CERN's Enlargement Policy

Nations United through Global Science

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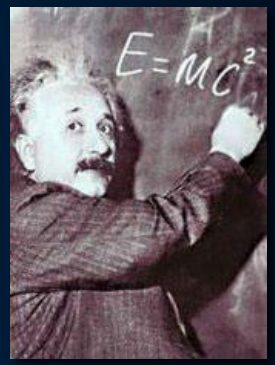
Head of Associate & Non-Member State Relations

Promoting Particle Physics Worldwide
7 October 2016

Innovation Education
CERN
uniting people
Research

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 for accelerators and detectors

  Information technology - the Web and the GRID

  Medicine - diagnosis and therapy

- **Train** scientists and engineers of tomorrow

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

CERN: founded in 1954: 12 European States

"Science for Peace"

Today: 22 Member States

~ 2300 staff
~ 1400 other paid personnel
~ 12500 scientific users

Budget (2016) ~1000 MCHF

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

Associate Member States: Pakistan, Turkey, Ukraine

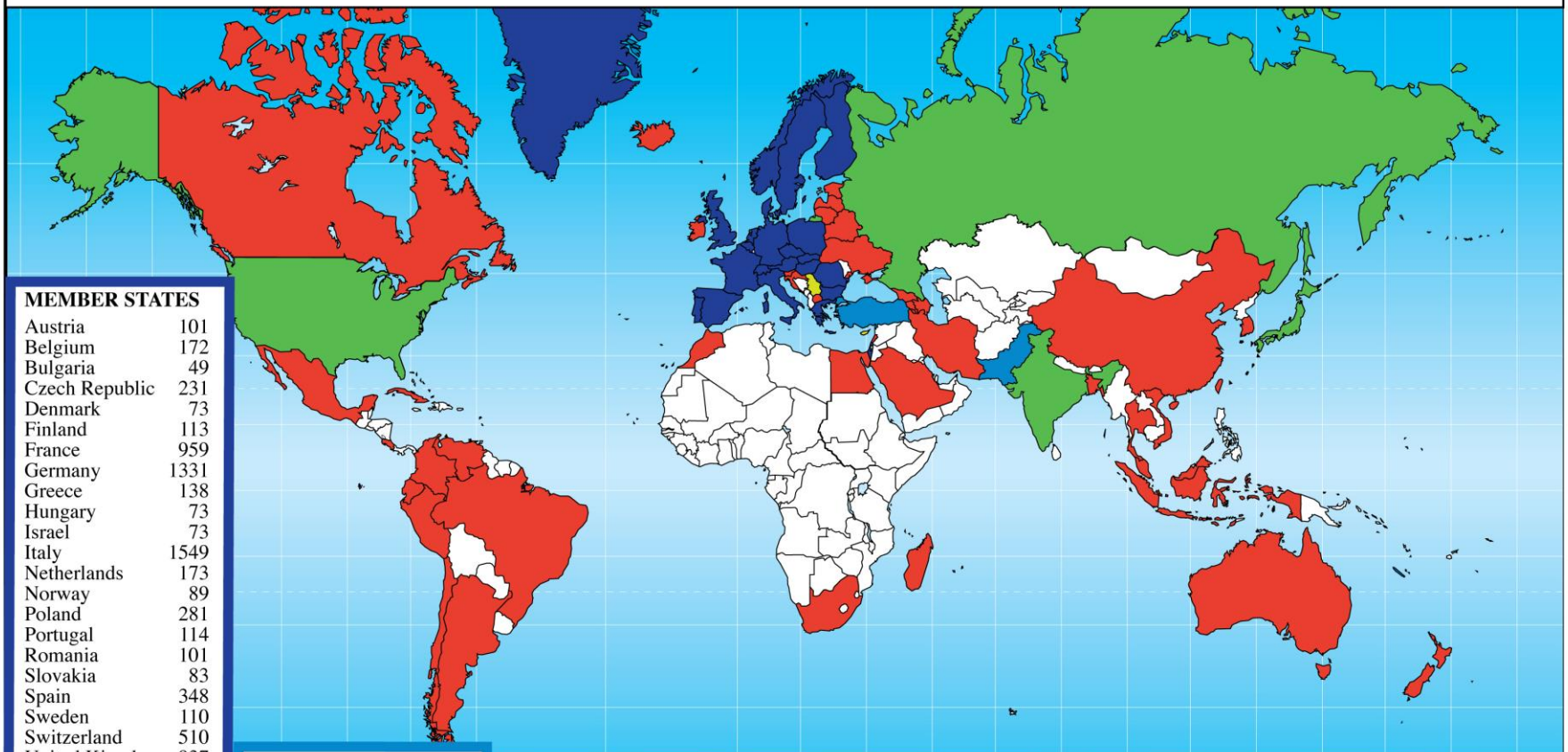
States in accession to Membership: Cyprus, Serbia

