



Welcome to CERN

Innovationsforum

29. - 30. Januar 2008

Research &
Discovery

Technology

Training

Collaborating

CERN in Numbers

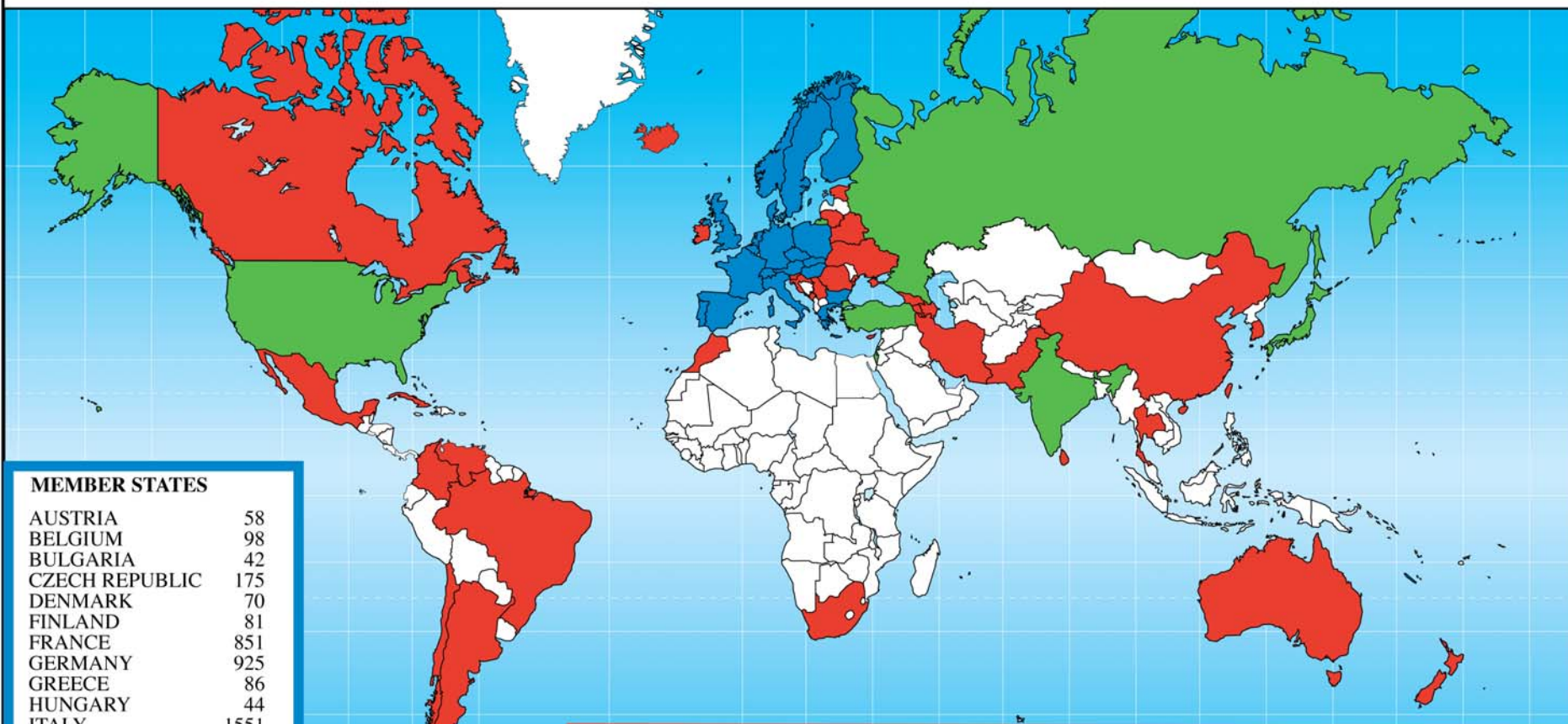


- 2464 staff*
- 753 Fellows and Associates*
- 9035 users*
- Budget (2007) 982 MCHF (610M Euro)

*15 November 2007

- **Member States:** Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.
- **Observers to Council:** India, Israel, Japan, the Russian Federation, the United States of America, Turkey, the European Commission and Unesco

