

Willkommen bei CERN

Dr. Sascha Schmeling



European Organization for Particle Physics
Organisation européenne pour la physique des particules

CERN wurde 1954 von 12 europäischen Staaten gegründet

“Science for Peace”

Heute hat CERN 22 Mitgliedsstaaten

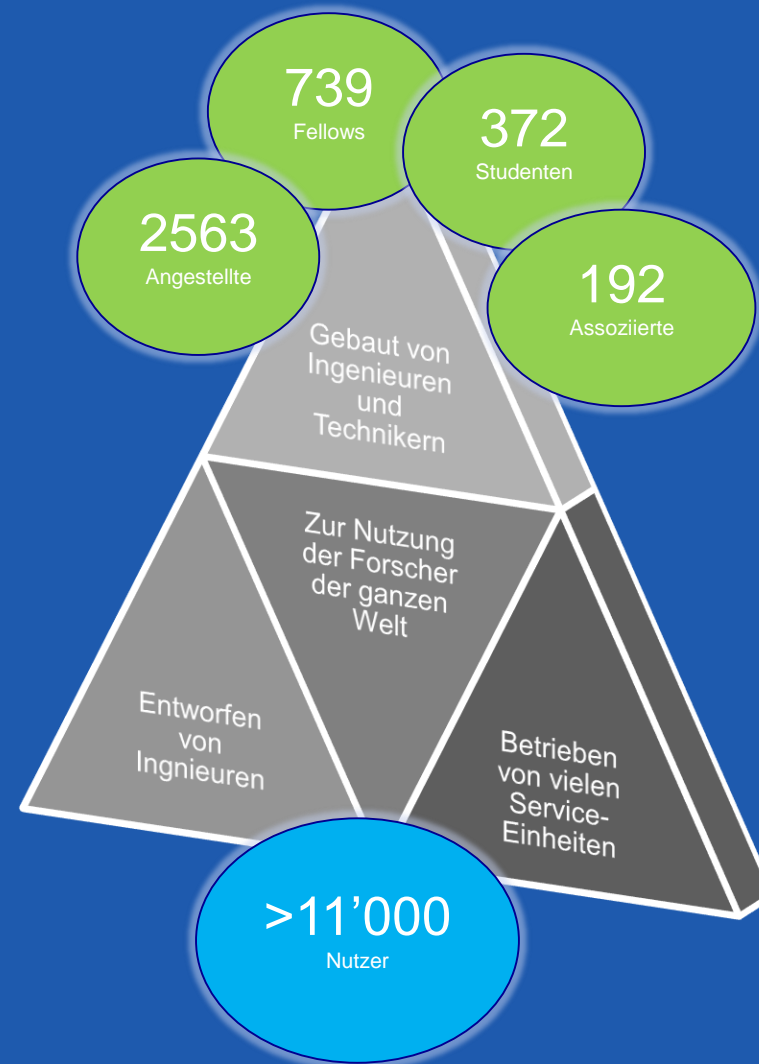
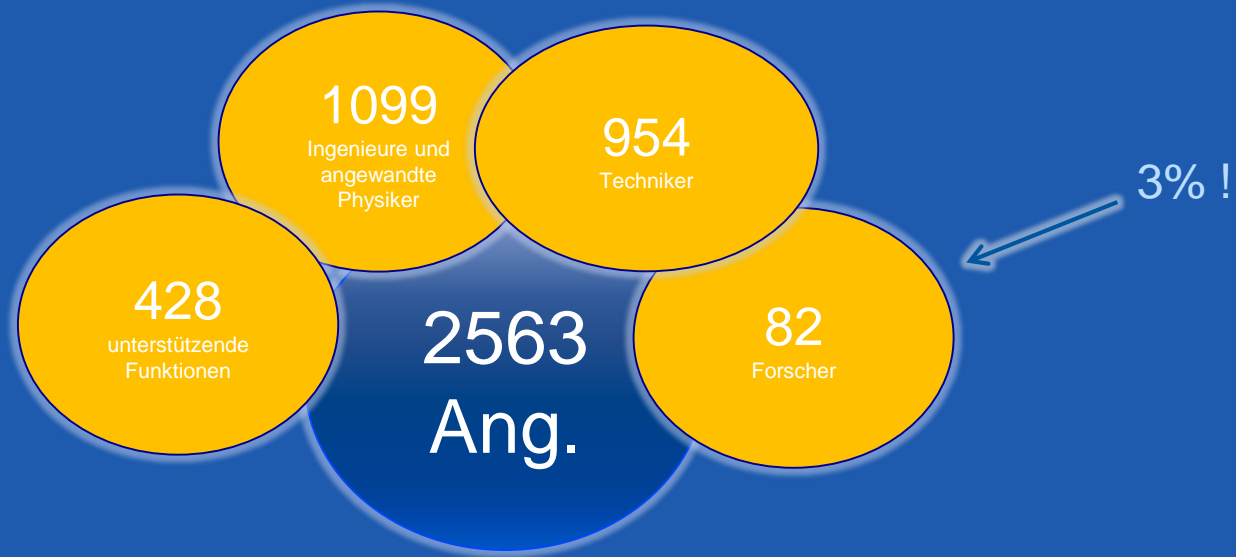
~ 2.560 internationale Beamte
~ 2.490 weitere Angestellte
~12.000 Nutzer
Budget (2018) ~1240 MCHF

Mitgliedsstaaten: Belgien, Bulgarien, Dänemark, Deutschland, Finnland, Frankreich, Griechenland, Großbritannien, Israel, Italien, Niederlande, Norwegen, Österreich, Polen, Portugal, Rumänien, Schweden, Schweiz, Slowakische Republik, Spanien, Tschechische Republik, Ungarn

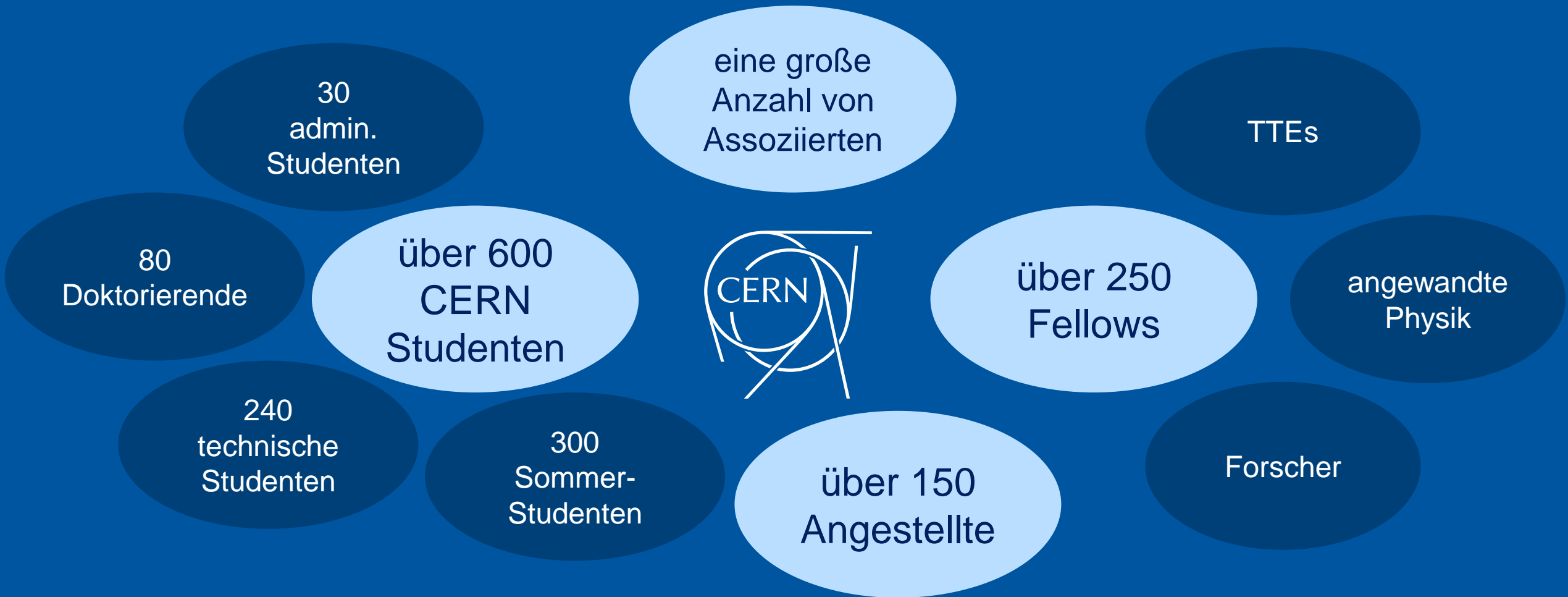
Assoziierte Mitgliedsstaaten: Indien, Litauen, Pakistan, Türkei, Ukraine; ... **im Beitrittsverfahren:** Serbien, Slowenien, Zypern

