HEP Outreach and Future Perspectives of HEP in Hungary

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RECFA Meeting, Budapest,
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HEP outreach activities in Hungary - 1

Public activities

Targeting tax payers and decision makers

- **CERN-HU20 – 20 years of Hungary in CERN – June 2012**
- **CERN Open Days at Wigner – 28-29 September 2013 (Mayor)**
  - **→ CERN60 at September 2014**
- **„Higgs-bus" – 3 Oct. 2013 Wigner exhibition bus → 2014/15**
- **Articles in ORIGO, INDEX, CERN-blog**
- **Talk on the series of „University for Everybody" (MTA-supervision)**

Targeting children

- **Card game with particle physics (T. Csörgő)**

Industrial connections and innovation

CERN tenders, industrial partners

- **Innovation Day at NIH – May 2012**
- **Knowledge transfer seminars for companies**
- **Membership in the HEPTECH – December 2013**

Mutual efforts to prepare for HORIZON2020

- **Small scale discussion, meetings (continuous effort)**

HEP outreach activities in Hungary - 2

Professional outreach

Targeting secondary school students and teachers

- **Wigner Open Days – November 2013**
- **CERN Teacher Program – August 2013/12/11/ … [HorvathD]**
  - **→ 40 teachers every years (other nations, also)**
- **Continuous talks (recruitment for university) in public schools**

Targeting Batchelor students

- **Summer students in the Detector Laboratory**
- **Inviting BSc student groups (physics, IT, engineers)**
- **Offering student activites for TDK work (BSc)**

Student training

CERN Summer students

- **Invitation, training, assistence**

Other Schools and trainings

- **Zimanyi winter School 2013/12/11/…**
- **CERN-JINR school at June 2012**
- **CERN Schools: DAQ (01/13), Theory (06/13)**

Future Perspectives

Future Perspectives depend on manpower and financing

Manpower in FTE (yearly average from 2006) – focusing on experiments

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:

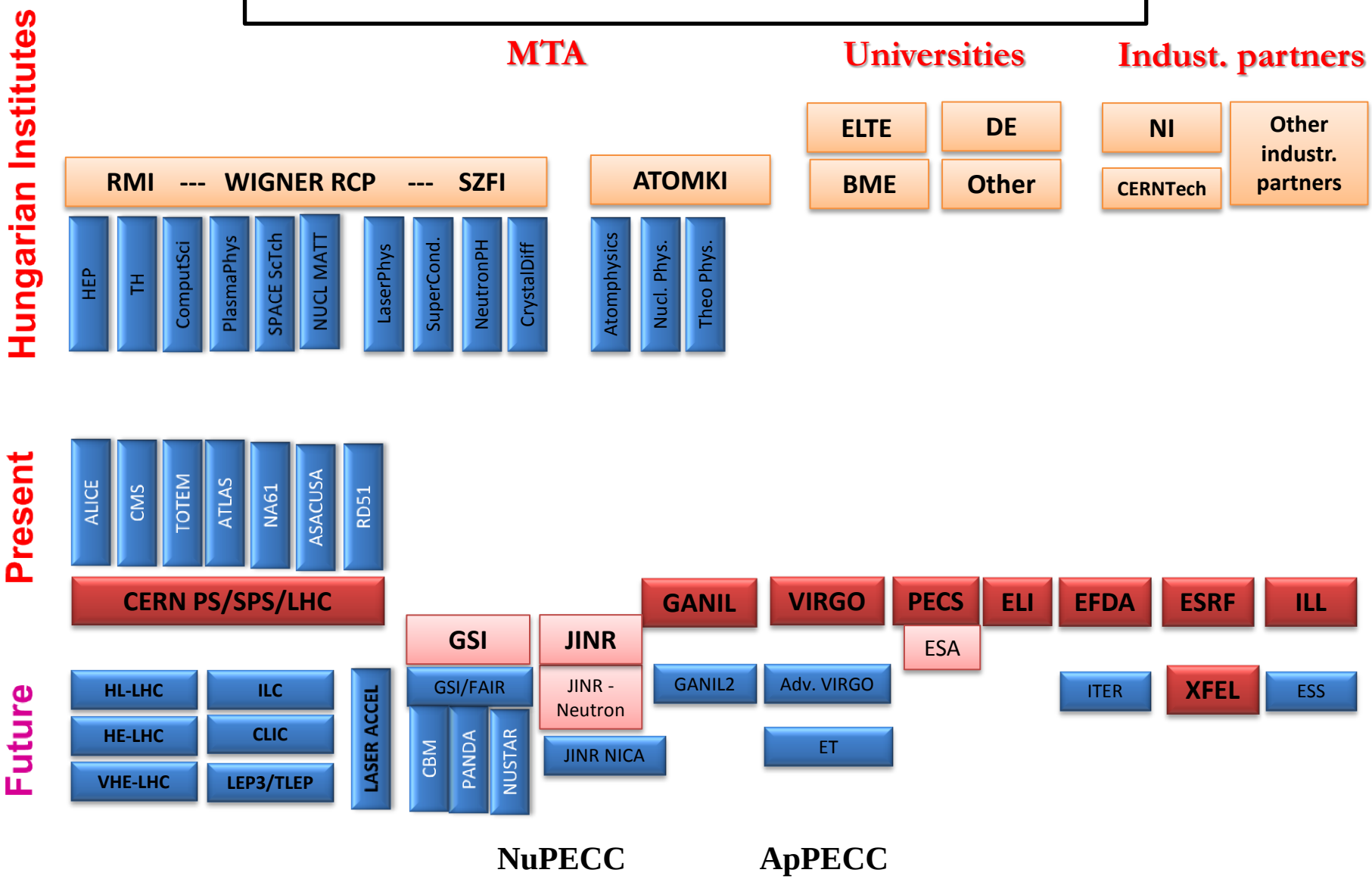
0.75 M€ for PhDs + 0.15 M€ for Students	
0.1 M€ for workshop	**1.0M€**

