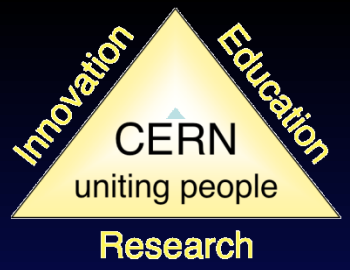
Designing Effective Outreach Programmes for Teachers at CERN

Inspiring the next generation of scientists and engineers

Mick Storr

Head CERN Teacher Programmes
and
Visits Service

The Mission of CERN



- **Push forward** the frontiers of knowledge

  E.g. the secrets of the Big Bang ... what was the matter like within the f... moments of the Universe's ex...

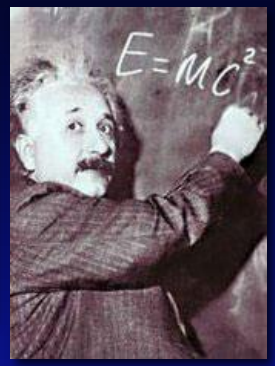
- **Develop** new technologies ... accelerators and detect...

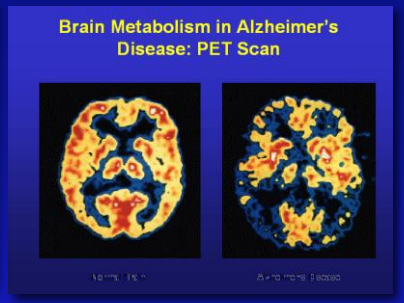
  IT - the Web and the G...

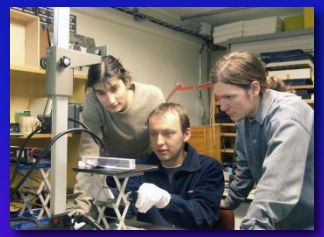
  Medicine - diagnosis and therapy

- **Train** scientists and engineers of tomorrow

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







CERN was founded 1954: 12 European States

"Science for Peace"

