

5-minutes tour of CERN

(based on official CERN slides)

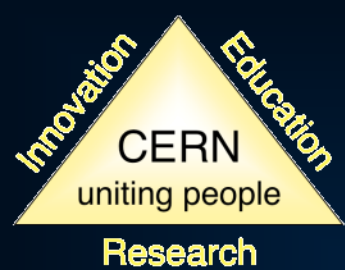


Christian Joram / CERN

EIROforum Topical Workshop on Managing Instrumentation Projects
ESO, 19-21 May 2014



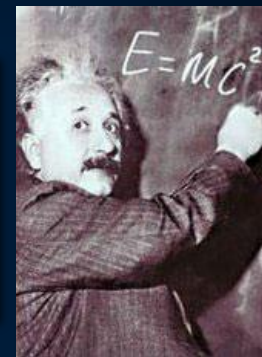
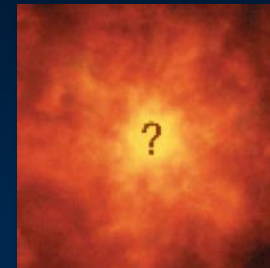
Accelerating Science and Innovation



The Mission of CERN

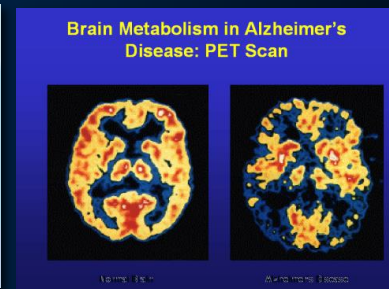
- ❑ **Push back** the frontiers of knowledge

E.g. the secrets of the Big Bang: what was the matter like within the first moments of the universe's existence?



- ❑ **Develop** new technologies, accelerators and detectors

Information technology
Medicine - diagnosis and therapy



- ❑ **Train** scientists and engineers of tomorrow



- ❑ **Unite** people from different countries and cultures



CERN was founded 1954: 12 European States

“Science for Peace”

Today: 21 Member States

~ 2300 staff
~ 1600 other paid personnel
~ 10500 users
Budget (2014) ~1000 MCHF

Member States: Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Israel, Italy, the Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom

Candidate for Accession: Romania

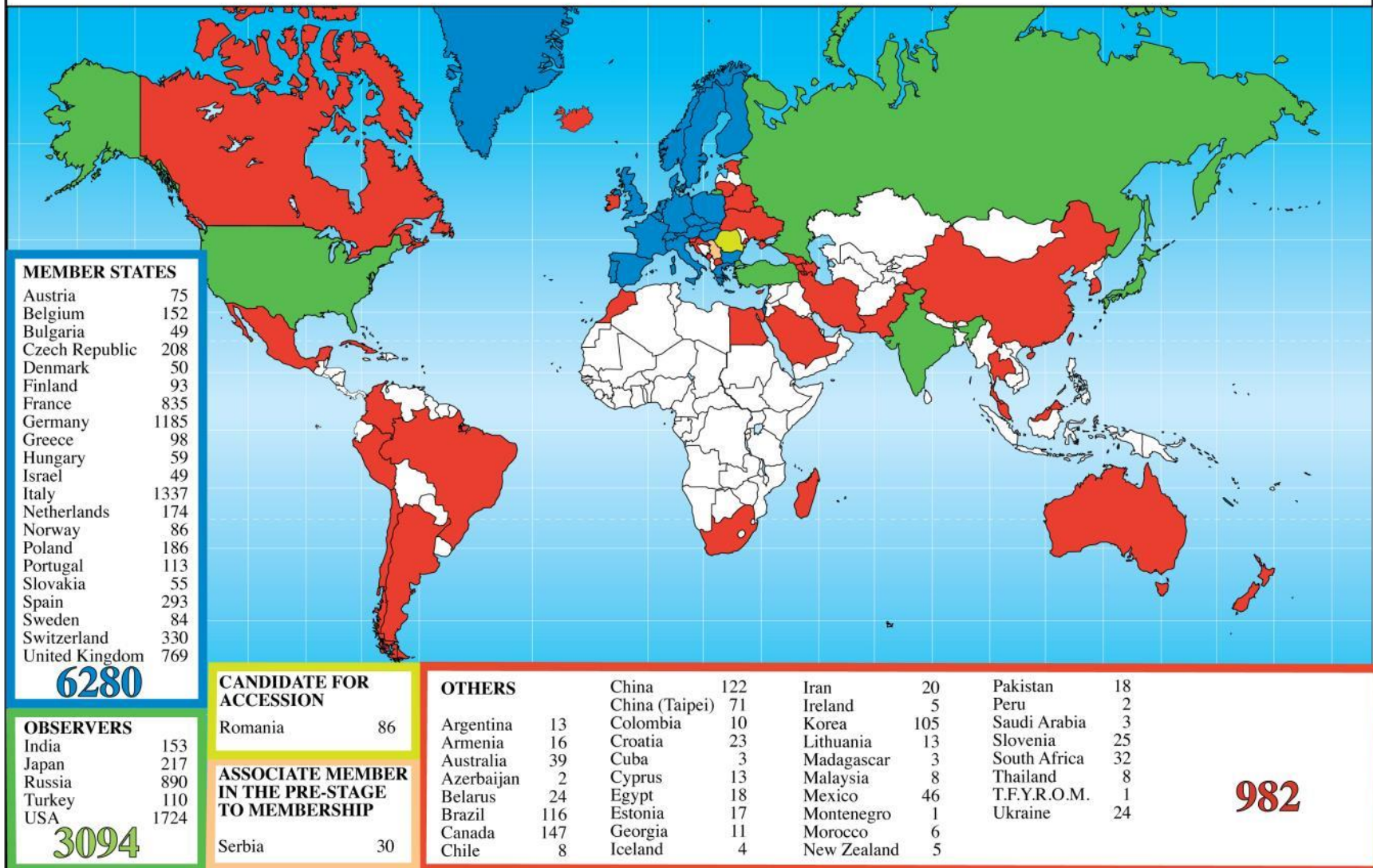
Associate Member in Pre-Stage to Membership: Serbia

Applicant States for Membership or Associate Membership:
Brazil, Cyprus, Pakistan, Russia, Slovenia, Turkey, Ukraine

Observers to Council: India, Japan, Russia, Turkey, United States of America; European Commission and UNESCO

Science is getting more and more global

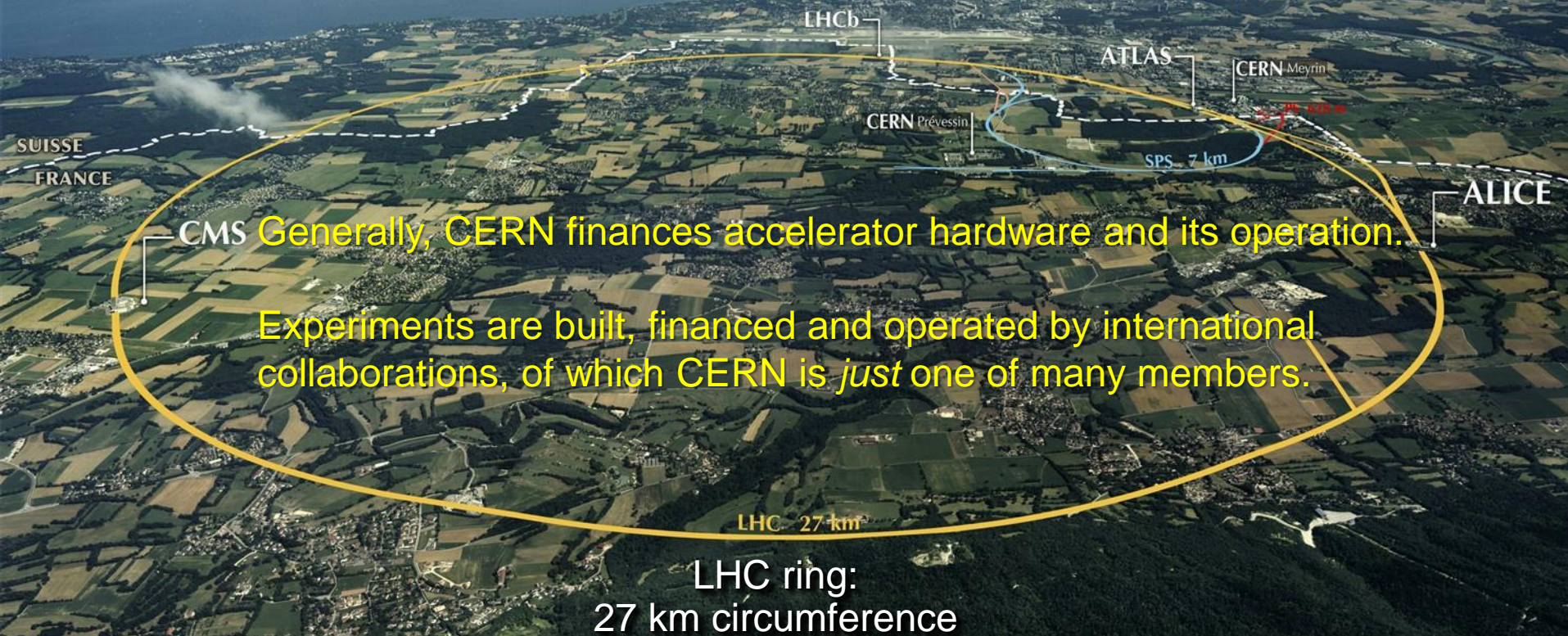
Distribution of All CERN Users by Location of Institute on 14 January 2014