Grants from OTKA (integrated):

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

Yearly: 7.5M€

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



Guidence: EU HEP Strategy and its „Documents”:

„Physics Briefing Book” by the Preparatory Group (2012/12)
Input for the Strategy Group
(HEP community + Open Symposium at Cracow)

„European Strategy Paper”, adopted by the CERN Council
2013/05 Brussels

„Deliberation Paper” , created by the ESG, 2013/05
(explanations)

„Brochure” for social relevance of particle physics
created by the Communication Group

Dowload:
http://council.web.cern.ch/council/en/EuropeanStrategy/ESParticlePhysics.html
http://council.web.cern.ch/council/en/EuropeanStrategy/ESArchive.html

Four (4/1) large scale projects with high priority:

c) The discovery of the Higgs boson is the start of a major programme of work to measure this particle's properties with the highest possible precision for testing the validity of the Standard Model and to search for further new physics at the energy frontier. The LHC is in a unique position … Europe's top priority should be the exploitation of the full potential of the LHC, including the high-luminosity upgrade of the machine and detectors with a view to collecting ten times more data than in the initial design, by around 2030. This upgrade programme will also provide further exciting opportunities for the study of flavour physics and the quark-gluon plasma.

Accomplishment demands large resources from Europe (from MS):

2020-25: construction cost + running cost;

2030-35: M&O and data analysis/computing expenses

Four (4/2) large scale projects with high priority:

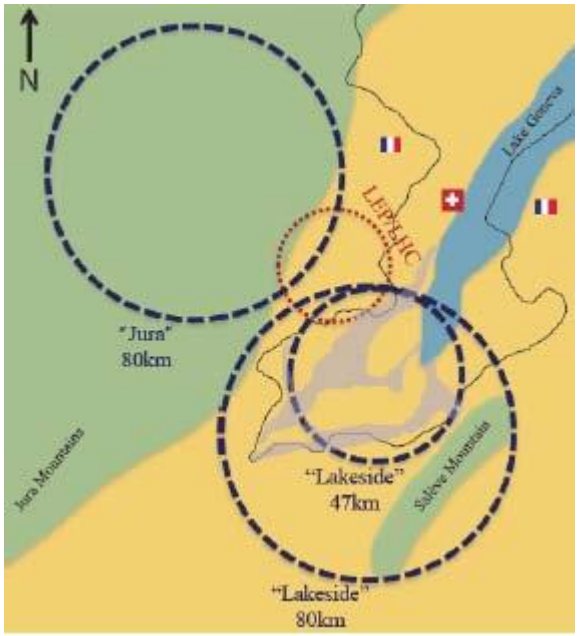
d) To stay at the forefront of particle physics, Europe needs to be in a position to propose an ambitious post-LHC accelerator project at CERN by the time of the next Strategy update, when physics results from the LHC running at 14 TeV will be available. CERN should undertake design studies for accelerator projects in a global context, with emphasis on proton-proton and electron-positron high-energy frontier machines. These design studies should be coupled to a vigorous accelerator R&D programme, including high-field magnets and high-gradient accelerating structures, in collaboration with national institutes, laboratories and universities worldwide.