Today: 20 Member States

~ 2300 staff
~ 1050 other paid personnel
> 11000 users

Budget (2012) ~1000 MCHF

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

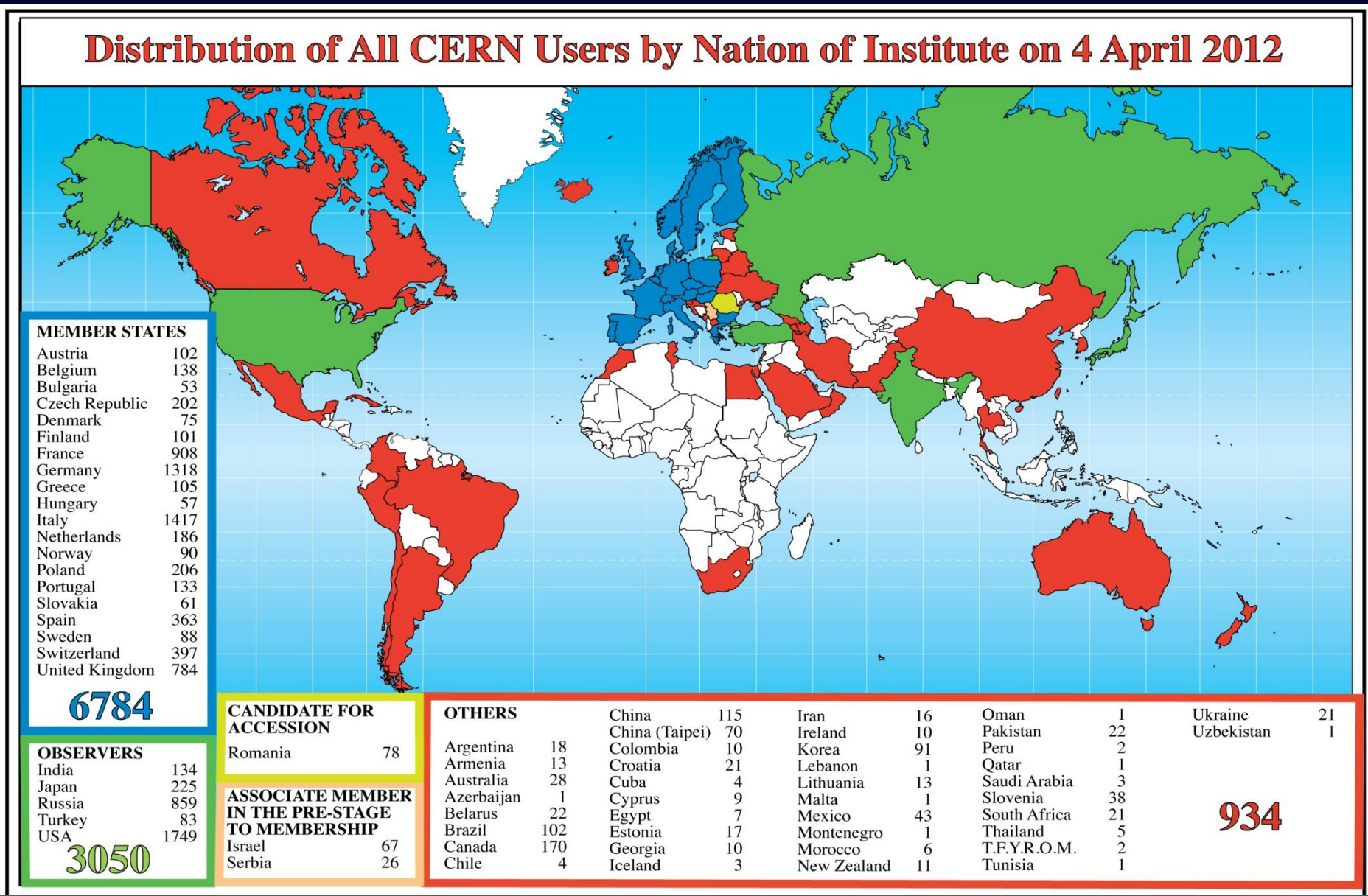
Candidate for Accession: Romania

Associate Members in the Pre-Stage to Membership: Israel, Serbia

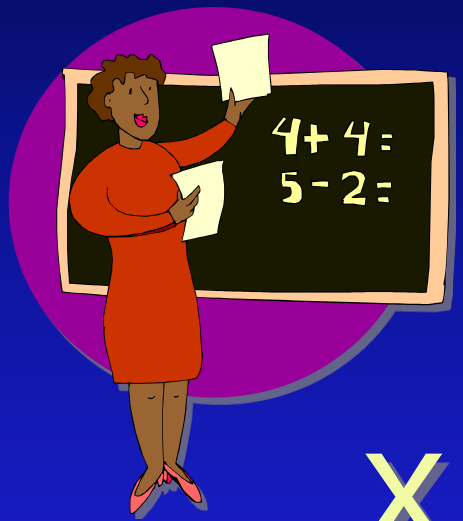
Applicant States: Cyprus, Slovenia, Turkey

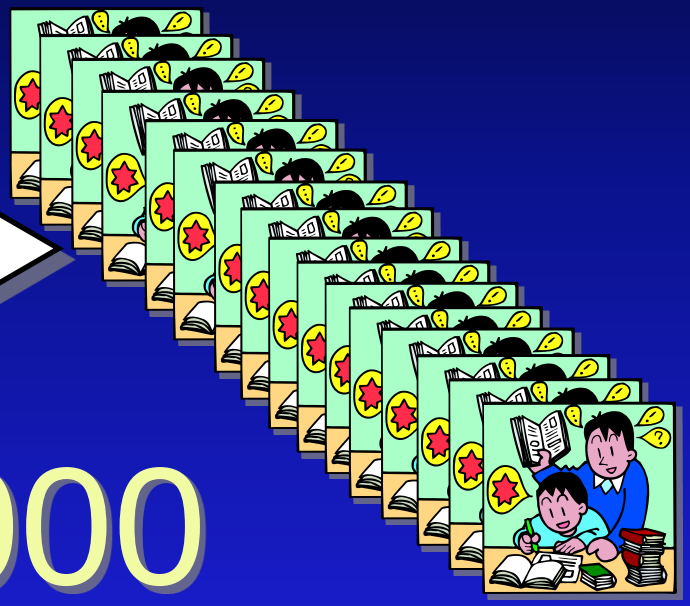
Observers to Council: India, Japan, the Russian Federation, the United States of America, Turkey, the European Commission and UNESCO

