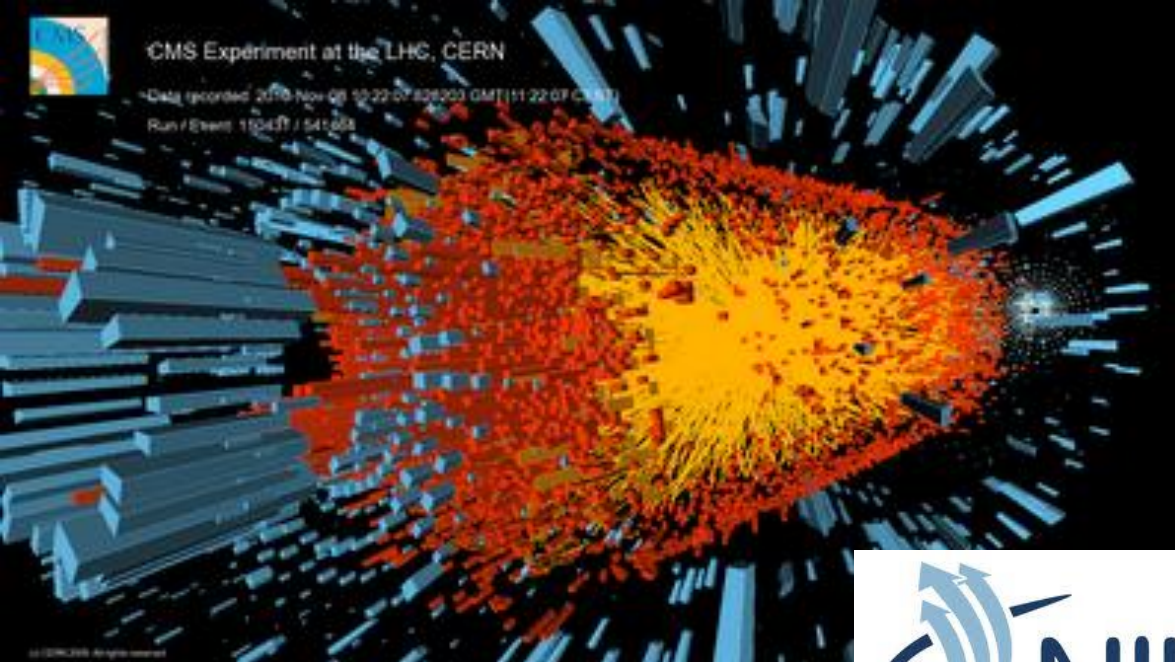




CMS Experiment at the LHC, CERN

Data recorded: 2010-Nov-08 10:22:07.826203 GMT [11:22:07 CEST]