Distribution of All CERN Users by Nation of Institute on 15 November 2007



MEMBER STATES

AUSTRIA	58
BELGIUM	98
BULGARIA	42
CZECH REPUBLIC	175
DENMARK	70
FINLAND	81
FRANCE	851
GERMANY	925
GREECE	86
HUNGARY	44
ITALY	1551
NETHERLANDS	154
NORWAY	70
POLAND	182
PORTUGAL	102
SLOVAKIA	46
SPAIN	261
SWEDEN	73
SWITZERLAND	333
UNITED KINGDOM	623

5825

OBSERVER STATES

INDIA	105
ISRAEL	63
JAPAN	175
RUSSIA	942
TURKEY	42
USA	1268

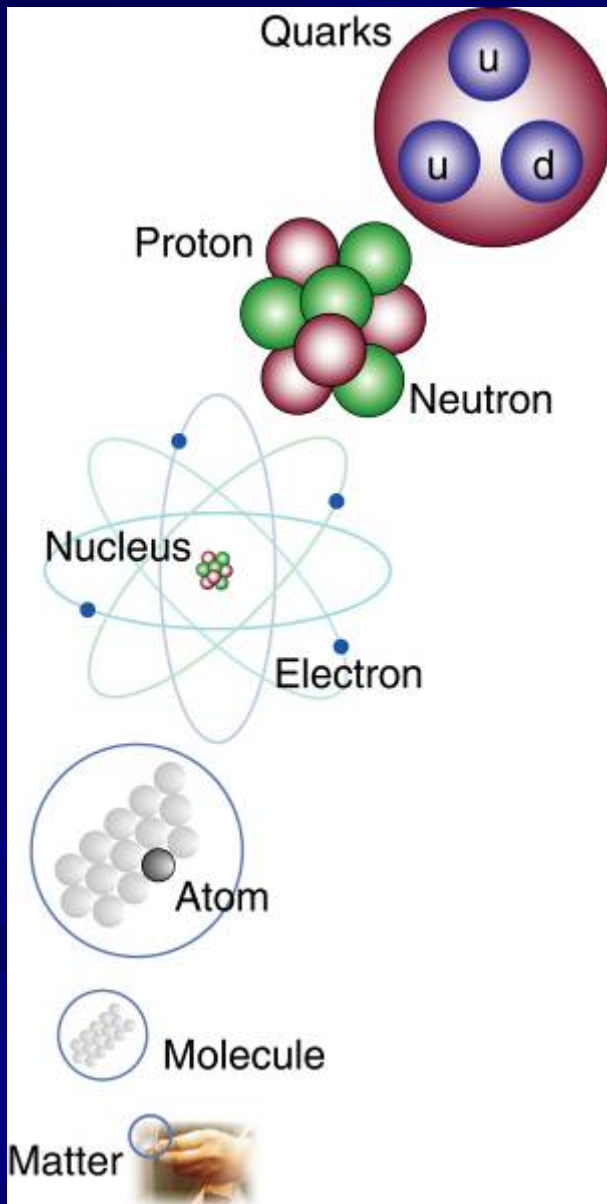
2595

OTHER STATES

ARGENTINA	9	CROATIA	18	MEXICO	20	TAIWAN	37
ARMENIA	17	CUBA	3	MONTENEGRO	1	THAILAND	1
AUSTRALIA	12	CYPRUS	7	MOROCCO	6	UKRAINE	16
AZERBAIJAN	1	ESTONIA	11	NEW ZEALAND	7	VENEZUELA	1
BELARUS	19	GEORGIA	8	PAKISTAN	25	VIETNAM	1
BRAZIL	65	ICELAND	1	ROMANIA	47		
CANADA	122	IRAN	6	SERBIA	15		
CHILE	4	IRELAND	11	SLOVENIA	15		
CHINA	59	KOREA	37	SOUTH AFRICA	3		
COLOMBIA	5	LITHUANIA	4	SRI LANKA	1		