Beitrittskandidaten: Australien, Brasilien, Estland, Irland, Kanada, Kroatien, Lettland, Südkorea

Beobachter im Rat: Japan, Russland, USA; Europäische Kommission, UNESCO, JINR

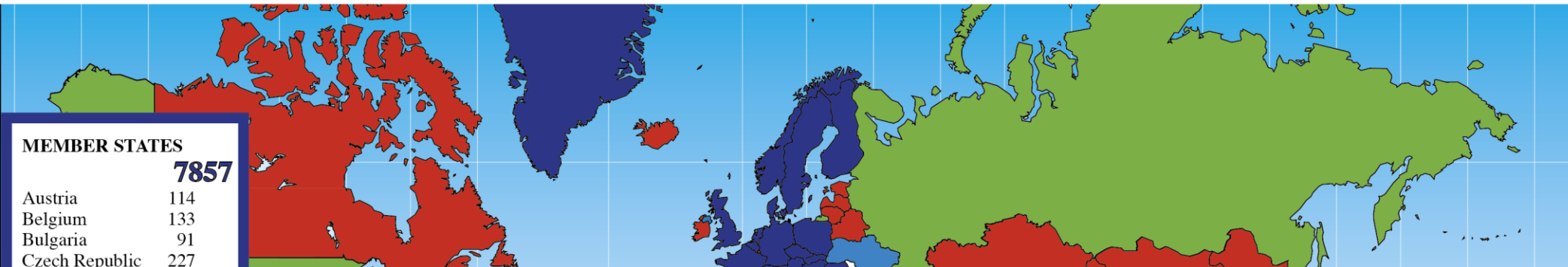


Jedes Jahr ...



Distribution of All CERN Users by Nationality on 5 July 2017

CERN
User
Community



MEMBER STATES **7857**

| | |
|----------------|------|
| Austria | 114 |
| Belgium | 133 |
| Bulgaria | 91 |
| Czech Republic | 227 |
| Denmark | 71 |
| Finland | 121 |
| France | 881 |
| Germany | 1316 |
| Greece | 234 |
| Hungary | 80 |
| Israel | 60 |
| Italy | 2044 |
| Netherlands | 172 |
| Norway | 66 |
| Poland | 343 |
| Portugal | 123 |
| Romania | 130 |
| Slovakia | 122 |
| Spain | 445 |
| Sweden | 93 |
| Switzerland | 229 |
| United Kingdom | 762 |

OBSERVERS **2725**

| | |
|--------|------|
| Japan | 298 |
| Russia | 1152 |
| USA | 1275 |

ASSOCIATE MEMBERS **710**

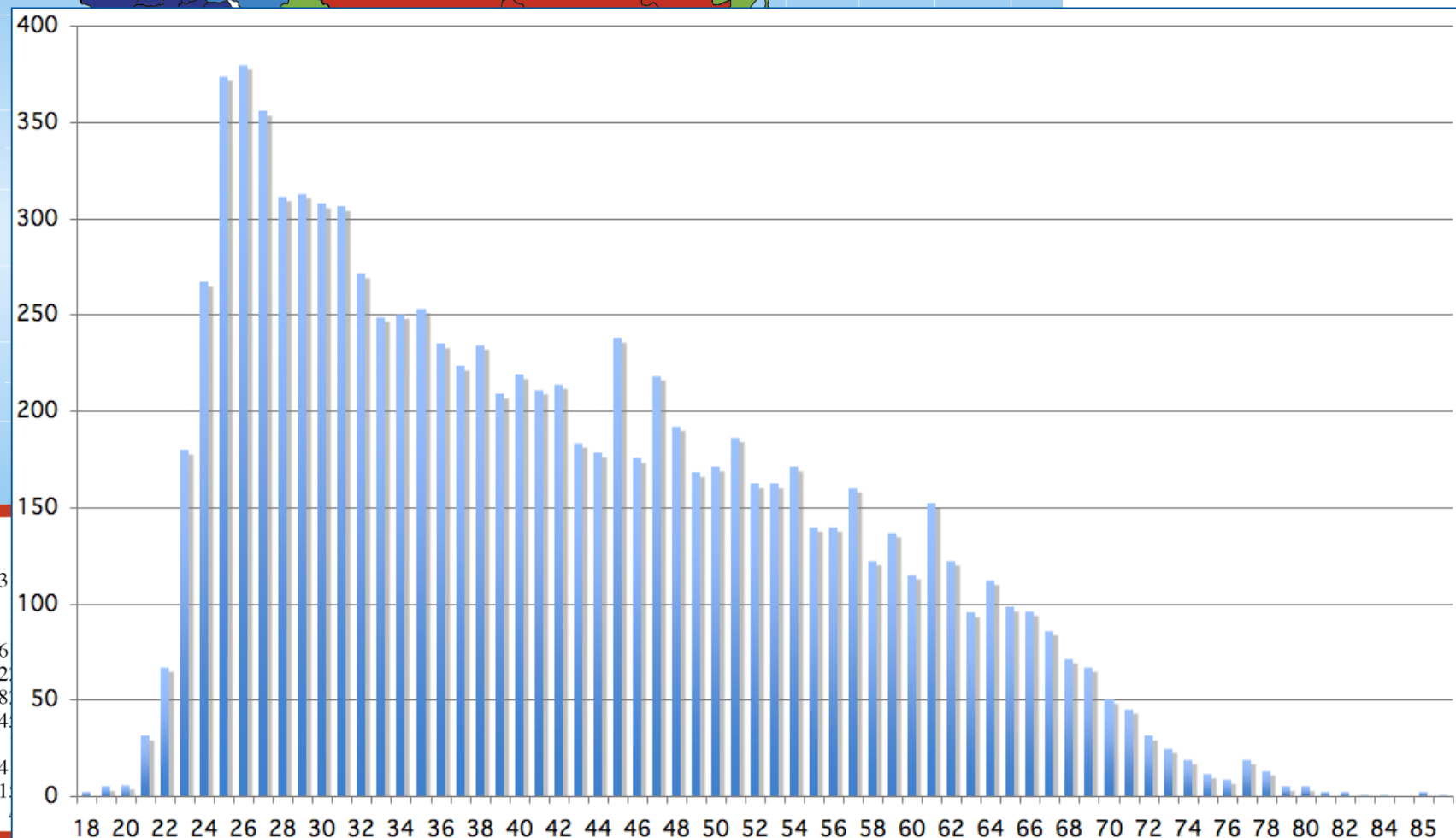
| | |
|----------|-----|
| India | 360 |
| Pakistan | 61 |
| Turkey | 179 |
| Ukraine | 110 |

OTHERS **1865**

| | | | |
|------------|----|----------------------|----|
| Albania | 3 | Bosnia & Herzegovina | |
| Algeria | 14 | Brazil | 13 |
| Argentina | 24 | Burundi | |
| Armenia | 25 | Cameroon | 16 |
| Australia | 30 | Canada | 16 |
| Azerbaijan | 9 | Chile | 2 |
| Bangladesh | 12 | China | 48 |
| Belarus | 47 | Colombia | 4 |
| Bolivia | 3 | Costa Rica | |
| | | Croatia | 4 |
| | | Cuba | 1 |
| | | Ecuador | |