Ambition of Europe: „energy frontier"

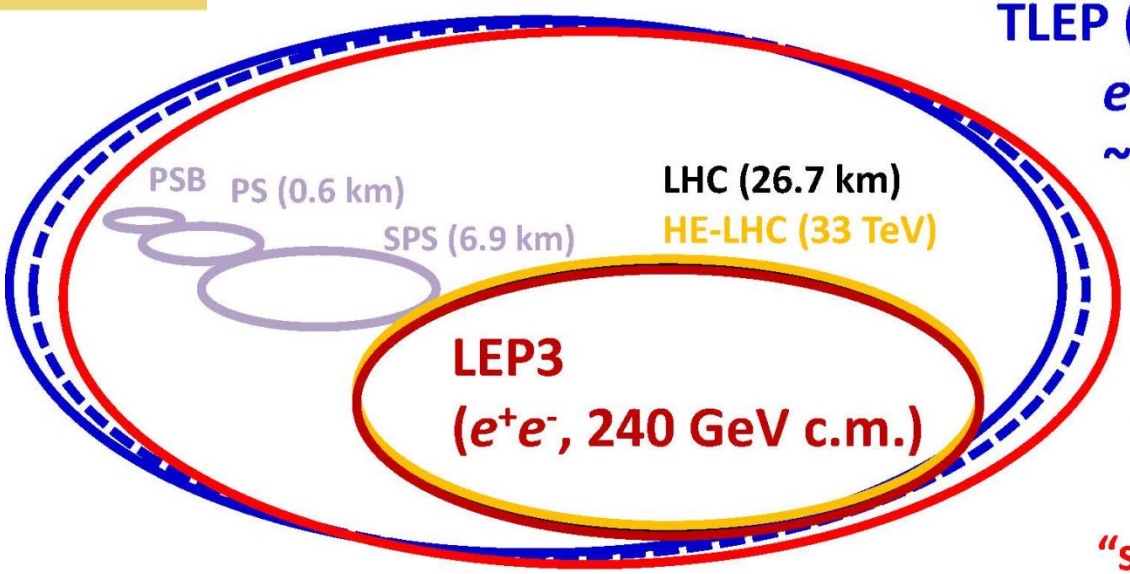
Next accelerator: physics beyond the Higss sector

Accelerator R&D, extreme strong magnetic fields, new ideas …

+ active collaboration between leading institutes



VLHC and TLEP plans and ideas



TLEP (80-100 km, e^+e^-, up to ~350 GeV c.m.)

VHE-LHC (pp, up to 100 TeV c.m.)

"same" detectors!

& $e^{\pm}$ (120 GeV) – p (7, 16 & 50 TeV) collisions ([(V)HE-]TLHeC)

Four (4/3) large scale projects with high priority:

e) International Linear Collider (ILC): e^+-e^- collider

high precision measurements of properties of

Higgs bosons and other particles → B-SM informations

ILC Technical Design Report → EU participation

ILC construction → Japan (!?) [far from Hungary]

f) Long Baseline Neutrino Experiment (LBNE):

neutrino oszcillation

CP-violation

neutrino mass hierarchy

steril neutrino

New results, new discoveries (role of US)

[No expertise at Hungary]

HEP plans in Hungary (short summary):

Short term plans – upgrade R&D (HL-LHC):

LHC ALICE: a, DAQ developments
b, TCP developments

LHC CMS: a, Allignment developmetns
b, Pixel detector R&D [ATLAS?]

Long term plans (HE-LHC, VLHC, TLEP):

Detector R&D: Special methods (CCC, GEM,…)

AWAKE collab: Leserplasma accelerator (PDPWA)

Accelerator R&D: Superconducting magnets (prep.)

+ ICT developments: WIGNER DATACENTER
CERN@WIGNER project (3+4 years)
GPU applications, Big Data, Tier-0 knowledge transfer, ..

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