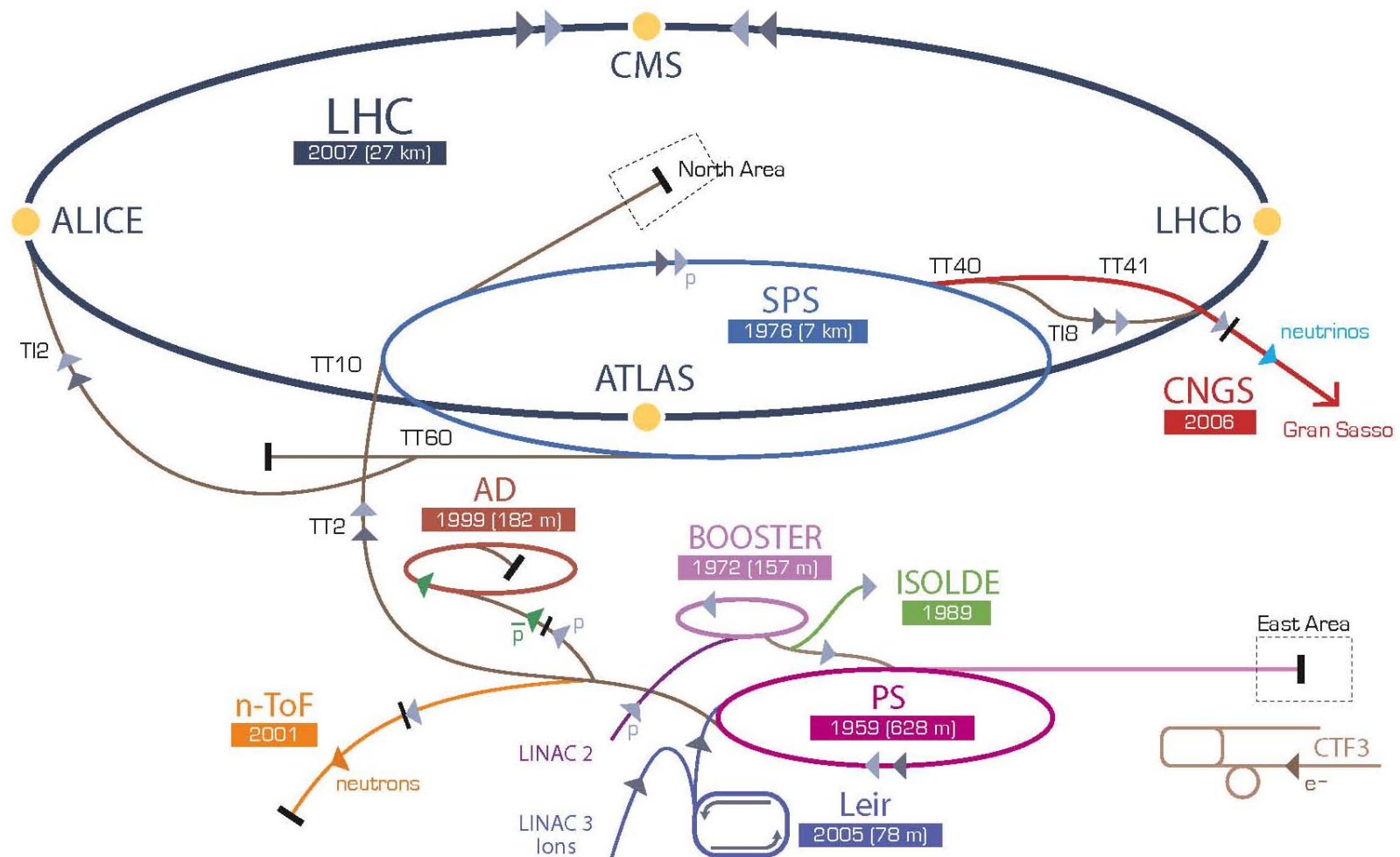
615

The study of elementary particles and fields and their interactions



	matter particles			gauge particles		
	1st gen.	2nd gen.	3rd gen.			
Q U A R K	<i>u</i> <i>up</i>	<i>c</i> <i>charm</i>	<i>t</i> <i>top</i>	Strong Force <i>g</i> x8 <i>Gluon</i>		
	<i>d</i> <i>down</i>	<i>s</i> <i>strange</i>	<i>b</i> <i>bottom</i>	Electro-Magnetic Force <i>γ</i> <i>photon</i>		
L E P T O N	<i>ν_e</i> <i>e neutrino</i>	<i>ν_μ</i> <i>μ neutrino</i>	<i>ν_τ</i> <i>τ neutrino</i>	Weak Force <i>W⁺</i> <i>W⁻</i> <i>Z</i> <i>W bosons</i> <i>Z boson</i>		
	<i>e</i> <i>electron</i>	<i>μ</i> <i>muon</i>	<i>τ</i> <i>tau</i>			
scalar particle(s)				<i>H</i> ...		
Elements of the Standard Model						