Applications for Membership or Associate Membership: Brazil, Croatia, India, Lithuania, Russia, Slovenia

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

Science is getting more and more global

Distribution of All CERN Users by Location of Institute on 19 September 2016



MEMBER STATES

Austria	101
Belgium	172
Bulgaria	49
Czech Republic	231
Denmark	73
Finland	113
France	959
Germany	1331
Greece	138
Hungary	73
Israel	73
Italy	1549
Netherlands	173
Norway	89
Poland	281
Portugal	114
Romania	101
Slovakia	83
Spain	348
Sweden	110
Switzerland	510
United Kingdom	937

7608

ASSOCIATE MEMBERS

Pakistan	45
Turkey	131

176

OBSERVERS

India	199
Japan	275
Russia	1019
USA	2002

3495

STATES IN ACCESSION TO MEMBERSHIP

Cyprus	15
Serbia	37

52

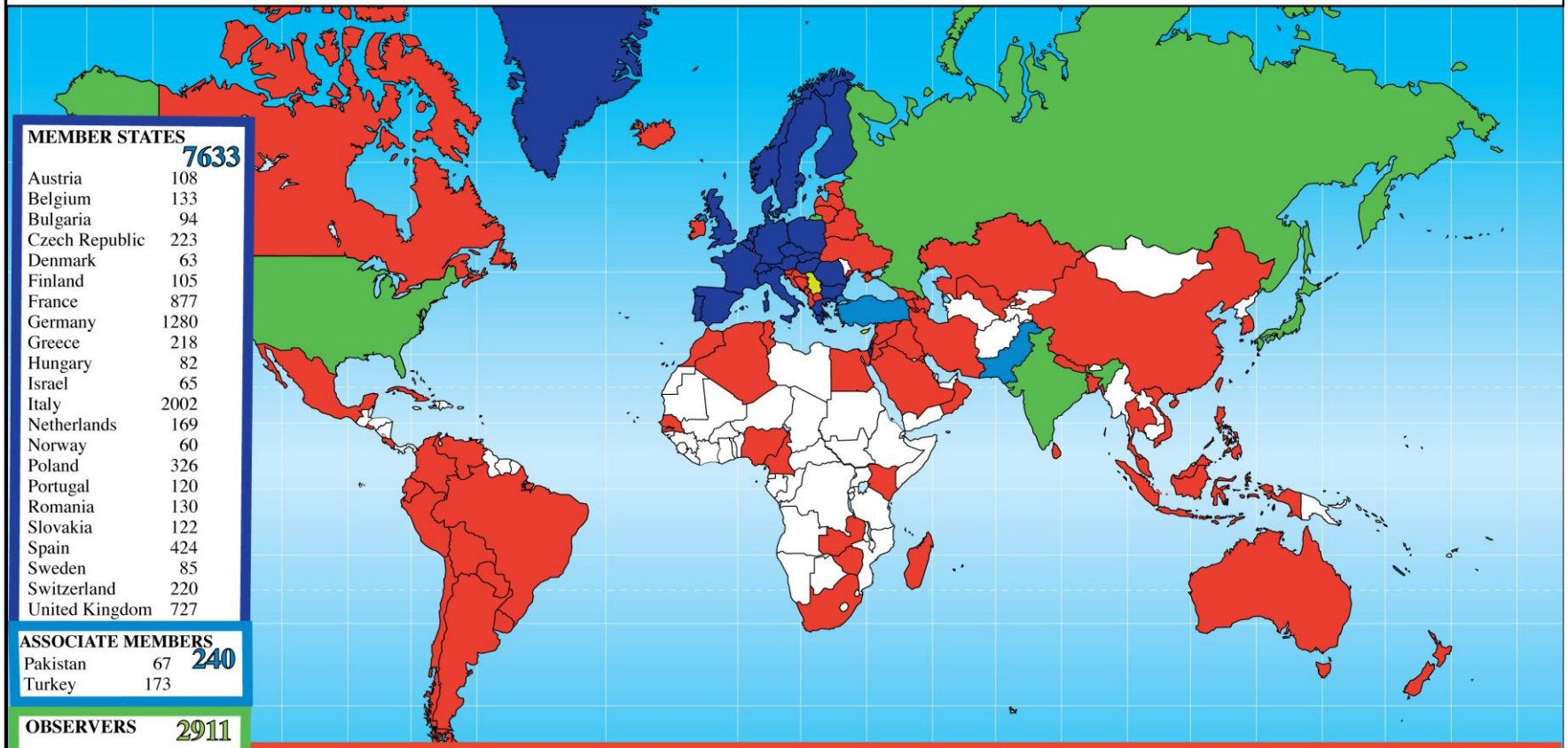
OTHERS

Argentina	24	China	207	Iceland	4	Malta	8	Thailand	14
Armenia	18	Colombia	18	Indonesia	9	Mexico	61	TFYROM	2
Australia	39	Costa Rica	1	Iran	31	Morocco	10	Ukraine	31
Azerbaijan	5	Croatia	26	Ireland	7	New Zealand	9	Venezuela	1
Bangladesh	4	Cuba	3	Korea	145	Peru	3	Viet Nam	1
Belarus	23	Ecuador	2	Latvia	1	Saudi Arabia	1		
Brazil	136	Egypt	26	Lebanon	1	Singapore	3		
Canada	188	Estonia	17	Lithuania	22	Slovenia	21		
Chile	19	Georgia	27	Madagascar	2	South Africa	54		
		Hong Kong	23	Malaysia	14	Taiwan	79		

1340

Science is getting more and more global