Run / Event: 150477 / 541288



Pb+Pb @ sqrt(s) = 2.76 ATeV

2010-11-08 11:30:46

Fill : 1482

Run : 137124

Event : 0x00000000D3BBE693



# High Energy Physics research in Hungary

Lévai Péter

MTA WIGNER Research Centre for Physics,  
Budapest

**RECFA Meeting, Budapest,  
4 October 2013**

## **History of HEP in Hungary**

### **Time period I: JINR Dubna (1956-1992) – 35 years**

**Hungary was a founding member of JINR at Dubna**

**Data analyses, DAQ, electronics**

**JINR-CERN workshops, schools**

**HU scientists at CERN as Dubna delegates**

**Dezső Kiss, director (1989-1992)**

### **Time period II: CERN (1992-2002) – 20 years**

**CERN membership stabilised high energy physics at Hungary**

**CERN LEP L3 & OPAL**

**CERN SPS NA35 & NA49**

**+ NA61/SHINE**

**CERN LHC ALICE @ CMS**

**+ TOTEM, ATLAS**

**ASACUSA, RD51**

### **Time period III: CERN Tier-0 + upgrades (2003- ...)**

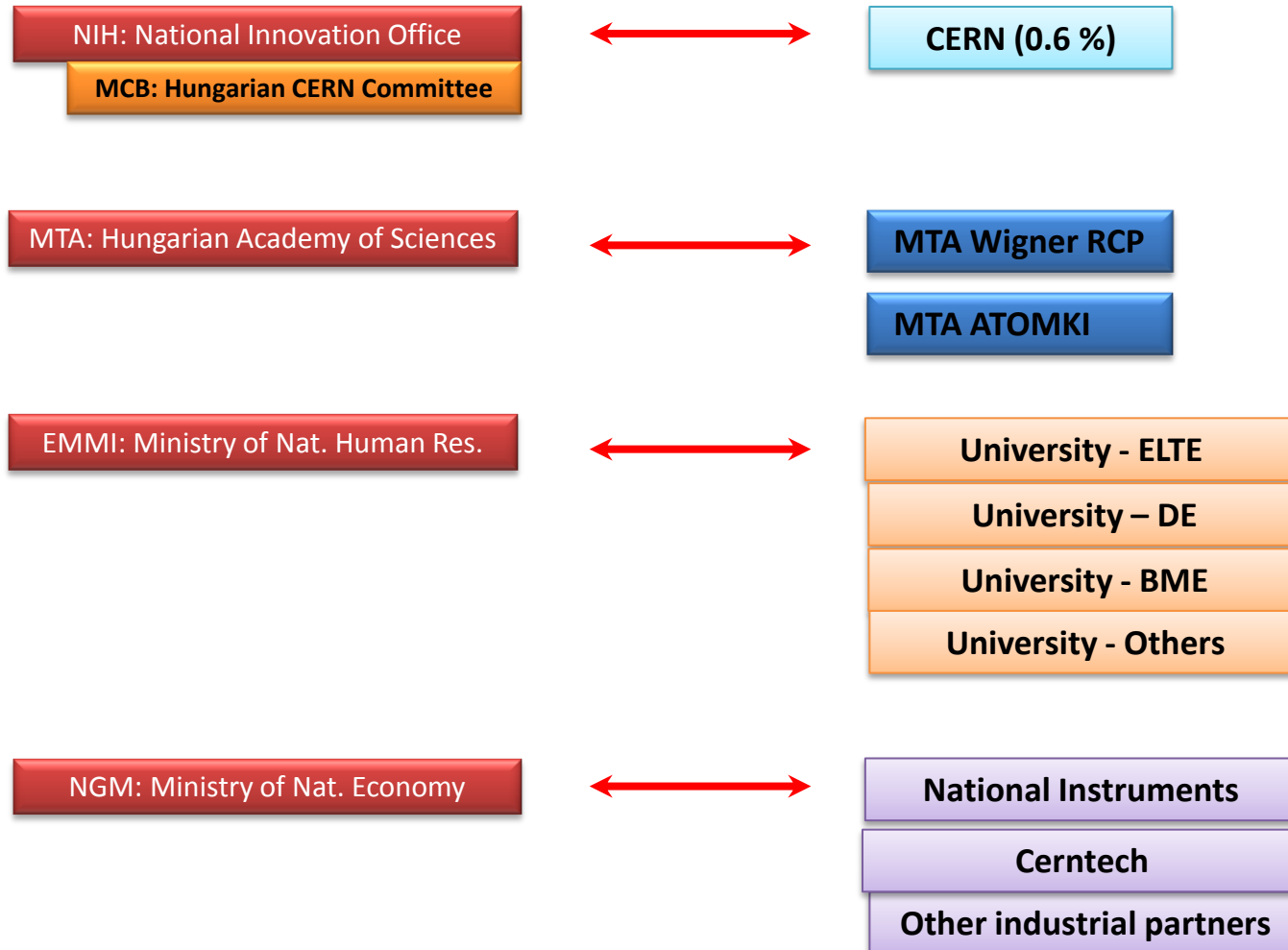
**CERN moved first time outside its fence: Tier-0 at WIGNER RCP**