ASSOCIATE MEMBERS IN THE PRE-STAGE TO MEMBERSHIP **104**

| | |
|----------|----|
| Cyprus | 26 |
| Serbia | 47 |
| Slovenia | 31 |



CERN Council
President: S. de Jong

member states
2 delegates
candidate(s) for accession
2 delegates
associate member states
2 delegates
ex officio members
different observers on invitation

Finance Committee
President: O. Malmberg

member states
2 delegates
candidate(s) for accession
2 delegates
associate member states
2 delegates
ex officio members
different observers on invitation

Scientific Policy Committee
President: K. Ellis

16 individual members
ex officio members

Tripartite Employment Forum
Chairperson: B. Dormy

Pension Fund Governing Board
Chairperson: T. Roth





Council Secretariat
Legal Service

Director General
Fabiola Gianotti

Internal Audit
Health, Safety, and Environment Unit

Finance and Human
Resources
Martin Steinacher

Research and Computing
Eckhard Elsen

Accelerators and
Technology
Frédéric Bordry

International Relations
Charlotte Warakaulle

**Finance and
Administrative Procedures**
Florian Sonnemann

Experimental Physics
Manfred Krammer

Beams
Paul Collier

Relations

Human Resources
James Purvis

Theoretical Physics
Gian Giudice

Technology
Jose Miguel Jimenez

Education, Communication,
and Outreach

**Industry, Procurement, and
Technology Transfer**
Thierry Lagrange

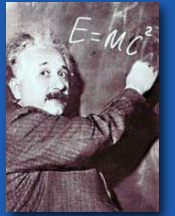
Information Technologies
Frédéric Hemmer

Engineering
Roberto Losito

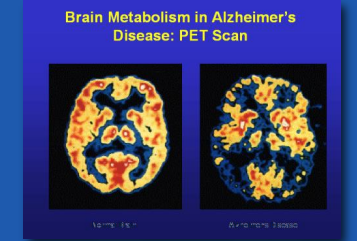
**Space Management
and Buildings**
Lluís Miralles Verge



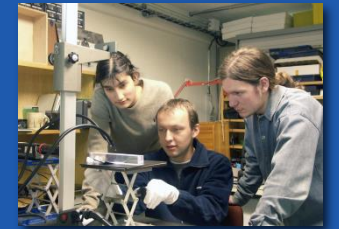
Forschung an den Grenzen menschlichen Wissens