Science is becoming more and more global



Teachers are multiplicative factors





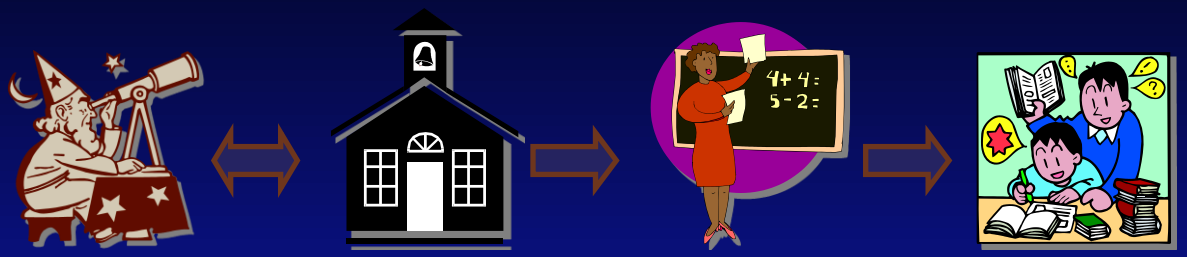
x 1000

School Teacher

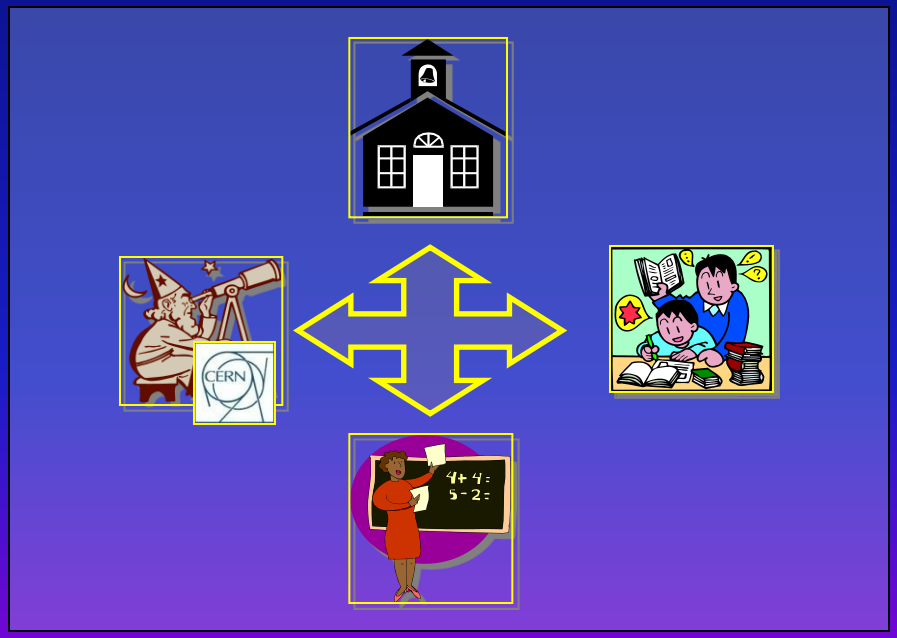
School Students

Objective of Teacher Programmes
To bring modern research closer to schools

OLD



NEW



Objectives of CERN Teacher Prorgrammes

- Pass the message
  - Teachers are our partners and colleagues
- Recognise
  - Teachers hold the future in their hands
- Empower teachers
  - To update, expand and pass on their knowledge
- Facilitate
  - Learning
  - Networking
- Inspire and encourage
- Open and honest
- NOT TO tell teachers how to teach
- Learn from teachers

THANK

What are we trying to achieve with the help of physics teachers ?