**Upgrade projects at LHC, e.g. ALICE & CMS**

**New directions at CERN, e.g. AWAKE**

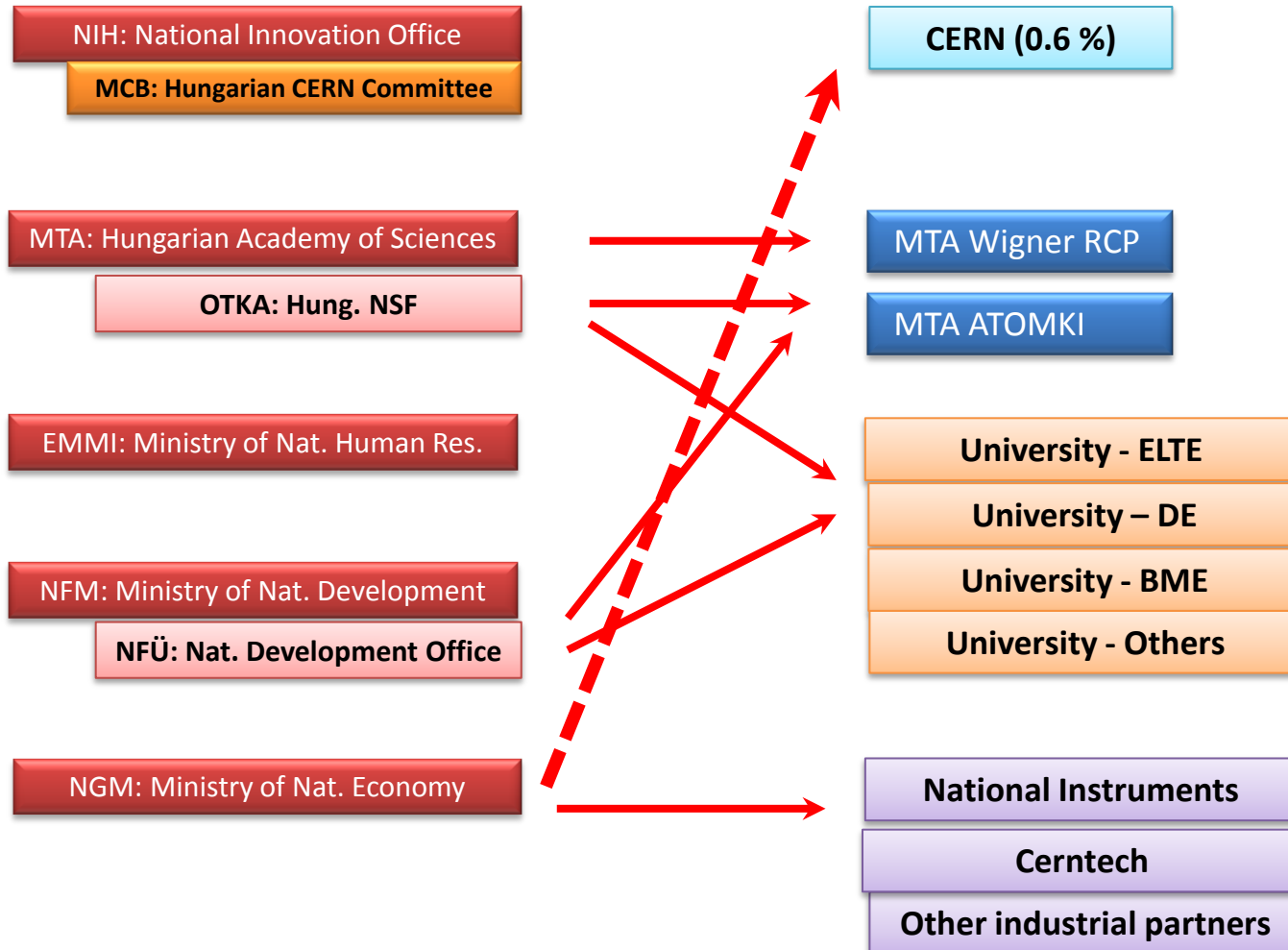
# HEP Research --- Official Structure (2013/10)

## Structure of Ministries, Research and R&D Partners



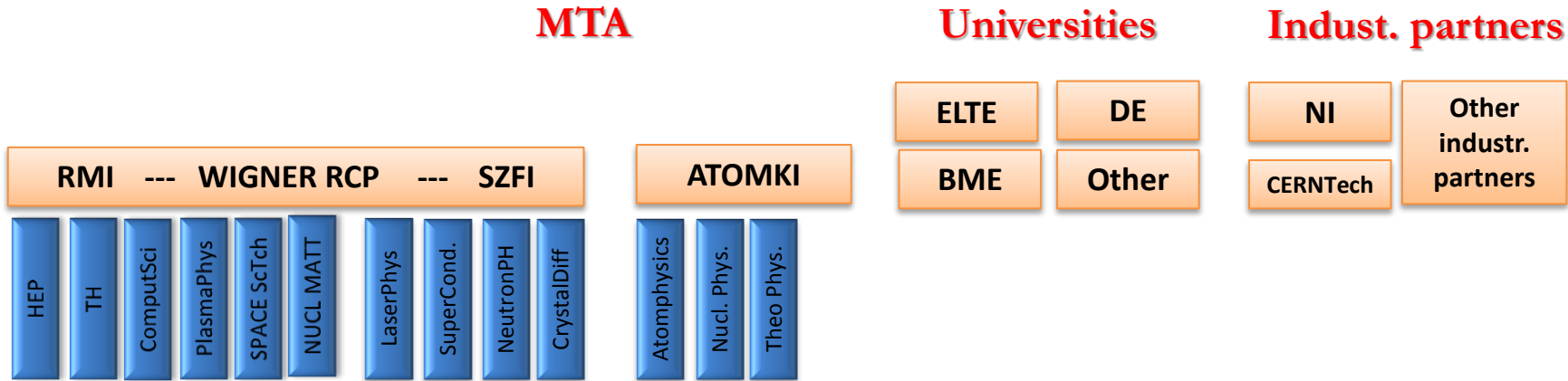
# HEP Research --- Financing Structure (2013/10)