2010: a New Era in Fundamental Science



There are also very fruitful physics programmes at **SPS, PS / AD, Isolde, Neutrino beam** (towards Gran Sasso lab) as well as some exotic experiments (CLOUD, CAST, ...)





Thank You!



Accelerating Science and Innovation

CERN: Particle Physics and Innovation

- ❑ **Interfacing** between fundamental science and key technological developments



- ❑ **CERN Technologies and Innovation**



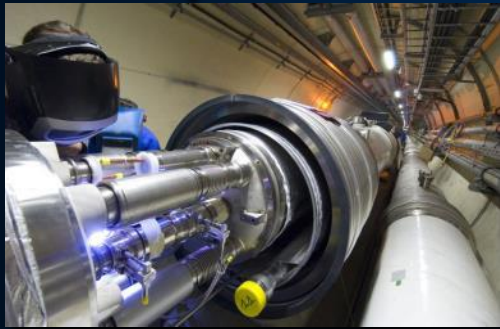
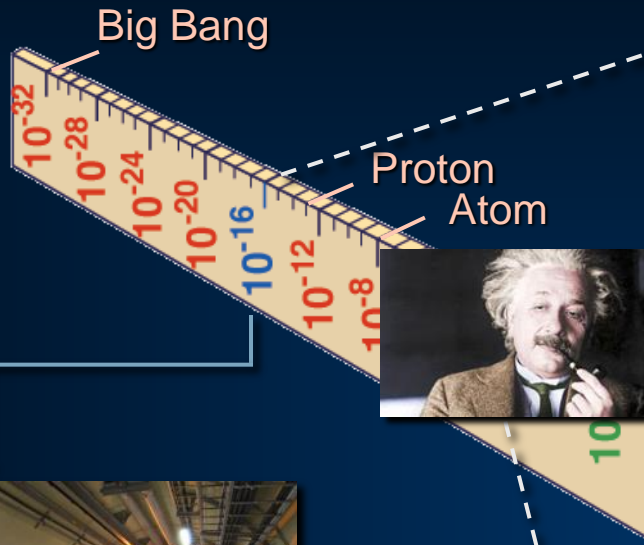
Accelerating particle beams



Detecting particles



Large-scale computing (Grid)