Distribution of All CERN Users by Nationality on 19 September 2016



MEMBER STATES	7633
Austria	108
Belgium	133
Bulgaria	94
Czech Republic	223
Denmark	63
Finland	105
France	877
Germany	1280
Greece	218
Hungary	82
Israel	65
Italy	2002
Netherlands	169
Norway	60
Poland	326
Portugal	120
Romania	130
Slovakia	122
Spain	424
Sweden	85
Switzerland	220
United Kingdom	727

ASSOCIATE MEMBERS	240
Pakistan	67
Turkey	173

OBSERVERS	2911
India	319
Japan	306
Russia	1113
USA	1173

STATES IN ACCESSION TO MEMBERSHIP	69
Cyprus	23
Serbia	46

OTHERS															
		Bosnia & Herzegovina	1	Egypt	29	Kenya	3	Montenegro	2	Saudi Arabia	1	Tunisia	4
		Brazil	124	El Salvador	1	Korea Rep.	161	Morocco	17	Senegal	1	Ukraine	91
Albania	4	Cameroon	1	Estonia	14	Latvia	2	Nepal	8	Singapore	6	Uruguay	1
Algeria	10	Canada	160	Georgia	48	Lebanon	14	New Zealand	6	Sint Maarten	1	Uzbekistan	5
Argentina	20	Chile	23	Iceland	5	Lithuania	34	Nigeria	1	Slovenia	30	Venezuela	11
Armenia	24	China	437	Indonesia	12	Luxembourg	1	Oman	1	South Africa	38	Viet Nam	10
Australia	30	Colombia	40	Iran	59	Madagascar	2	Palestine (O.T.).	7	Sri Lanka	4	Zambia	1
Azerbaijan	10	Costa Rica	2	Iraq	1	Malaysia	18	Paraguay	1	Syria	1	Zimbabwe	5
Bangladesh	10	Croatia	40	Ireland	18	Malta	8	Peru	7	Taiwan	54		
Belarus	48	Cuba	17	Jordan	1	Mauritius	2	Philippines	3	Thailand	20		
Bolivia	3	Ecuador	4	Kazakhstan	1	Mexico	82	San Marino	1	T.F.Y.R.O.M.	2		