Innovative Technologien für die Forschung



Ausbildung: Wissenschaftler



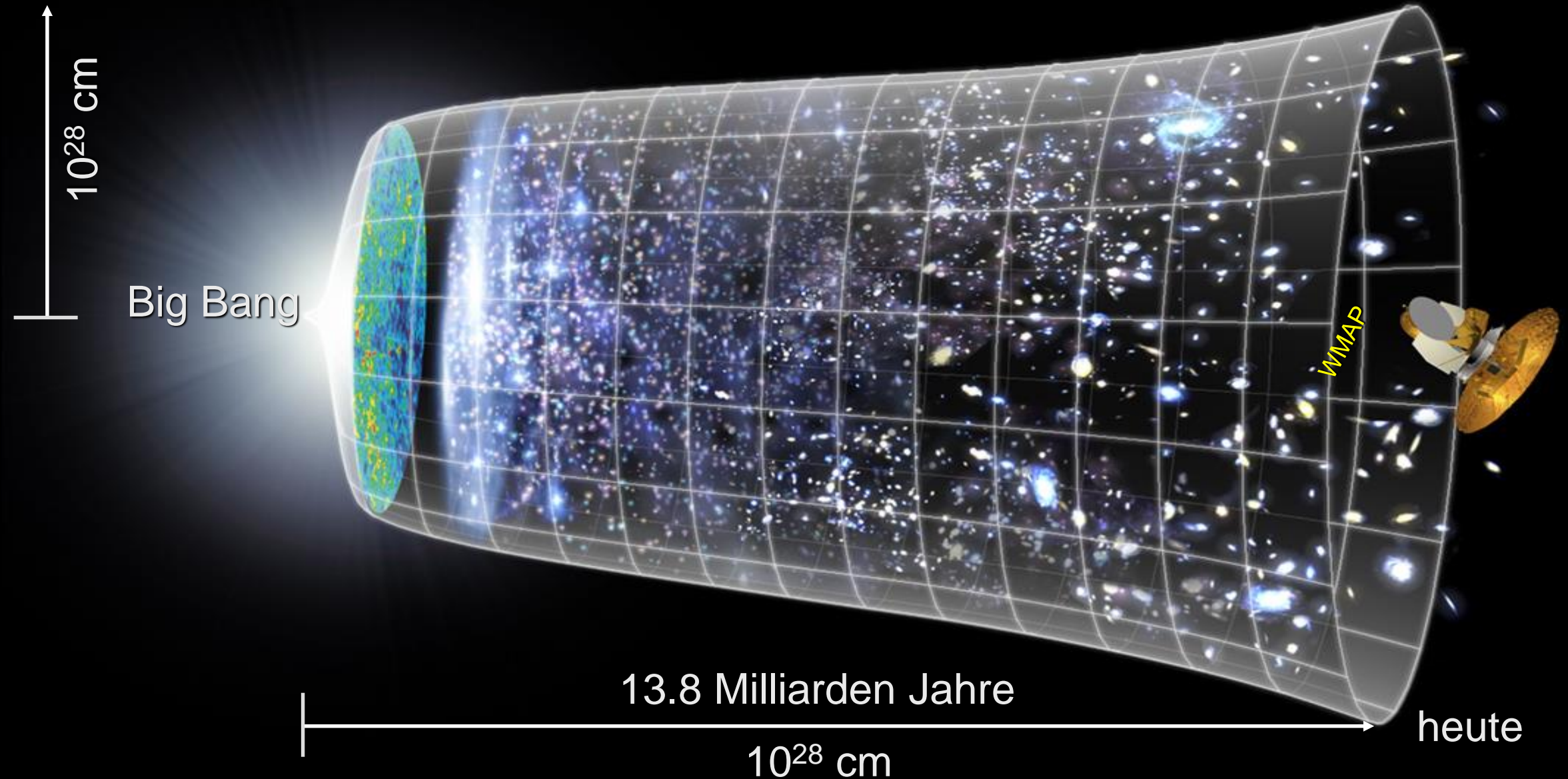
Zusammenarbeit und Verständigung

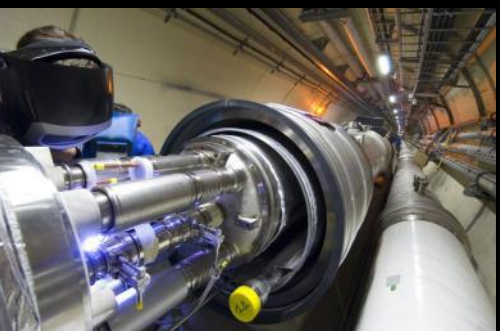
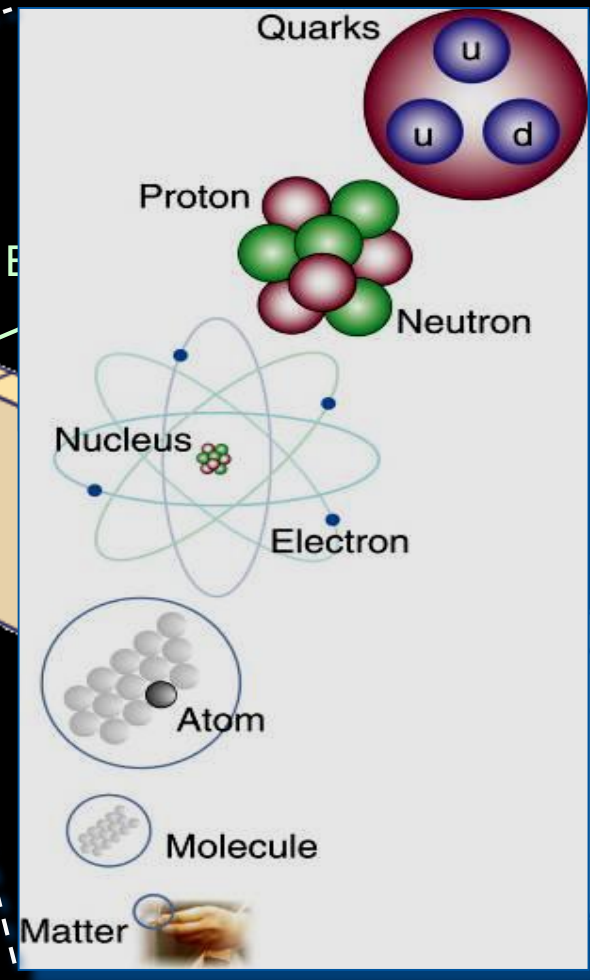
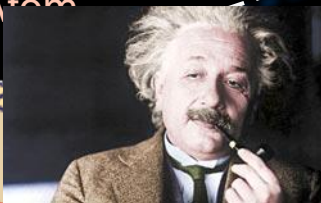
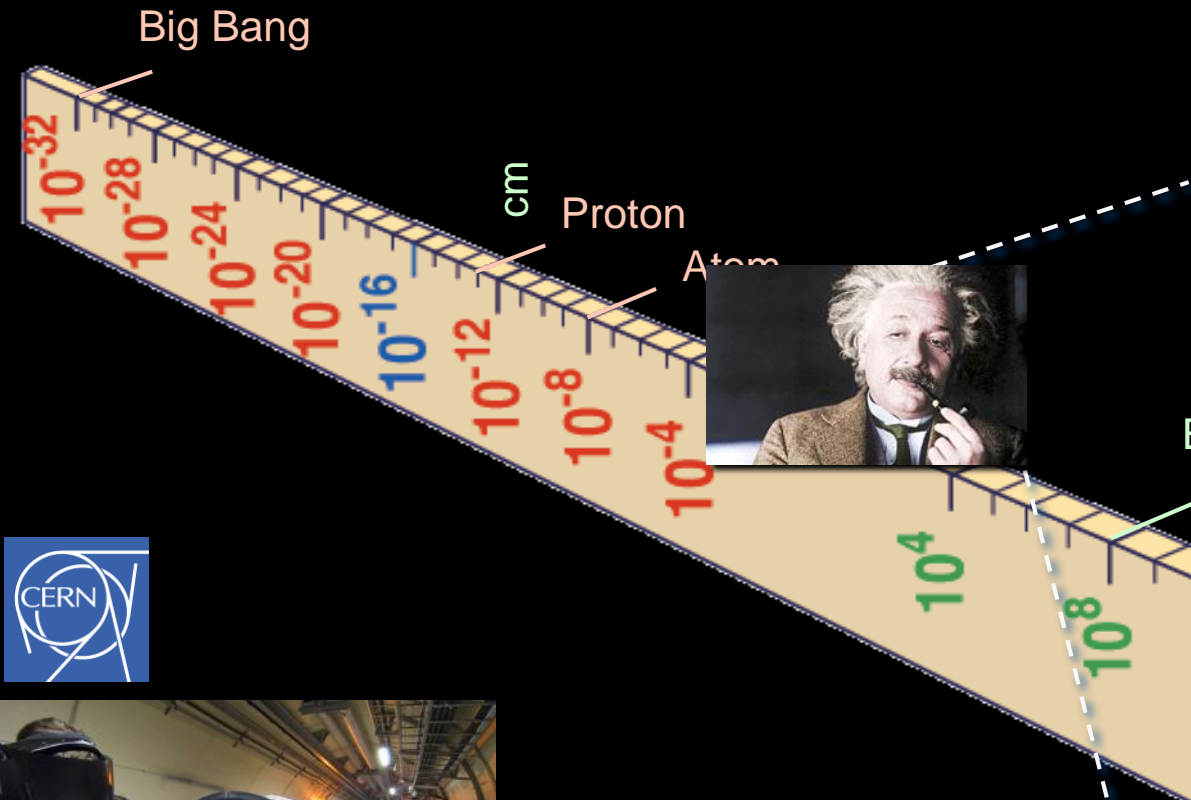


The Mission



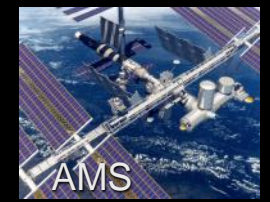
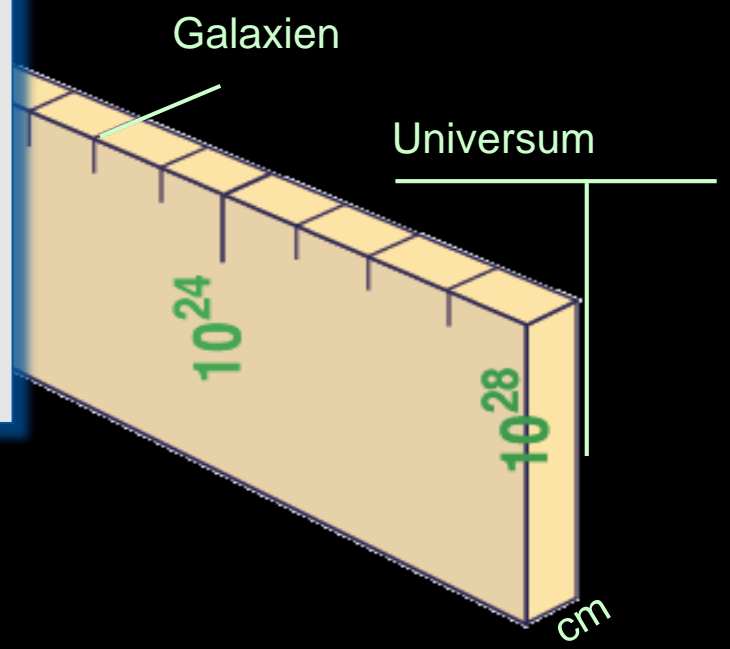
Die wissenschaftliche Herausforderung: Erforschung der Entwicklung des frühen Universums