1: RAISE AND MAINTAIN THE INTEREST OF STUDENTS IN MODERN SCIENCE

Motivate them to continue scientific education at school
Help them to better understand the physical world

Improve scientific literacy

2: INSTIL A FEELING OF MYSTERY AND DISCOVERY POTENTIAL

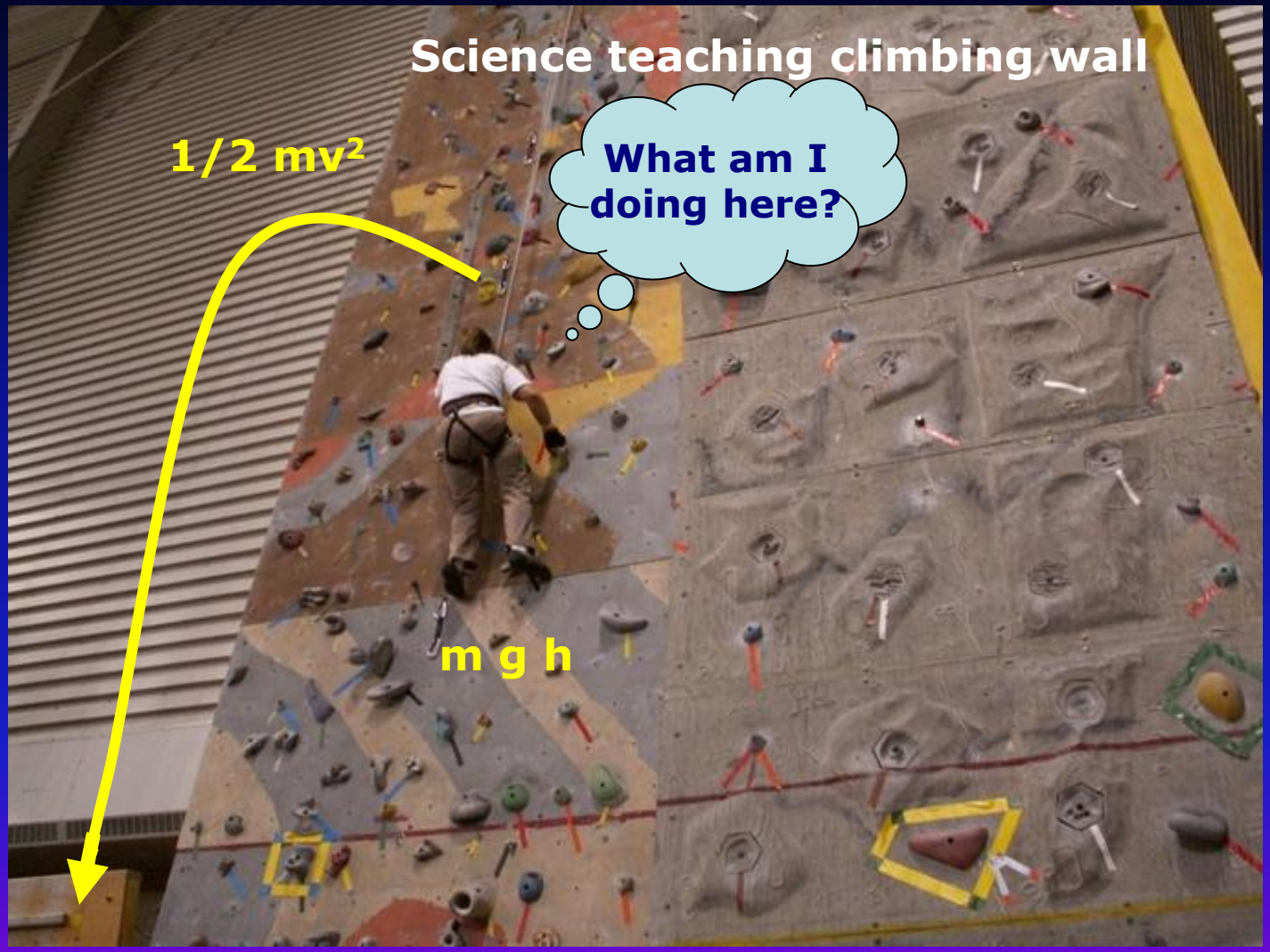
Motivate students to take up science/engineering at universities