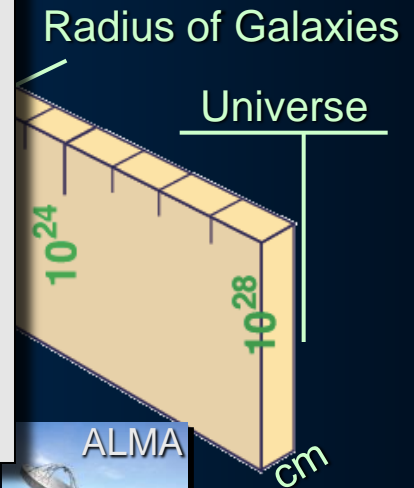
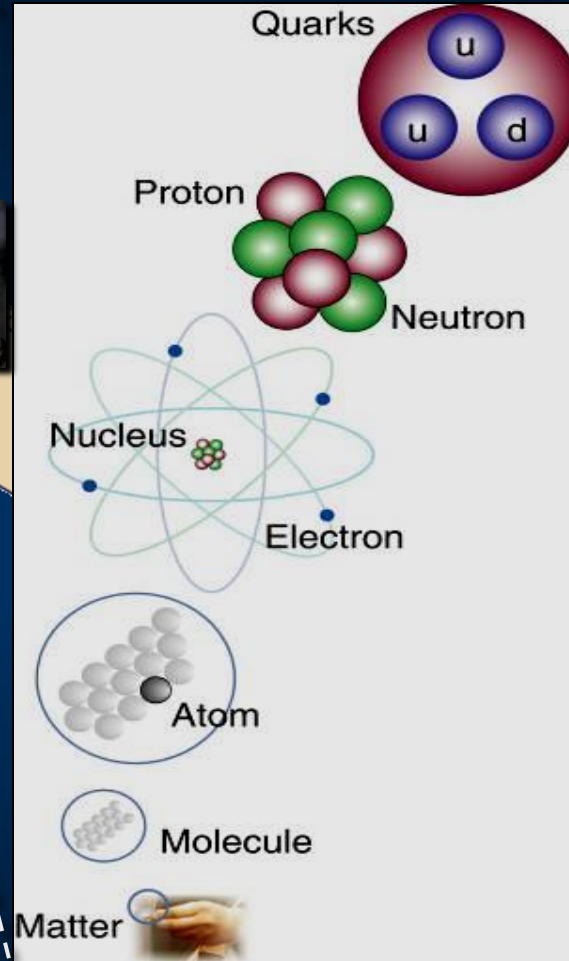


LHC

Super-Microscope



Study physics laws of first moments after Big Bang
increasing Symbiosis between Particle Physics,
Astrophysics and Cosmology



Nobel Prize in Physics 2013



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"*.

Medical Application as an Example of Particle Physics Spin-off

Combining Physics, ICT, Biology and Medicine to fight cancer

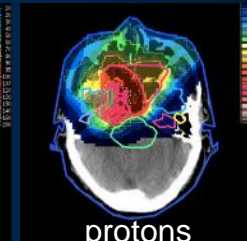
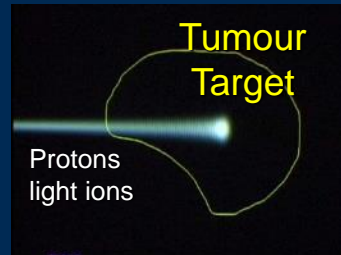


Hadron Therapy

Accelerating particle beams

~30'000 accelerators worldwide

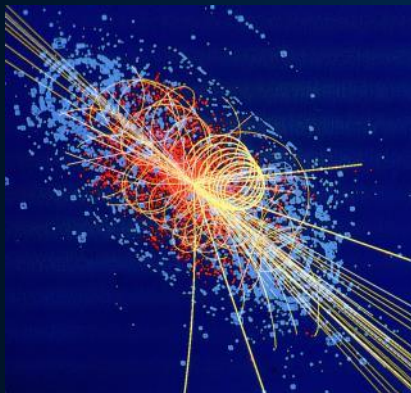
~17'000 used for medicine



Leadership in Ion Beam Therapy now in Europe and Japan

>100'000 patients treated worldwide (45 facilities)

>50'000 patients treated in Europe (14 facilities)