LHC

Supermikroskop

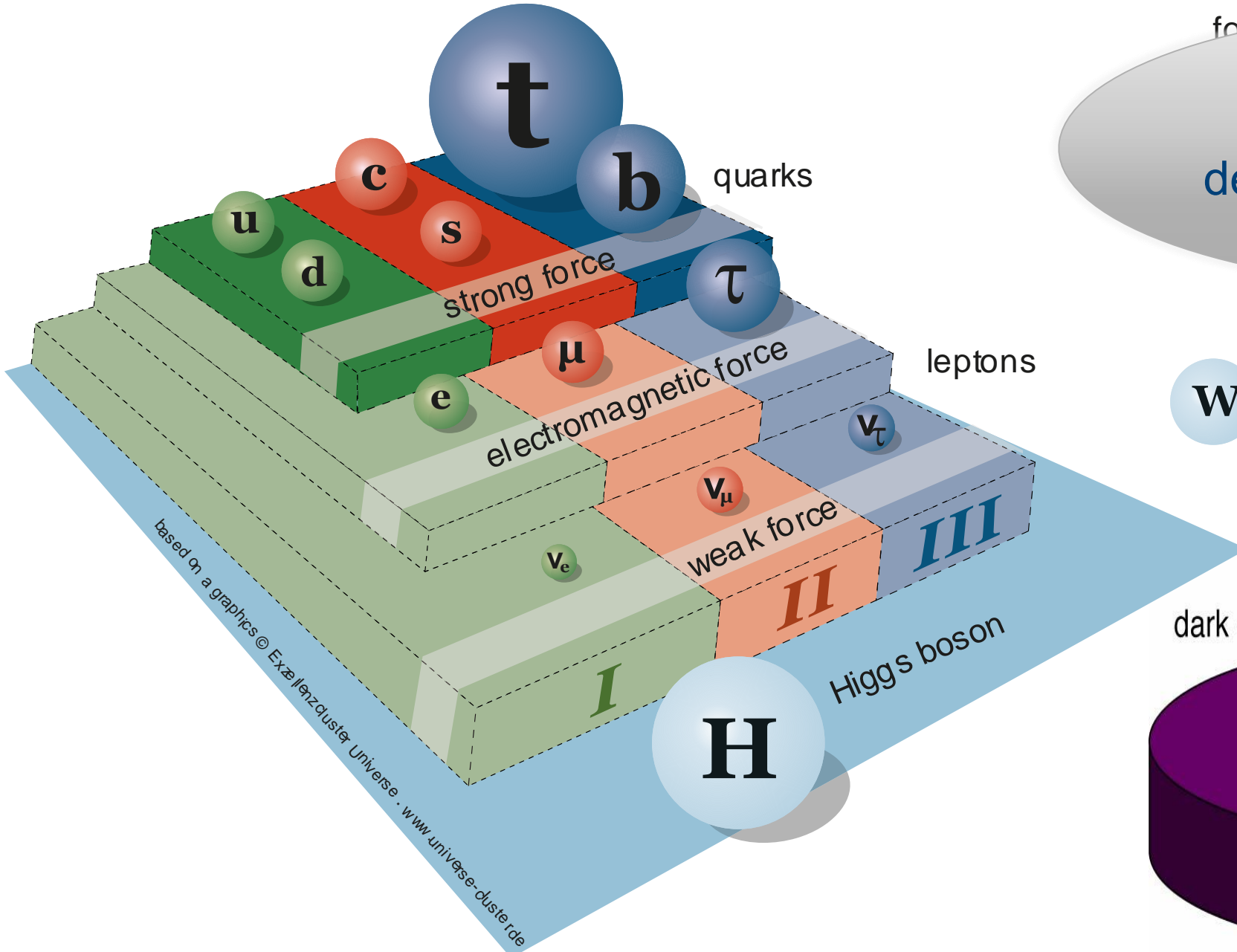




The Nobel Prize in Physics 2013 was awarded jointly to François Englert and Peter W. Higgs "for the theoretical discovery of a mechanism that contributes to our understanding of the origin of mass of subatomic particles, and which recently was confirmed through the discovery of the predicted fundamental particle, by the ATLAS and CMS experiments at CERN's Large Hadron Collider".