## Structure of Ministries, Research and R&D Partners

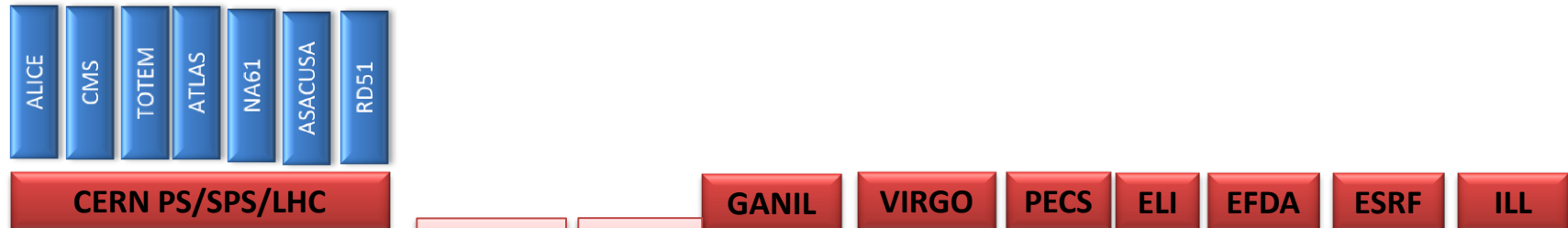


# HEP participant partners in Hungary + ESFRI connections (2013/10)

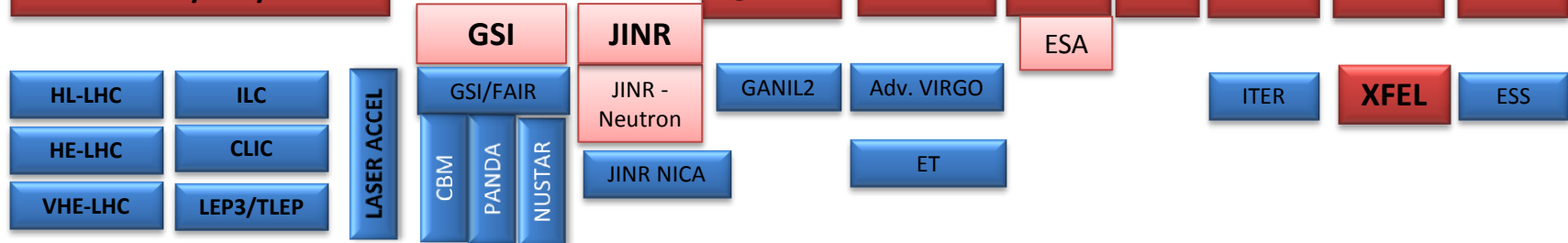
**Hungarian Institutes**



**Present**



**Future**



**NuPECC**

**ApPECC**

## Manpower and financing

### Manpower in FTE (yearly average from 2006) under MTA supervision

#### MTA Wigner FK + MTA ATOMKI

25 FTE with PhD + 8 Young Researchers (before PhD)

#### Universities

5 FTE with PhD + 7 PhD Students

Integrated: 30 FTE + 15 Students (+30% in foreign countries)