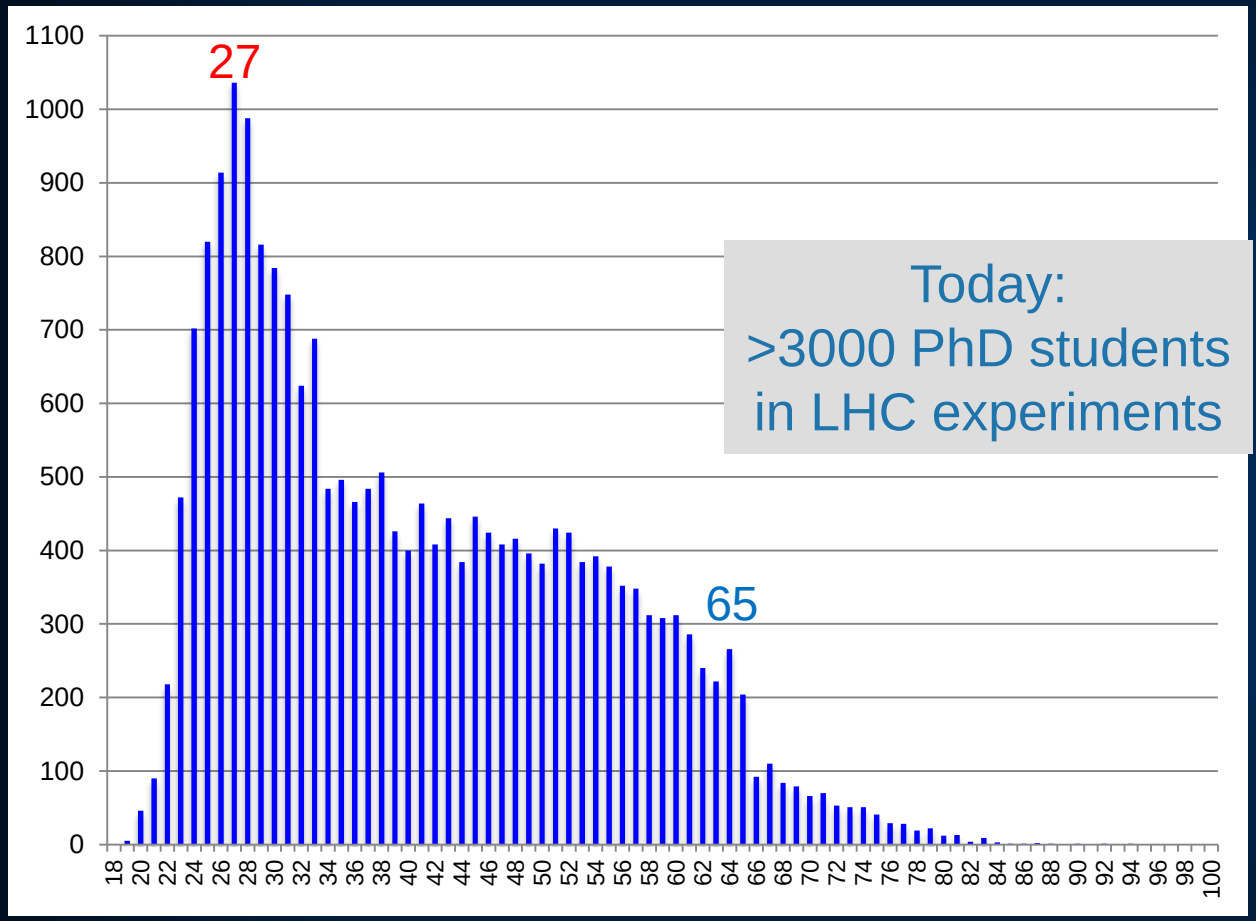
1864

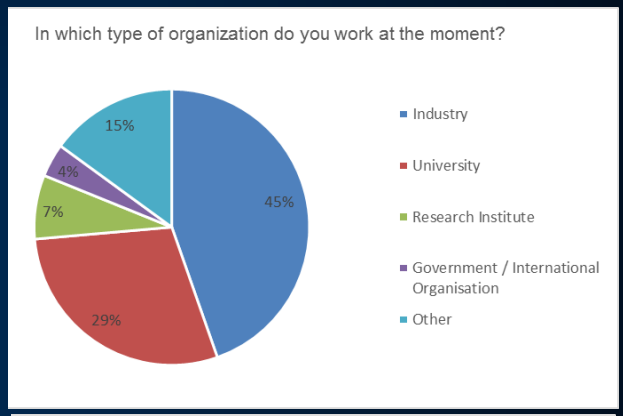
Participation of NMS

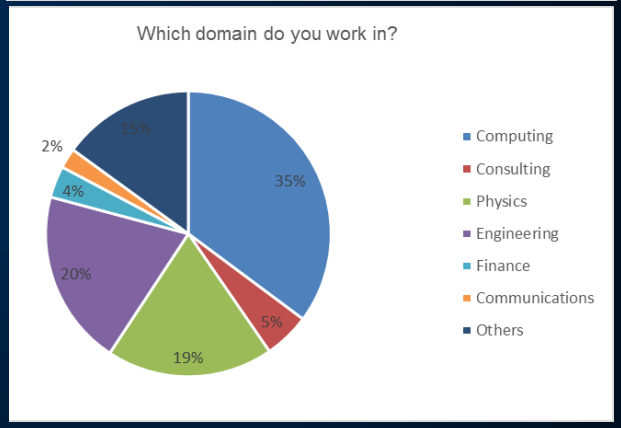
- CERN continues to attract an increasing/record number of Users (visiting scientists) – 12 500 (September 2016)
  - Participation of NMS Users on LHC is about 40% and on non-LHC about 20%.
  - NMS Users dominated by North America; increase mostly driven by Asia-Pacific and Latin America.
- Number of States involved/interested in accelerator R&D is growing beyond restricted circle of NMS that contributed to the LHC accelerator construction (which were mostly Observer States with the addition of Canada).

Age Distribution of Scientists

- and where they go afterwards

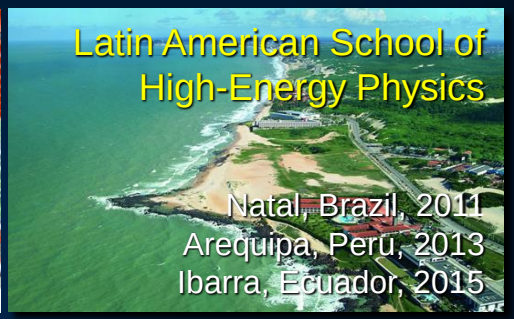






They do not all stay: where do they go?