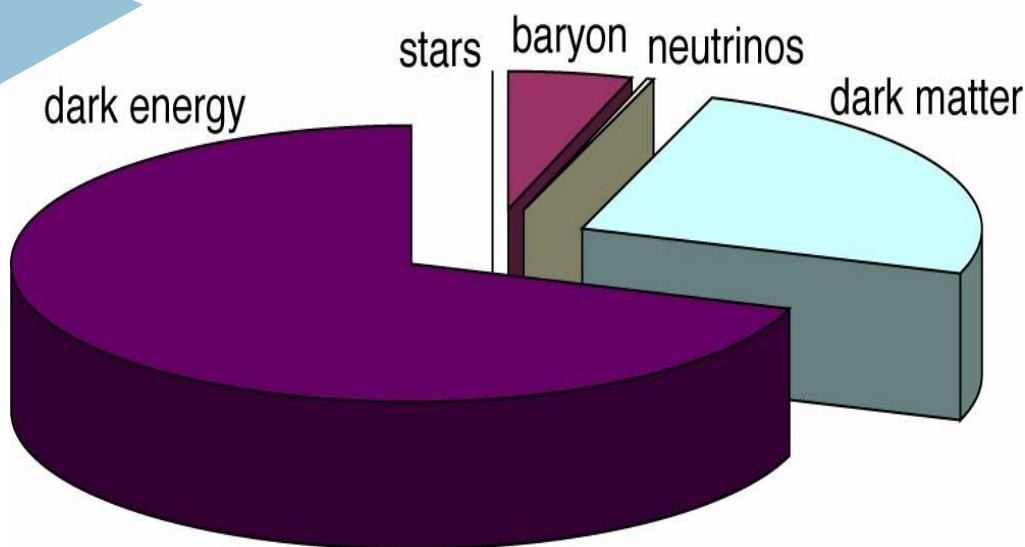


Physics Nobel Prize 2013

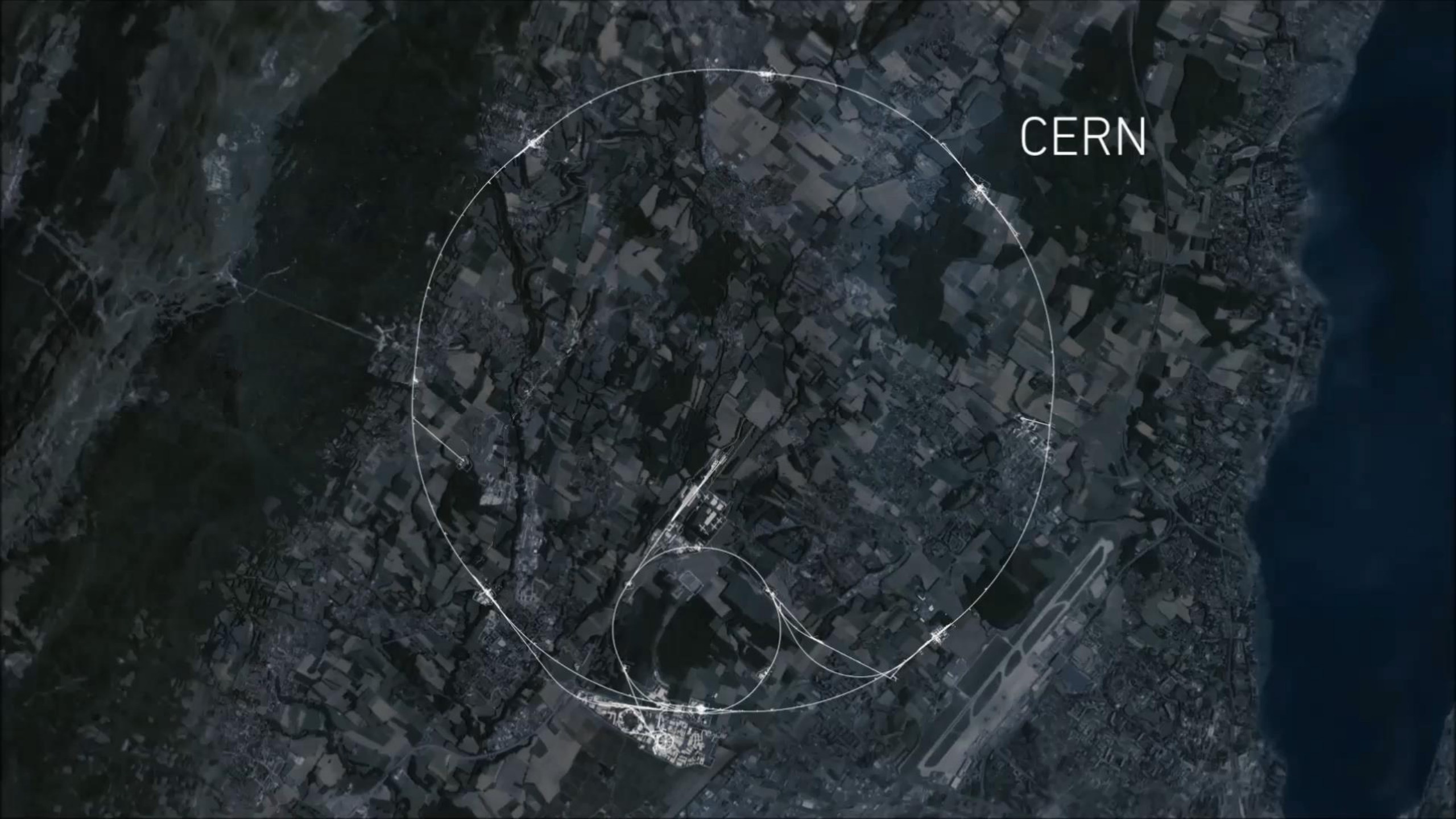


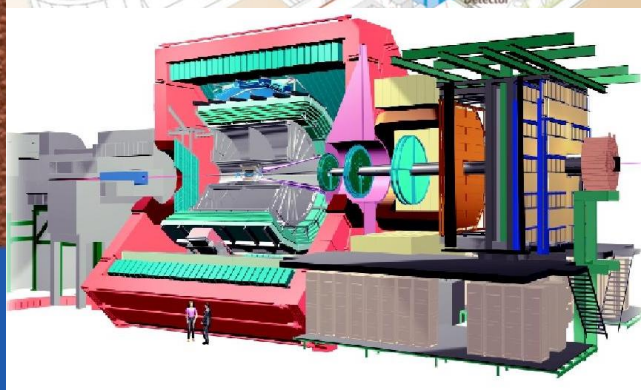
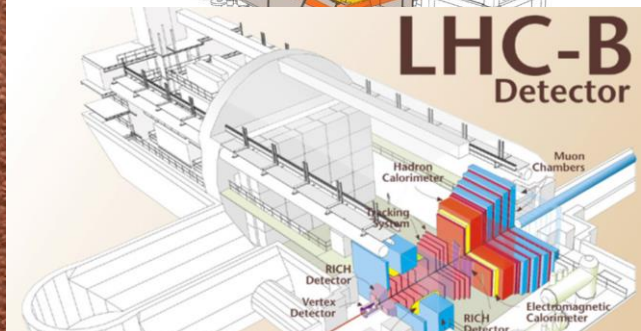
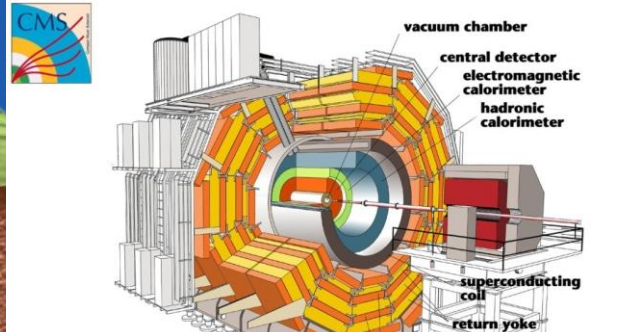
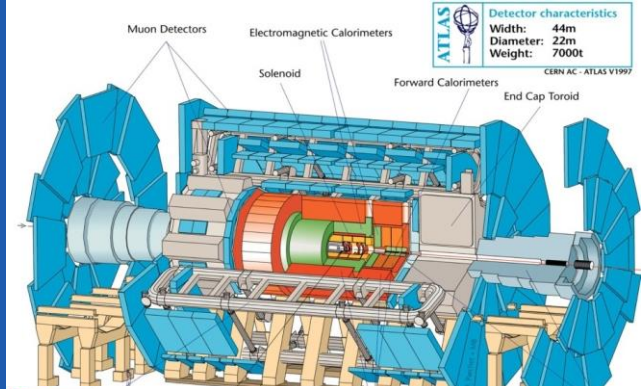
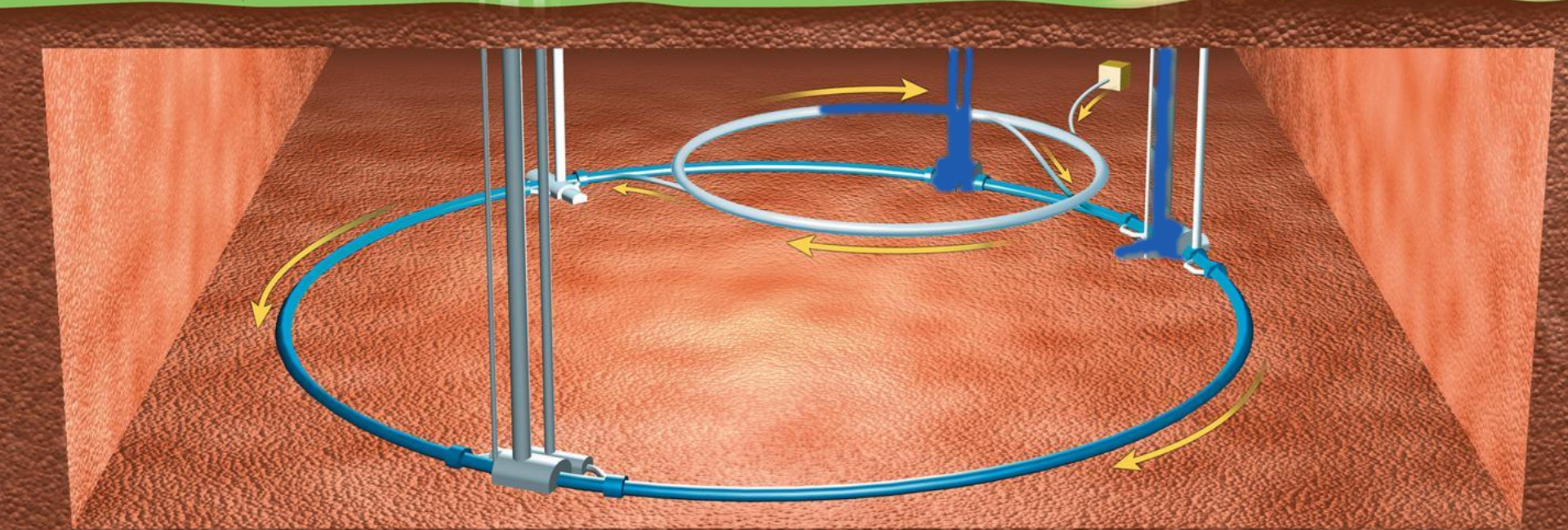
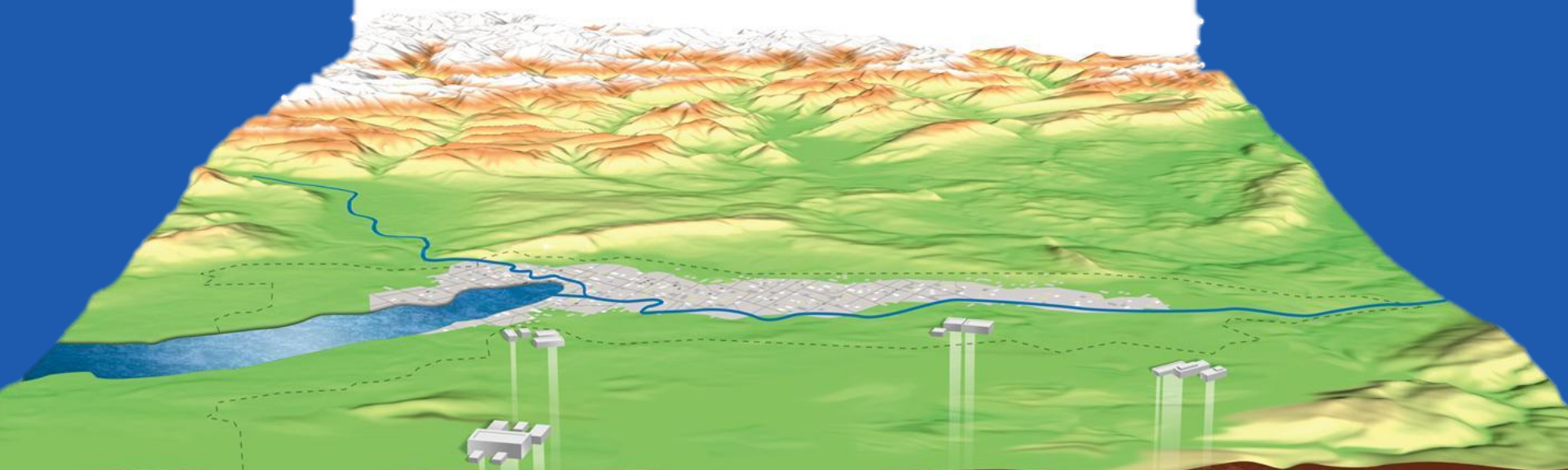
„Es gibt Licht am Ende des dunklen Universums!“