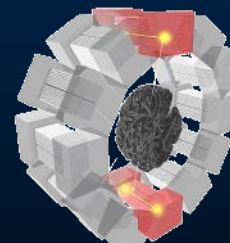


Imaging

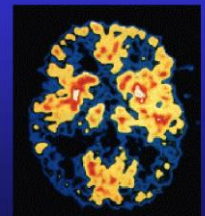
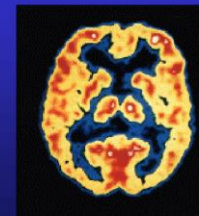
Clinical trial in Portugal, France and Italy for new breast imaging system (ClearPEM)



PET Scanner



Brain Metabolism in Alzheimer's Disease: PET Scan



Detecting particles

CERN Education Activities

Scientists at CERN

Academic Training Programme



Latin American School
Natal, Brazil, 2011
Arequipa, Peru, 2013



Young Researchers

CERN School of High Energy Physics
CERN School of Computing
CERN Accelerator School



Physics Students

Summer Students
Programme

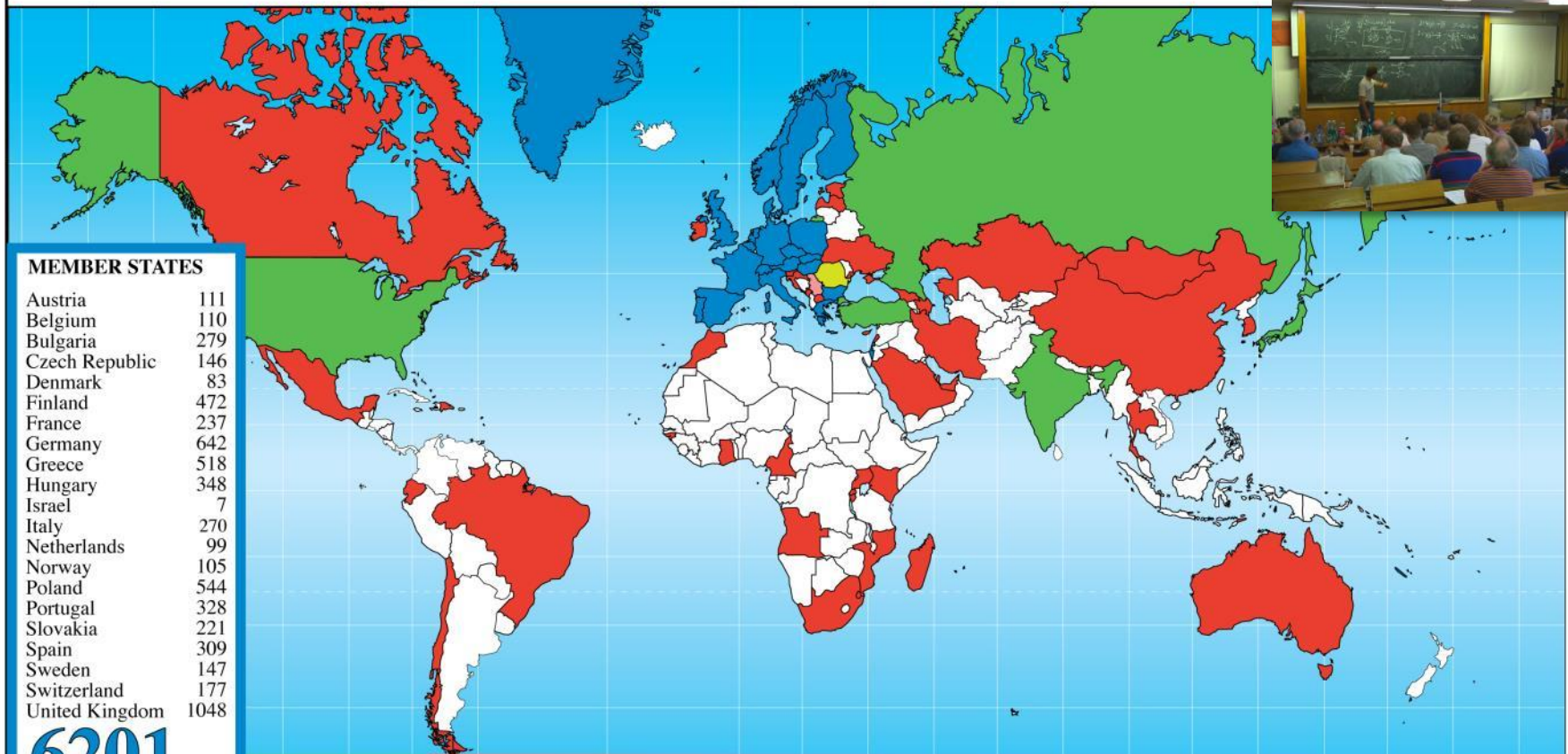


CERN Teacher Schools

International and National
Programmes

CERN Teacher Programme

Teacher Programme Participants 1998 - 2013 (Total: 7087)



MEMBER STATES

Austria	111
Belgium	110
Bulgaria	279
Czech Republic	146
Denmark	83
Finland	472
France	237
Germany	642
Greece	518
Hungary	348
Israel	7
Italy	270
Netherlands	99
Norway	105
Poland	544
Portugal	328
Slovakia	221
Spain	309
Sweden	147
Switzerland	177
United Kingdom	1048

6201

CANDIDATE FOR ACCESSION

Romania	12
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ASSOCIATE MEMBER IN THE PRE-STAGE TO MEMBERSHIP

Serbia	14
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OBSERVER STATES

India	2
Japan	5
Russia	193
Turkey	3
USA	65

268

OTHERS

Angola	4
Australia	5
Azerbaijan	1
Brazil	114
Burundi	1
Cameroon	3
Canada	3
Cape Verde	3
Chile	3

China	1
Croatia	1
Cyprus	8
Dominican Rep.	21