CERN Accelerator Complex



▶ p [proton] ▶ ion ▶ neutrons ▶ \bar{p} [antiproton] ▶ \leftrightarrow proton/antiproton conversion ▶ neutrinos ▶ electron

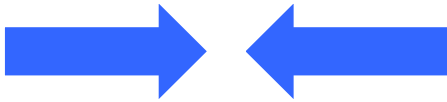
LHC Large Hadron Collider SPS Super Proton Synchrotron PS Proton Synchrotron

AD Antiproton Decelerator CTF3 Clic Test Facility CNGS Cern Neutrinos to Gran Sasso ISOLDE Isotope Separator OnLine DEvice

LEIR Low Energy Ion Ring LINAC LINear ACcelerator n-ToF Neutrons Time Of Flight

The LHC = Proton - Proton Collider

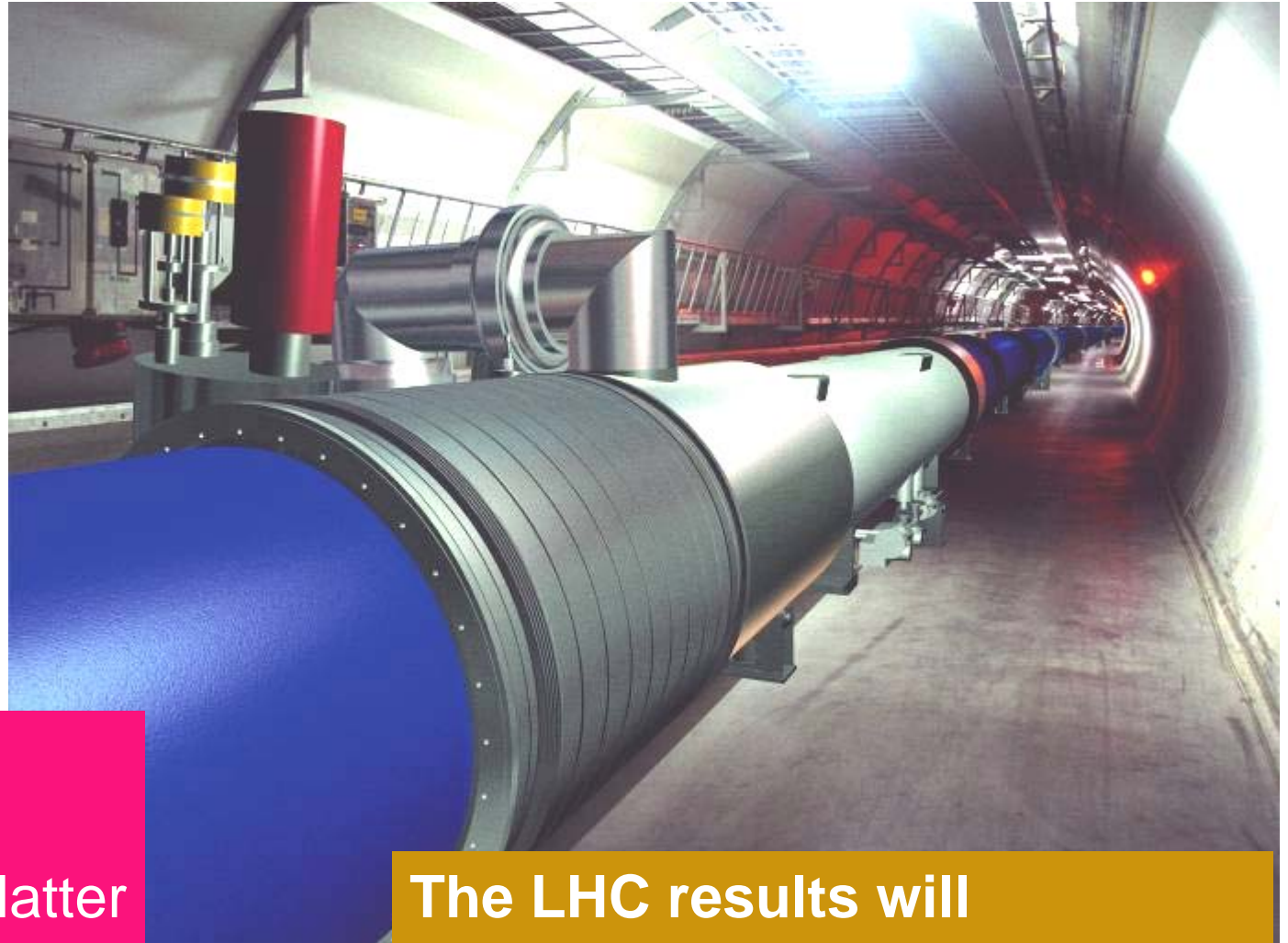
7 TeV + 7 TeV



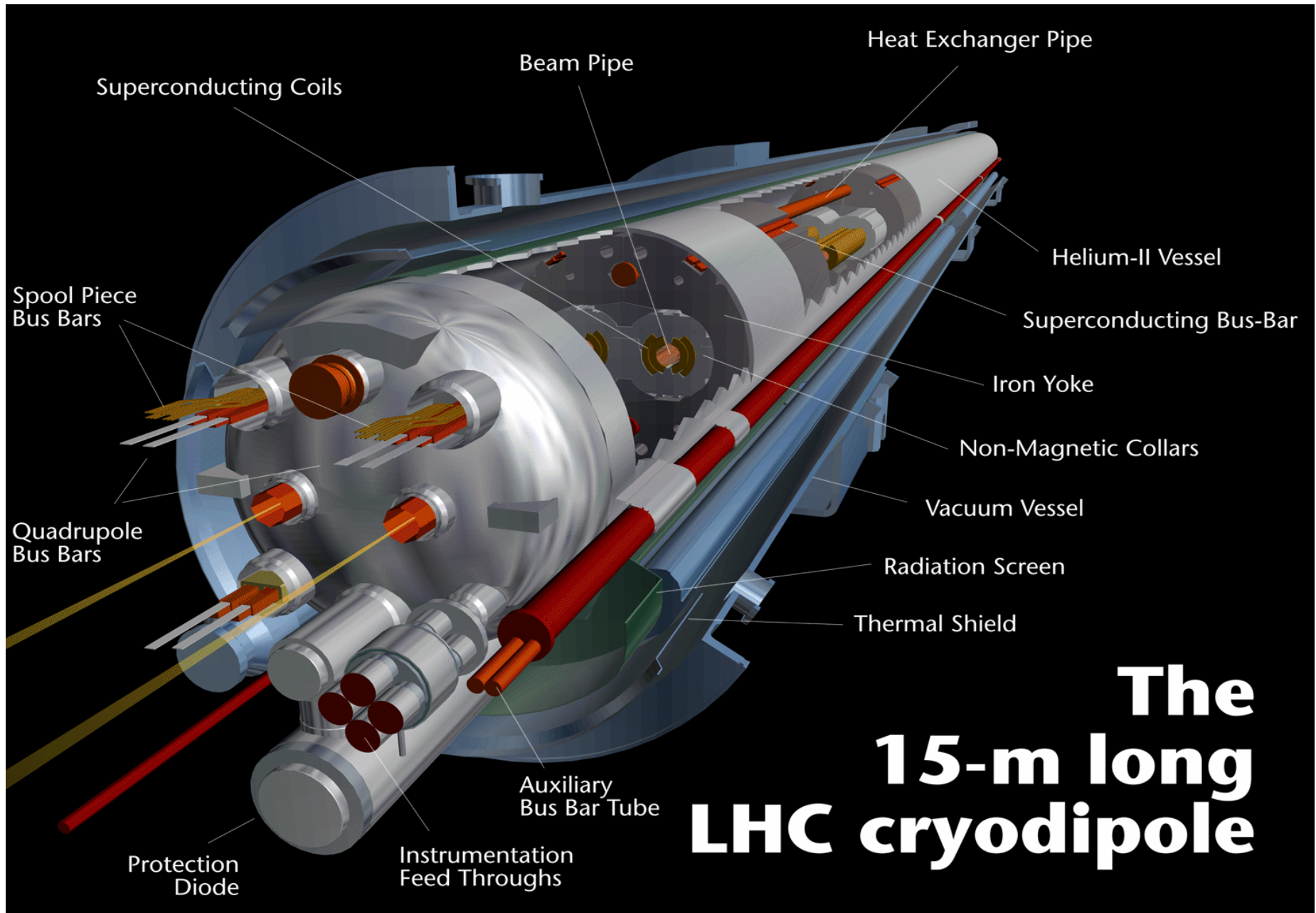
Luminosity =
 $10^{34} \text{cm}^{-2} \text{sec}^{-1}$