### Financing (yearly average)

#### CERN membership from GOV:

6.1 M€ general + 0.1 M € M&O A (ALICE, CMS) 6.2M€

#### Salary from MTA and EMMI:

0.75 M€ for PhDs + 0.15 M€ for Students

0.1 M€ for workshop 1.0M€

#### Grants from OTKA (integrated):

2.1 M€ collected during 2006-2013 (7 years) 0.3M€

**Yearly: 7.5M€**



# Wigner Research Centre for Physics of the Hungarian Academy of Sciences



**Institute for Particle and  
and Nuclear Physics**



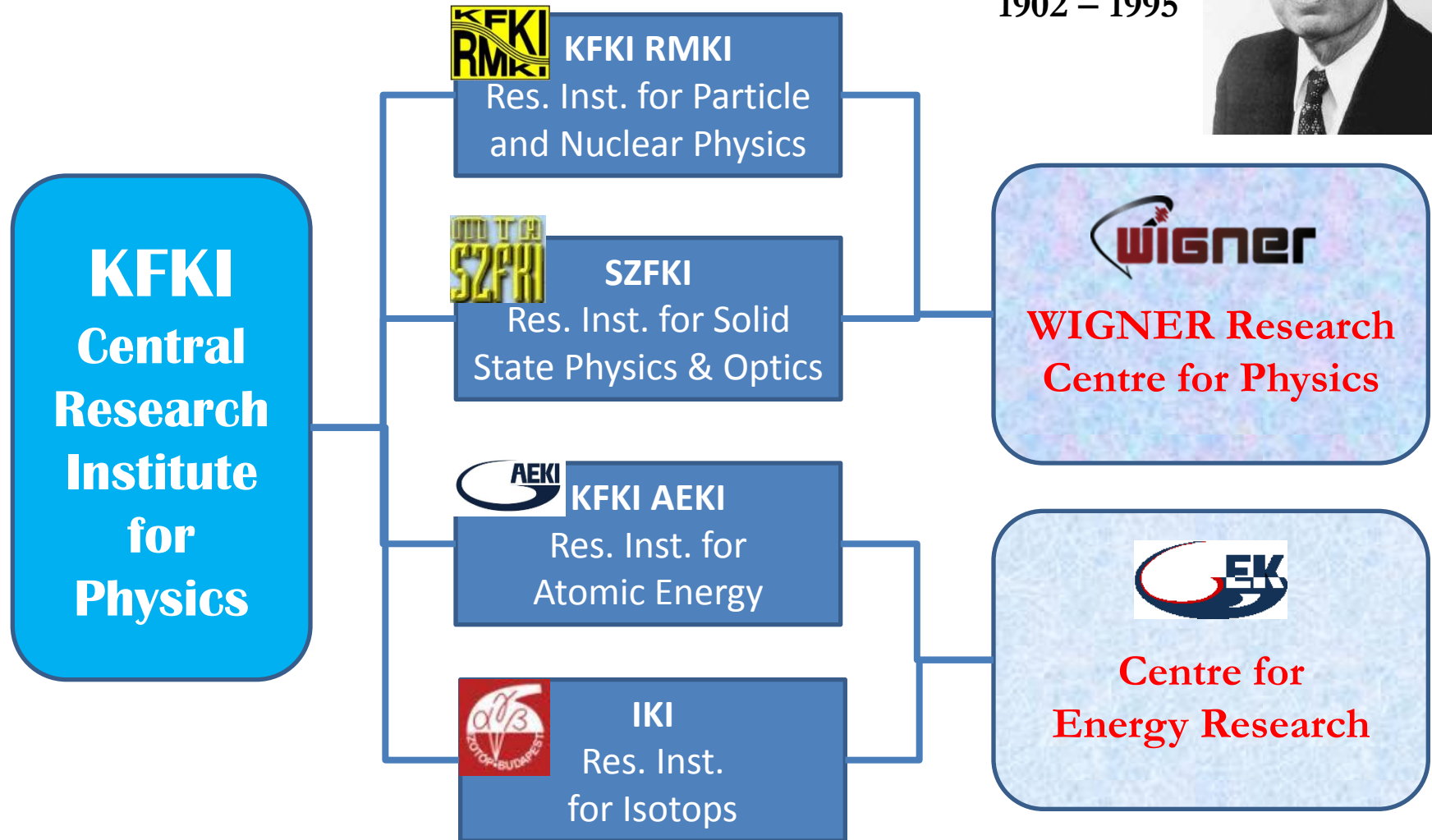
**Institute for Solid State  
Physics and Optics**