Ecuador	2
Estonia	46
Georgia	74
Ghana	6
Guinea Bissau	1
Iran	1
Ireland	5
Kazakhstan	3
Kenya	4
Latvia	1
Lebanon	1
Madagascar	2
Malta	36
Mexico	6
Mongolia	1
Montenegro	13

Morocco	2
Mozambique	17
Qatar	1
Rwanda	17
Sao Tome	4
Saudi Arabia	1
Singapore	2
Slovenia	21
South Africa	6
South Korea	44

Swaziland	1
Thailand	7
T.F.Y.R.O.M.	11
Timor-Leste	7
Uganda	3
Ukraine	77
U.A.E.	1

592

Summer Students 2013



Summer Students 2013



MEMBER STATES 136

Austria	3
Belgium	3
Bulgaria	2
Czech Republic	5
Denmark	6
Finland	3
France	13
Germany	20
Greece	8
Hungary	2
Israel	2
Italy	12
Netherlands	9
Norway	3
Poland	3
Portugal	3
Slovakia	3
Spain	9
Sweden	7
Switzerland	4
United Kingdom	16

OBSERVERS 43

India	7
Japan	5
Russia	9
Turkey	6
USA	16

CANDIDATE FOR ACCESSION

Romania	3
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ASSOCIATE MEMBER IN THE PRE-STAGE TO MEMBERSHIP

Serbia	2
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OTHERS

Algeria	2	China	5	Estonia	4	Korea, South	2	New Zealand	1	Tunisia	1
Argentina	1	Colombia	1	Georgia	1	Lebanon	1	Pakistan	4	Ukraine	2
Australia	1	Comoros	1	Ghana	1	Lithuania	2	Palestine	1	U.A.E.	2
Bangladesh	1	Costa Rica	1	Hong Kong	4	Madagascar	1	Philippines	1	Venezuela	1
Belarus	1	Croatia	3	Iceland	1	Malaysia	3	Saudi Arabia	1	Zambia	1
Benin	1	Cuba	1	Indonesia	3	Malta	3	Slovenia	1		
Brazil	1	Cyprus	2	Iran	2	Mexico	2	South Africa	2		
Canada	5	Ecuador	3	Ireland	1	Morocco	2	Thailand	2		
Chile	1	Egypt	4	Kazakhstan	1	Nepal	1	T.F.Y.R.O.M.	2		