W^+ Z^0 W^-



CERN





Weitere Aktivitäten



Apprentices

Doctoral Students

Accelerator School

Academic Training

Exhibitions

Fellows

Physics School

Computing School

Visits

CERN-Latin America School

Technical Students

Summer Students

Microcosm

Outreach

Language Training

Technical Training

Science on Stage

Communications Training

Conferences

Teachers programmes

Management Training



Teilchendetektion

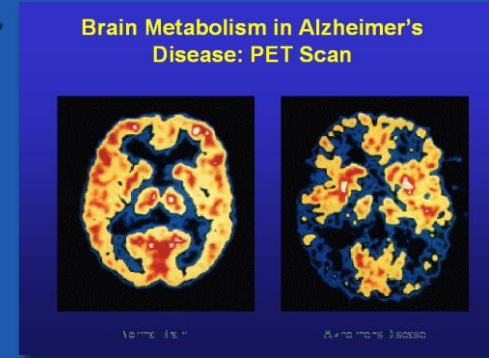
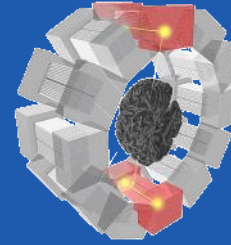


Bildgebung

klinischer Test für ein neues Mammografie-System (ClearPEM)



PET Scanner

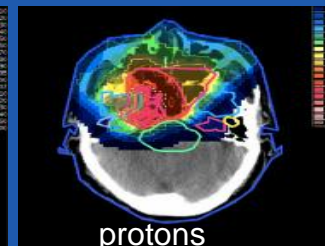
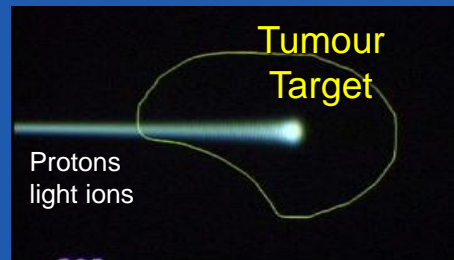


beschleunigte Teilchenstrahlen

~30'000 Beschleuniger weltweit
~17'000 für medizinische Nutzung



Hadronentherapie



>70'000 Patienten weltweit (30 Einrichtungen)
>21'000 Patienten in Europa (9 Einrichtungen)

Kompetenzen in der Ionen-Therapie sind nun in Japan und Europa konzentriert



Medizinische Anwendungen

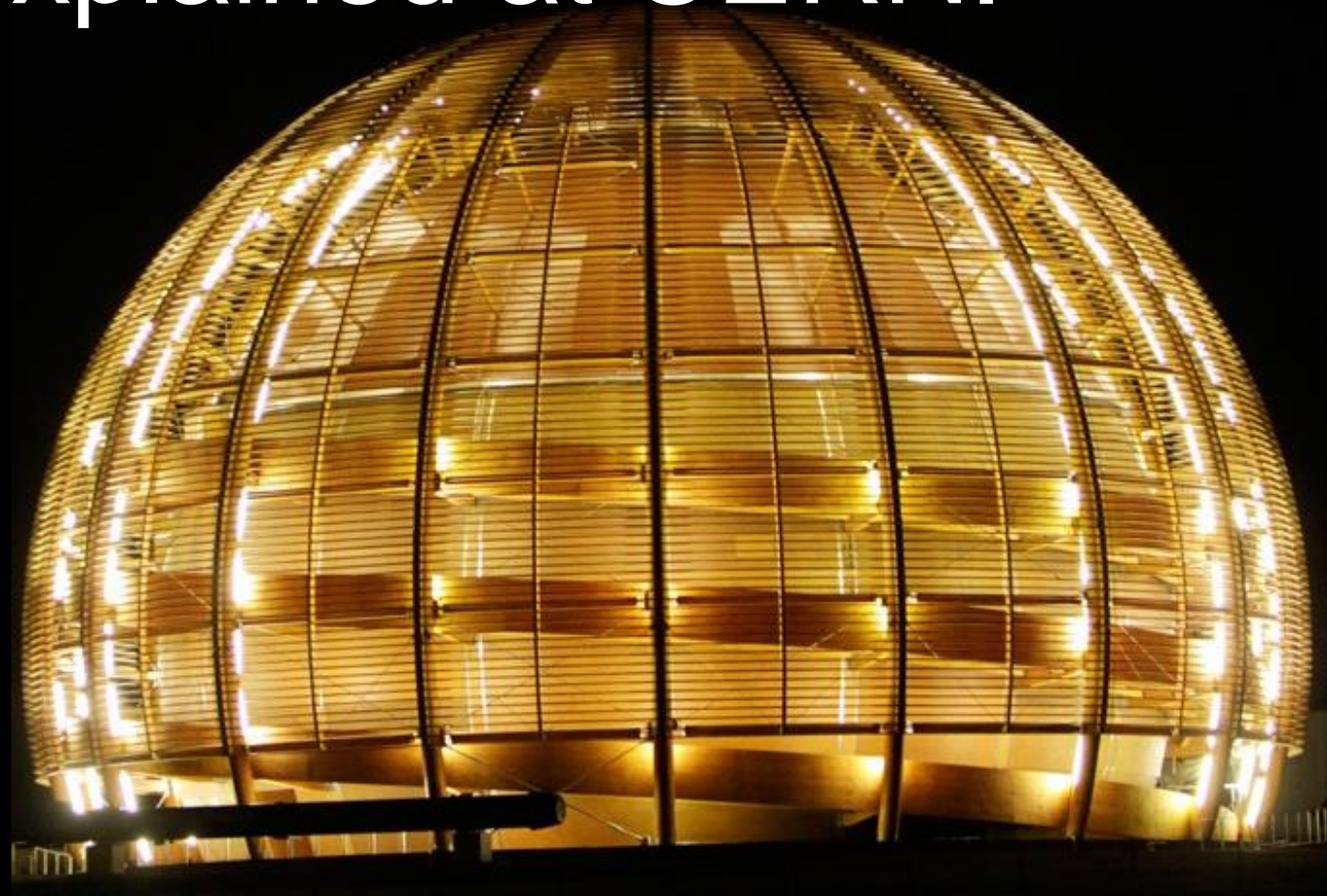
World Wide Web

WWW



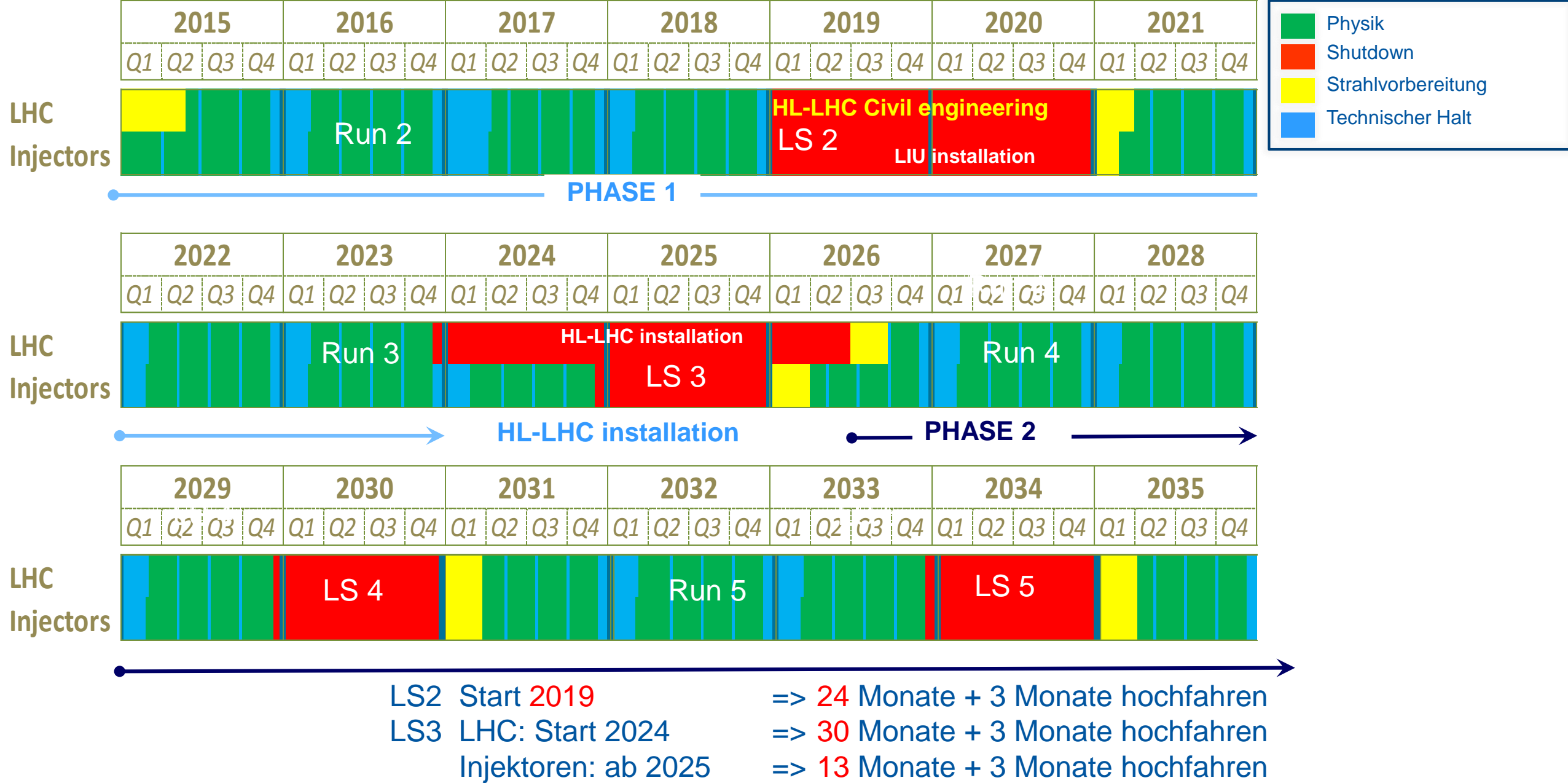
“Magic is not happening at CERN,
magic is being explained at CERN.”