From 1 January 2012



# History of the WIGNER RCP, successor of KFKI, Budapest

Eugene P.  
Wigner  
1902 – 1995

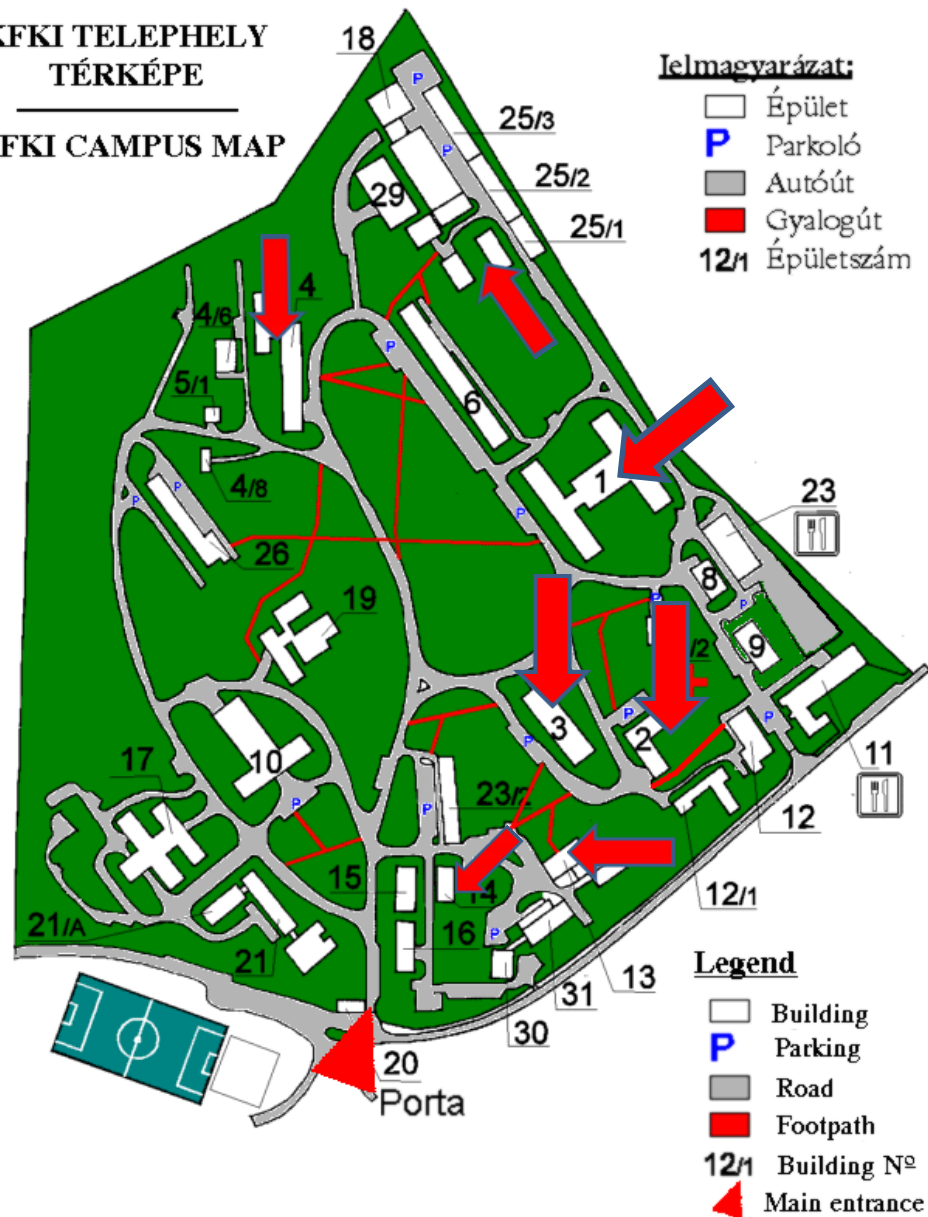


1952 (1972) 1992

2012



KFKI TELEPHELY  
TÉRKÉPE  
KFKI CAMPUS MAP



## WIGNER Research Centre for Physics, HAS

By January 2013:

155 researcher with PhD

50 young researcher

149 technical +

administ. staff

354 employees

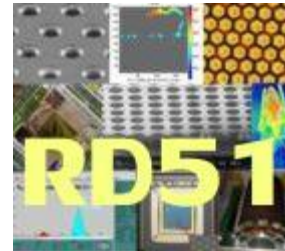
2012: 16M€ + 30M€ (DataC)