CERN Education Activities

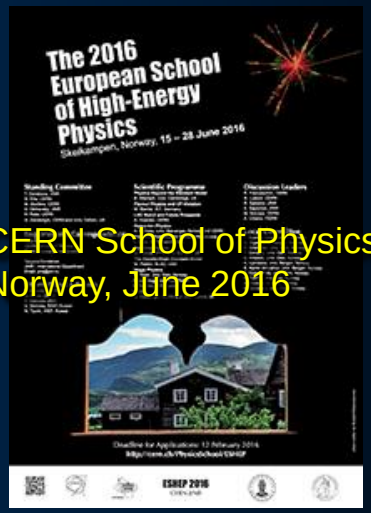


Scientists at CERN

Academic Training Programme

Young Researchers

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



CERN School of Physics
Norway, June 2016

Physics Students

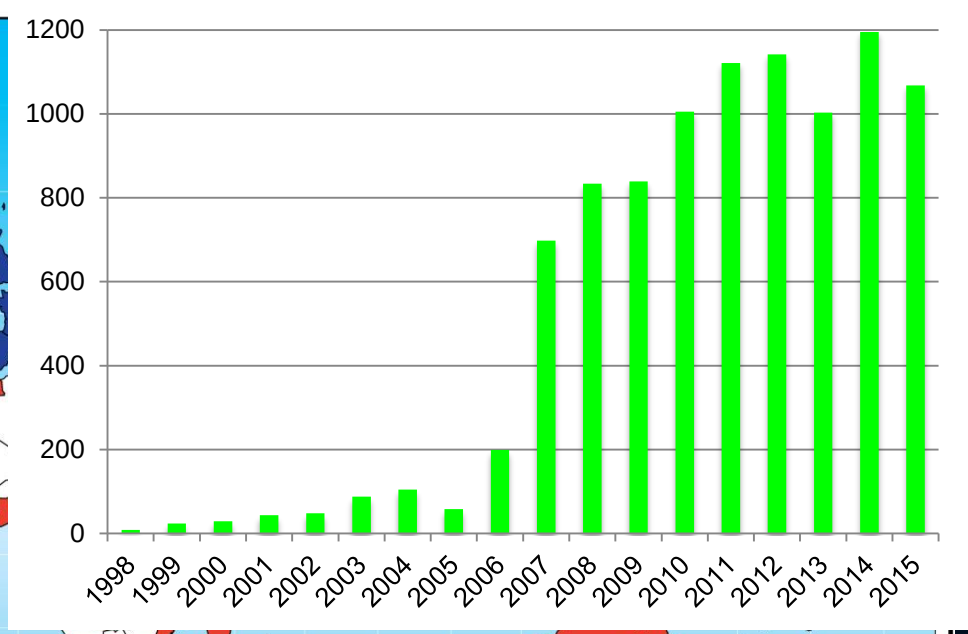
Summer Students Programme

CERN Teacher Schools

International and National Programmes

CERN Teacher Programme

Teacher Programme Participants 1998 - 2015 (Total: 9509)



MEMBER STATES

Austria	177
Belgium	123
Bulgaria	455
Czech Republic	154
Denmark	199
Finland	498
France	314
Germany	902
Greece	671
Hungary	446
Israel	47
Italy	551
Netherlands	143
Norway	106
Poland	580
Portugal	386
Slovakia	222
Spain	441
Sweden	216
Switzerland	124
United Kingdom	1161