Tom Hanks



European Organization for Particle Physics
Organisation européenne pour la physique des particules

Was passiert zur Zeit?



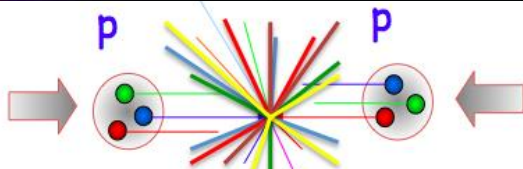
Und dann?



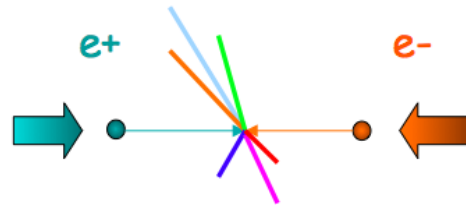
Proton

Elektron
Positron

LHC



CLIC



p-p Kollisionen

e⁺e⁻ Kollisionen

Ein Proton ist ein zusammengesetztes Objekt

- Der Initialzustand ist nicht pro Ereignis bekannt
- schränkt die Präzision ein

e⁺/e⁻ sind punktförmig

- Initialzustand ist gut bekannt (\sqrt{s} / Polarisation)
- hochpräzise Messungen möglich

Hohe Raten von QCD-Untergrund

- komplexe Trigger notwendig
- hohe Strahlungsraten

Sehr klare Experimente

- Auslese sogar ohne Trigger möglich
- sehr niedrige Strahlungsraten

High cross-sections for **colored-states**

Superior sensitivity for **electro-weak states**



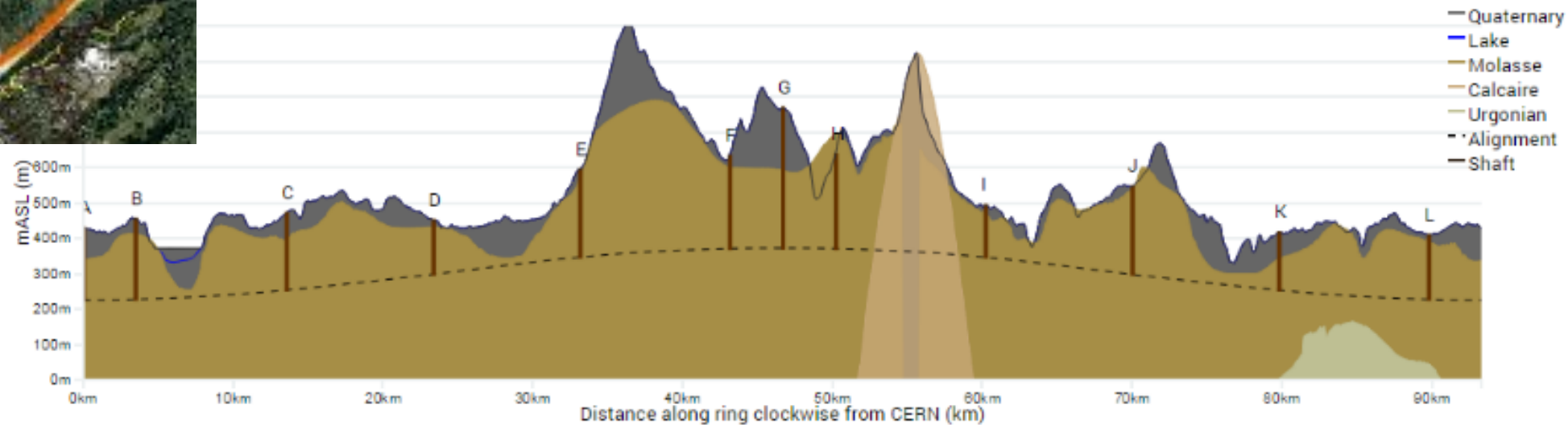


Eine internationale Studie

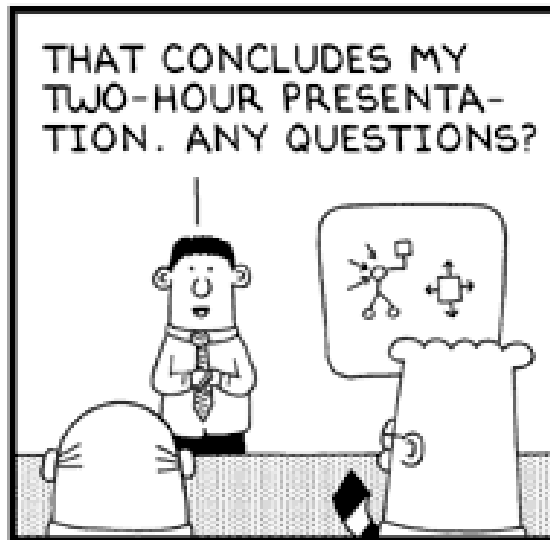
- pp -Kollider ($FCC-hh$)
- e^+e^- -Kollider ($FCC-ee$)
- $p-e$ ($FCC-he$) Option
- 80-100 km Tunnel



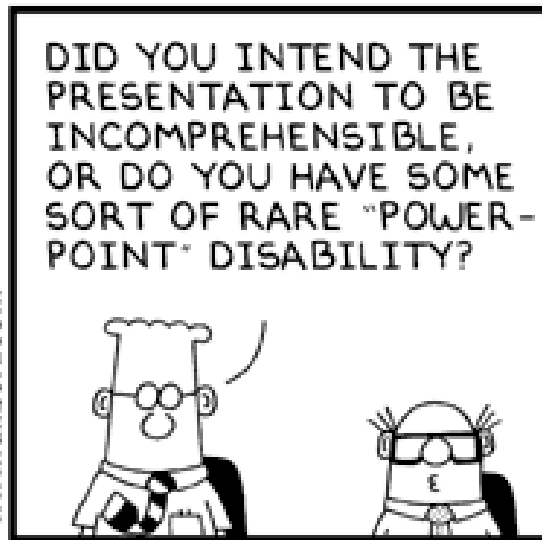
~16 T \Rightarrow 100 TeV pp in 100 km
 ~20 T \Rightarrow 100 TeV pp in 80 km



Ihre Fragen!



www.dilbert.com scottadams@aol.com



8/1/03 © 2003 United Feature Syndicate, Inc.