Prepare the future generation of scientists/engineers

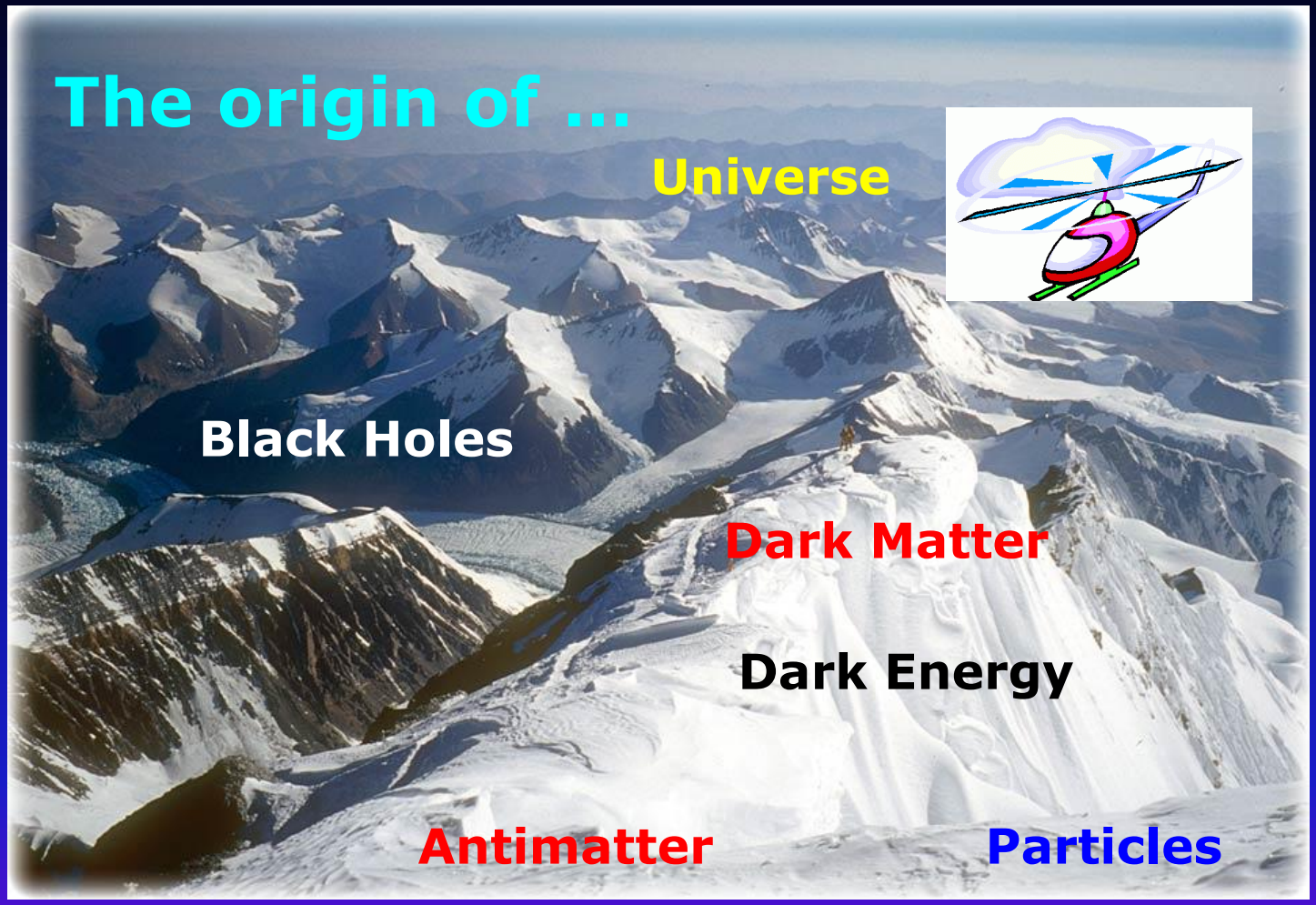
SCIENCE IS ALIVE !