# Flagship projects at the WIGNER RCP:

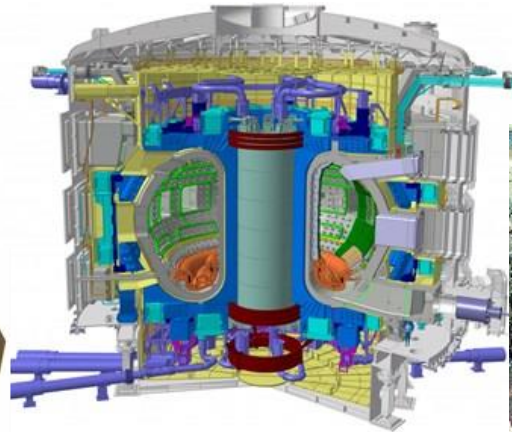
## 1. High Energy Physics



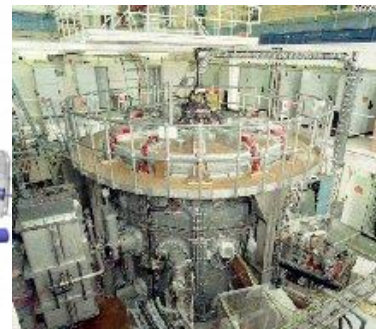
ATLAS



## 2. Fusion Energy Research (EURATOM) [Plasmadiagnostics]



ITER  
Chadarache

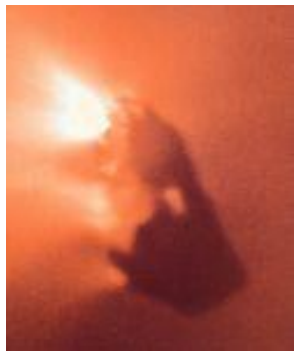


MAST, Culham

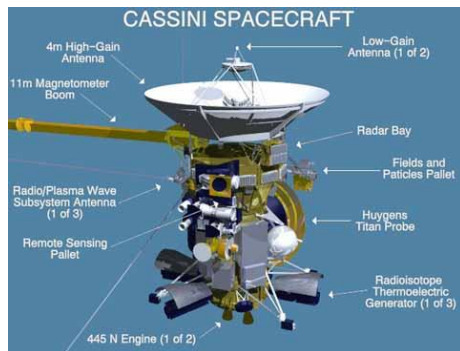


KSTAR, South Korea

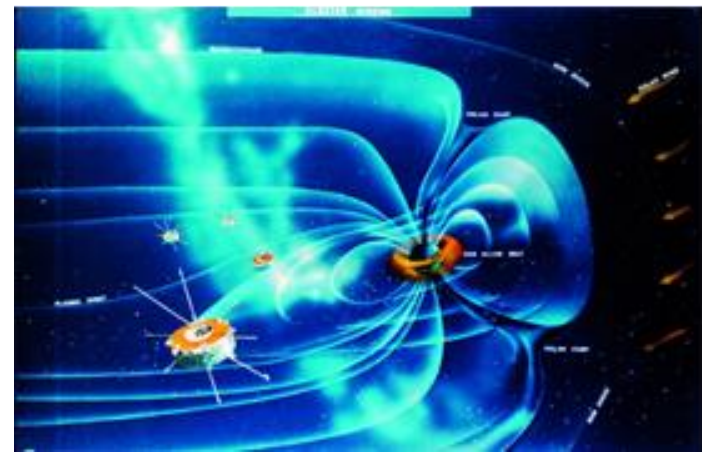
# 3. Space Science & Technology



Comet Halley: Vega 1/2 (1986)



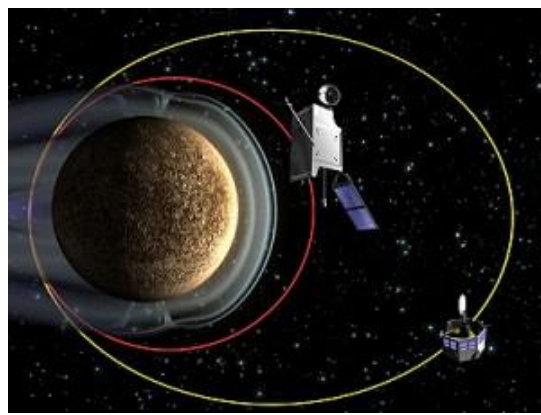
Saturn&Titan: Cassini (2004)



Earth: CLUSTER Mission (2001-14)



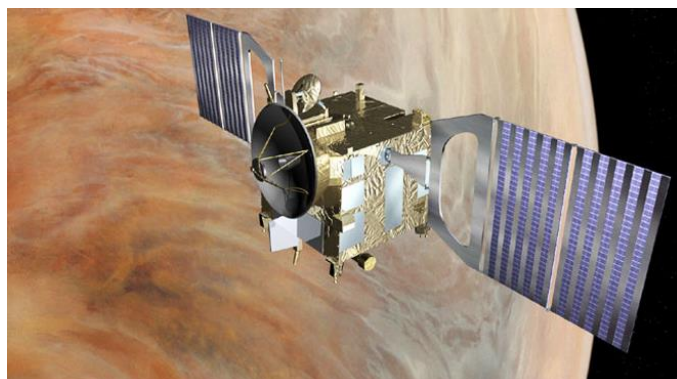
Rosetta – Philae probe (2004-14)



Mercury: BepiColombo (2014)

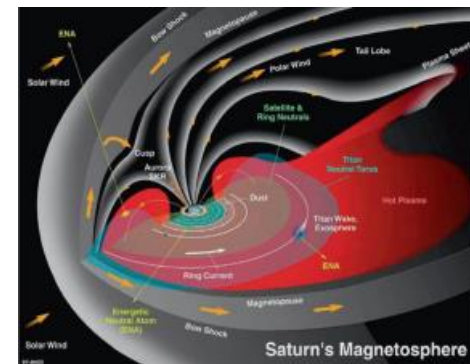


ISS: Plasma Wave Complex (2011)



Venus Express (2006)

Saturn's Magnetosphere



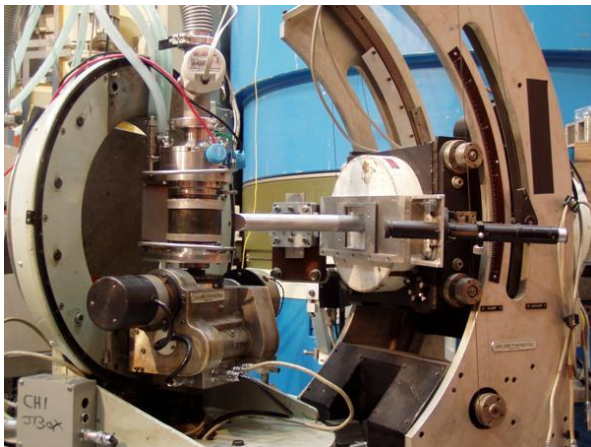
## 4. Budapest Neutron Center (BNC) [Experience in infrastructure management]