7916

ASSOCIATE MEMBERS 163

Pakistan	2
Turkey	161

CANDIDATES FOR ACCESSION

Romania	14
Serbia	68

82

OBSERVERS

India	4
Japan	7
Russia	336
USA	97

444

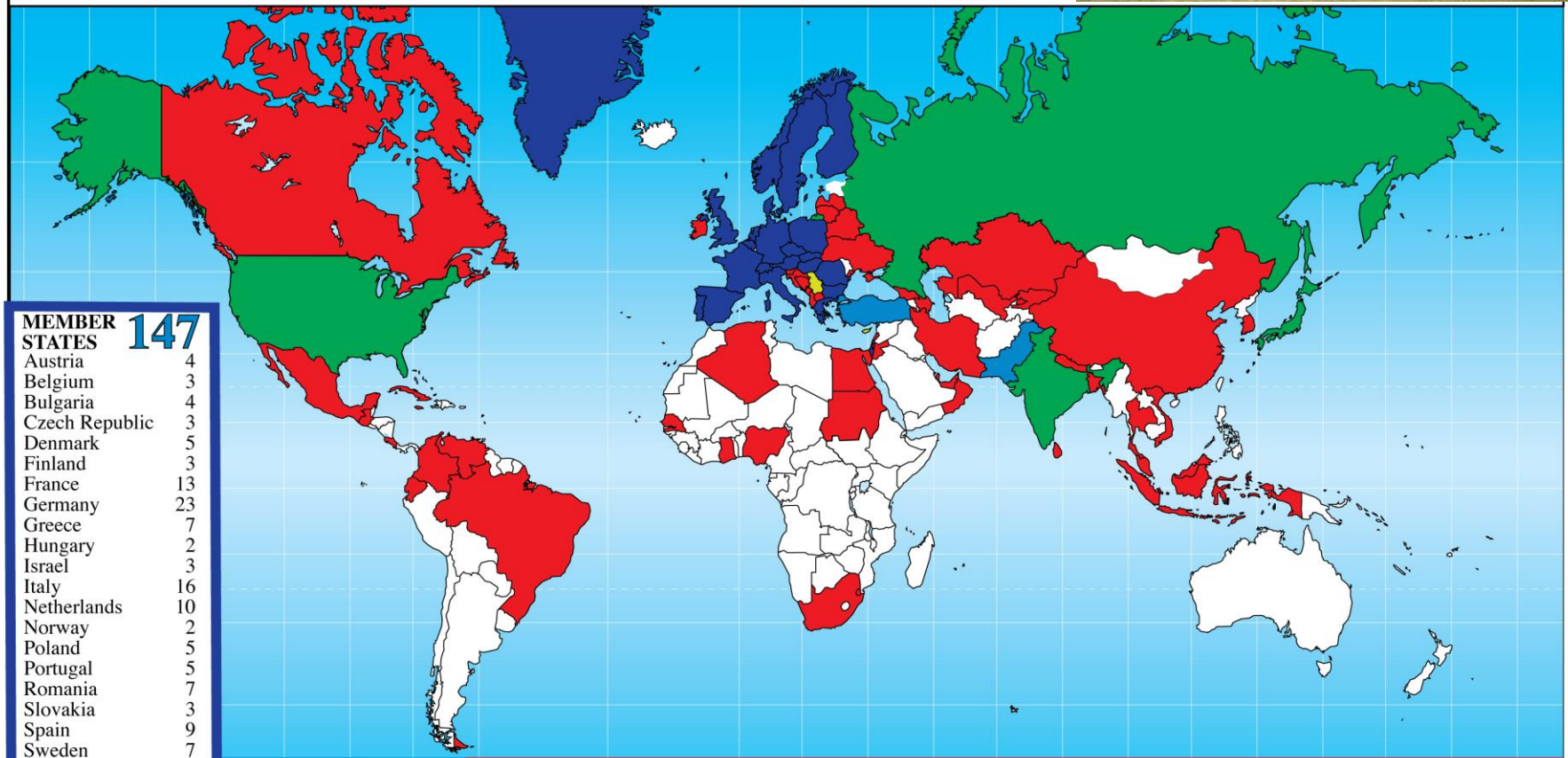
OTHERS

Angola	7	Cape Verde	4	Ghana	6	Malta	36	Sao Tome	6	Uganda	3
Armenia	1	Chile	3	Guinea Bissau	1	Mexico	14	Saudi Arabia	1	Ukraine	117
Australia	6	China	2	Iran	6	Mongolia	1	Singapore	2	U.A.E.	1
Azerbaijan	1	Costa Rica	4	Ireland	8	Montenegro	14	Slovenia	21		
Bahrain	2	Croatia	23	Jordan	11	Morocco	2	South Africa	7		
Belarus	3	Cyprus	10	Kazakhstan	8	Mozambique	21	South Korea	48		
Brazil	167	Dominican Rep.	45	Kenya	4	Nepal	2	Swaziland	1		
Burundi	2	Ecuador	2	Latvia	1	New Zealand	2	Taiwan	1		
Cameroon	4	Egypt	2	Lebanon	1	Palestine (O.T.)	4	Thailand	12		
Canada	8	Estonia	66	Lithuania	32	Qatar	1	T.F.Y.R.O.M.	12		
		Georgia	104	Madagascar	2	Rwanda	20	Timor-Leste	9		

904

Summer Students 2016

Summer Students 2016



MEMBER STATES 147

Austria	4
Belgium	3
Bulgaria	4
Czech Republic	3
Denmark	5
Finland	3
France	13
Germany	23
Greece	7
Hungary	2
Israel	3
Italy	16
Netherlands	10
Norway	2
Poland	5
Portugal	5
Romania	7
Slovakia	3
Spain	9
Sweden	7
Switzerland	3
United Kingdom	12

OBSERVERS 49

India	16
Japan	5
Russia	9
USA	19

ASSOCIATE MEMBERS 7

Pakistan	4
Turkey	3

STATES IN ACCESSION FOR MEMBERSHIP 7

Cyprus	2
Serbia	5

OTHERS

Albania	1	Colombia	1	Iran	2	Madagascar	1	Singapore	1	Venezuela	1
Algeria	3	Costa Rica	3	Ireland	1	Malaysia	3	Slovenia	1	Viet Nam	1