How researchers view science

How school students can view science



Take students on a sight-seeing tour …



Link modern physics to school curriculum

Residential Teacher Programmes

Basic content

- Lectures
  - Introductions to CERN, Particle Physics, Cosmology, the LHC Experiments, Particle Accelerators, Medical Applications of Particle Physics, and the GRID
- Visits to experimental facilities
- Hands-on activities
- Working group activities
- Opportunities to meet working research physicists in a variety of informal settings
- Team building and social programme

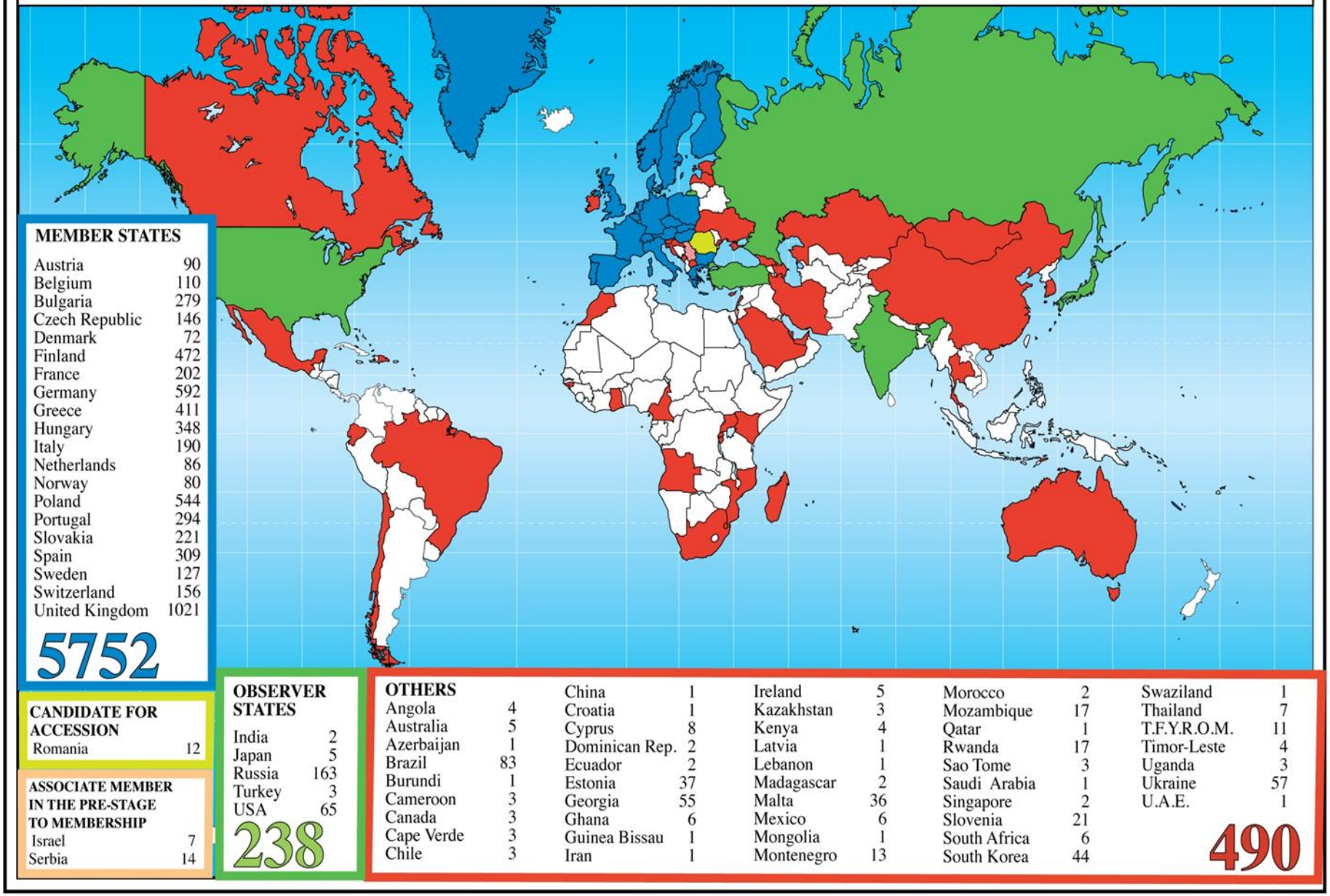
All lectures are web archived and made publicly available => a rich multi-lingual treasure trove