**BUDAPEST Reactor (10 MW)**



**GINA polarized neutron reflectometer**



**MTEST diffractometer**



**Cold Neutron Laboratory**



## The impact of our research activity

### Excellence at personal level:

Awards, Grants, Scholarships see Annual Report, p. iv

### Excellence at group level:

Awards, Grants for the Groups

7 Momentum Group, 1 ERC Group, 4 Wigner Group

### Publications in refereed journals and independent citations (MTMT of HAS):

2012	SZFI	RMI-S	RMI-XL	Total
Refereed scientific publications	217	223	789	1229
Impact factors	631	329	1895	2855
Citations (for previous papers)	4804	3628	10032	18464

### Financial success – research grants in 2012:

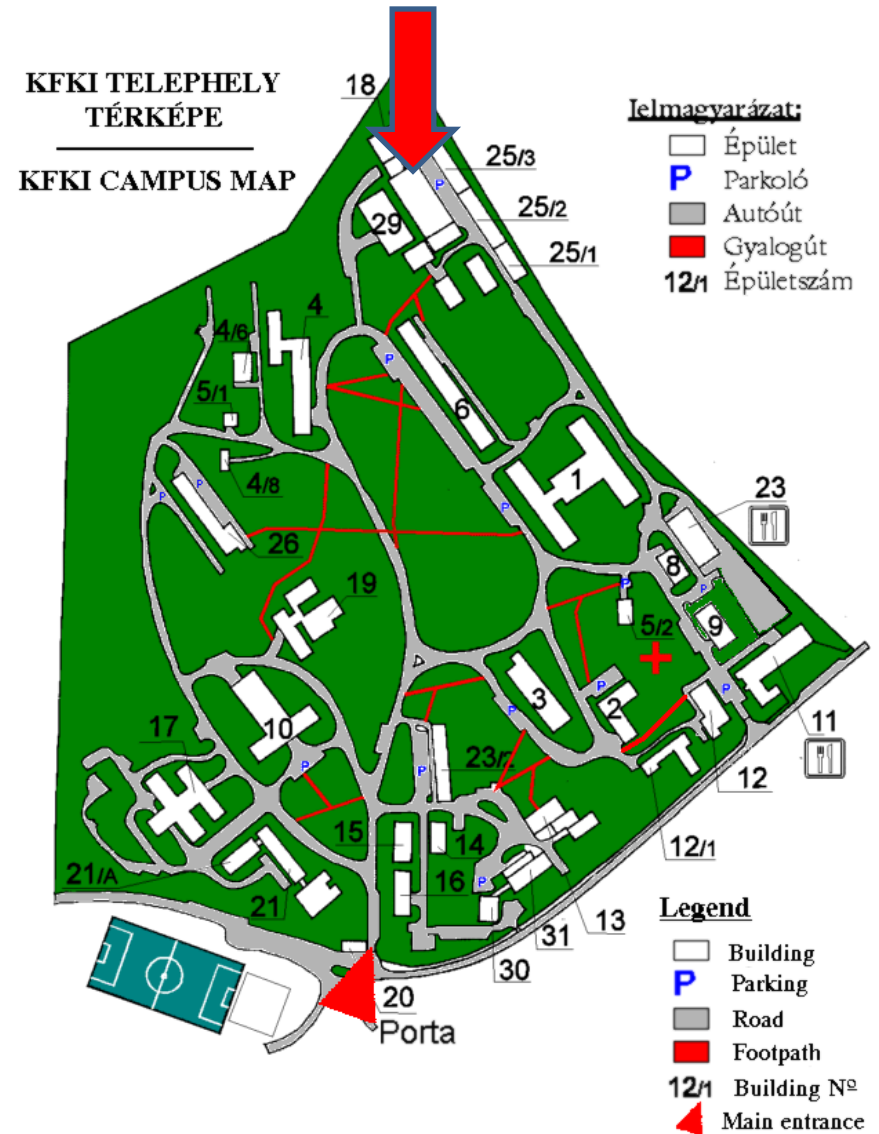
OTKA grants:	275 M HUF	1.00 M €
EU grants:	238 M HUF	0.86 M €
Non-EU grants:	144 M HUF	0.52 M €

# IT GRID Computing:

**IT: CERN TIER-2 Center  
VIRGOGRID  
GENAGRID  
HUNGRID  
RHIC PHENIX GRID**

**CERN@WIGNER project:  
(30 M€ investment)  
2012/13 construction**

## WIGNER Data Center



**WIGNER Data Center – after construction  
hosting CERN Tier-0  
from 1 January 2013**







**For a world class  
„Center of excellence” and  
„Center of knowledge”  
with local leadership  
and strong European integration !**