Azerbaijan	2	Croatia	2	Jamaica	1	Malta	4	South Africa	2		
Bangladesh	1	Cuba	1	Jordan	2	Mexico	1	Sri Lanka	1		
Belarus	1	Ecuador	1	Kazakhstan	1	Montenegro	2	Sudan	1		
Bosnia	2	Egypt	4	Korea	1	Nepal	1	Thailand	3		
Brazil	1	Georgia	1	Kyrgyzstan	1	Nigeria	2	T.F.Y.R.O.M.	3		
Canada	5	Ghana	1	Latvia	1	Oman	1	U.A.E.	1		
China	11	Guatemala	1	Lebanon	2	Palestine	2	Ukraine	3		
		Indonesia	3	Lithuania	1	Qatar	1	Uzbekistan	1		

95

Key Changes Introduced with 2010 Enlargement Policy

Membership open to all States, *irrespective of geographical location*

Associate Membership open to all States, *irrespective of geographical location*

- Regular Associate Membership
- Associate Membership as the pre-stage to full Membership
- Full Membership only to be granted to States once they have completed at least two years of Associate Membership
- No limitation on duration of Associate Membership; review every five years

Observer Status arrangements concluded with States to be phased out over time, with Observer Status to remain as an option for international organizations

"New modes of participation in CERN's activities are needed that on the one hand recognize the increasingly global nature of the scientific community using its facilities, while on the other hand placing the Organization, the LHC and future projects on a basis that is mutually beneficial to, and sustainable for, CERN's core of European Member States and its global partners."