Outcome

- Newly inspired, motivated and confident teachers
- Inspire and motivate students
- Communicate with their colleagues
- Communicate with the general public
- Act as ambassadors for science/engineering, physics, particle physics, CERN
- Organise follow up activities
  - Visits, exhibitions, video conferences, projects
- Promote teacher programmes
- Help us to expand beyond the borders of CERN

Excellent examples among the many teachers who have attended our programmes

Teacher Programme Participants 1998 - 2013



MEMBER STATES

Austria	90
Belgium	110
Bulgaria	279
Czech Republic	146
Denmark	72
Finland	472
France	202
Germany	592
Greece	411
Hungary	348
Italy	190
Netherlands	86
Norway	80
Poland	544
Portugal	294
Slovakia	221
Spain	309
Sweden	127
Switzerland	156
United Kingdom	1021

5752

CANDIDATE FOR ACCESSION

Romania	12

ASSOCIATE MEMBER IN THE PRE-STAGE TO MEMBERSHIP

Israel	7
Serbia	14

OBSERVER STATES

India	2
Japan	5
Russia	163
Turkey	3
USA	65

238

OTHERS

Angola	4	China	1	Ireland	5	Morocco	2	Swaziland	1
Australia	5	Croatia	1	Kazakhstan	3	Mozambique	17	Thailand	7
Azerbaijan	1	Cyprus	8	Kenya	4	Qatar	1	T.F.Y.R.O.M.	11
Brazil	83	Dominican Rep.	2	Latvia	1	Rwanda	17	Timor-Leste	4
Burundi	1	Ecuador	2	Lebanon	1	Sao Tome	3	Uganda	3
Cameroon	3	Estonia	37	Madagascar	2	Saudi Arabia	1	Ukraine	57
Canada	3	Georgia	55	Malta	36	Singapore	2	U.A.E.	1
Cape Verde	3	Ghana	6	Mexico	6	Slovenia	21		
Chile	3	Guinea Bissau	1	Mongolia	1	South Africa	6		
		Iran	1	Montenegro	13	South Korea	44		

490

Arthur C. Clarke

Author of 2001 : A Space Odyssey

- "When a distinguished but elderly scientist states that something is possible, he is almost certainly right. When he states that something is impossible, he is very probably wrong." •
- "The only way of discovering the limits of the possible is to venture a little way past them into the impossible."
- "Any sufficiently advanced technology is indistinguishable from magic."

Our goal, with the help of teachers, is to bring a little of the magic of CERN into the classroom