CERN/2918/Rev: Report of Council WG on Scientific and Geographical Enlargement

Overview of Developments since Adoption of Policy in 2010

2 new Member States

Israel, previously Observer Status, expression of interest in 2008; full membership since January 2014

Romania, candidate for Accession since 2010; full membership since July 2016

2 States in pre-stage of Membership

Serbia, application in 2009; Membership in the pre-stage since 2012

Cyprus, application in 2009; Membership in the pre-stage since 2016

3 Associate Member States

Turkey, application in 2012; Associate Member in 2015

Pakistan, application in 2013; Associate Member in 2015

Ukraine, application in 2011; Associate Member in 2016

Overview of Developments since Adoption of Policy in 2010

7 applications at different stages of progress

Brazil	authorization to negotiate Association Agreement 2013
Croatia	application file received May 2014; setting-up Task Force
India	concluding Association Agreement
Lithuania	application March 2016, Council authorized DG to sign Agreement Sept. 2016
Russian Federation	authorization to negotiate Association Agreement 2013; DG to visit Oct. 2016
Slovenia	in process of concluding Association Agreement

1 expression of interest Ireland

1 application 'postponed' Azerbaijan

12 International Co-operation Agreements Australia, Estonia, Colombia, Costa Rica, Tunisia, Albania, Mongolia, Bangladesh, US, Lebanon, Palestine, Qatar

Observer Status with JINR (Dubna) on a reciprocal basis

Taking stock…

- Some headway made with 2009 unofficial wish-list.
  - Brazil (applicant), Canada (under discussion), China, India (concluding Associate Membership Agreement), Japan (Protocol), Korea (under discussion), Russian Federation (applicant), US (Protocol)
  - Continuing work needed
- Main interest from European countries & European broader neighbourhood
- Particular interest among smaller to medium-sized countries

Strategy

- CERN's geographical enlargement policy introduced in 2010 offers *opportunities* but does not establish a *strategy*.
- Strategy discussion to a large extent already taken place in March 2016 Council session

Criteria for Associate Membership

43. For the purposes of its assessment of all Associate Membership applications, the Council shall verify fulfilment of the following criteria:

    a. existence within the applicant State of a solid basis in elementary particle physics, both theoretical and experimental, adequately funded both for the support of the research within the country and also for payment of travel and living expenses to enable the scientists of that country to participate in CERN activities;

    b. existence of a sufficiently developed industry within the applicant State to enable it to tender for contracts with CERN with a reasonable chance of success;

    c. the will of the national authorities of the applicant State to support basic research and their awareness of the implications of participation in a common endeavour in the field of particle physics.

- Criteria for Associate Membership as set out in CERN/2918/Rev remain relevant and valid
- **It is essential that the Associate Membership is beneficial to the particle physics community in the country, and Governments continue to invest in the growth of the national community → overarching objective**
- **Enlargement should also not hinder the operational efficiency of the Organization**

Future Directions – Input for Further Thinking & Discussion

Particle physics is becoming increasingly global and the opportunities available require coordination and collaboration, as well as competition >
enlargement is an important component in this environment

The key objective is to ensure that geographical enlargement supports and reinforces the long-term scientific aspirations of the Organization by consolidating the institutional base**. Enlargement is not an aim in and of itself.**

The focus should therefore be on reinforcing relations with countries that can bring scientific and technological expertise to the work of the Organization and can, in turn, benefit from a closer engagement, while helping to build capacity in countries with developing communities.

Future Directions – input for further thinking and discussion

Going forward, more targeted and tailored engagement could be directed to the following categories of countries, with different types of instruments

- **Countries with current applications in progress:** Engage to move forward current dossiers towards completion.
- **Countries with tradition and potential for participation in CERN efforts:** Countries that have well-developed particle physics communities and have particular potential for contribution to the work of the Organization
- **Maintaining the European core of the Organization:** In line with para. 28 of CERN/2918/Rev particular attention will be paid to EU/EFTA Member States
- **Countries with developing communities:** Complete International Cooperation Agreements, Protocols and Addenda

Thank You!

Accelerating Science and Innovation