Primary targets:

- Origin of mass
- Nature of Dark Matter
- Primordial Plasma
- Matter vs Antimatter



The LHC results will
determine the future course
of High Energy Physics



The 15-m long LHC cryodipole

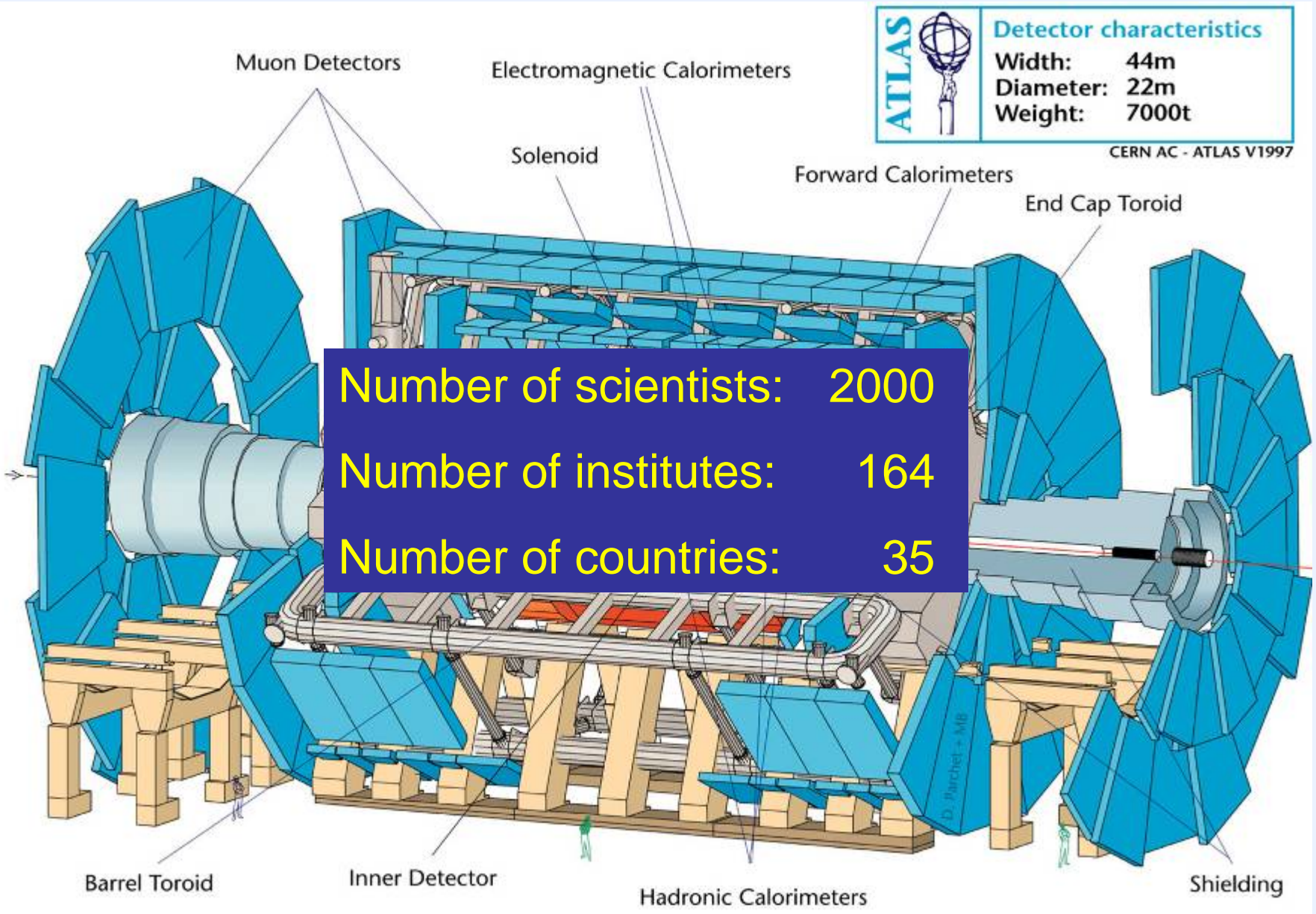
Magnet – Cryostat Assembly & Test





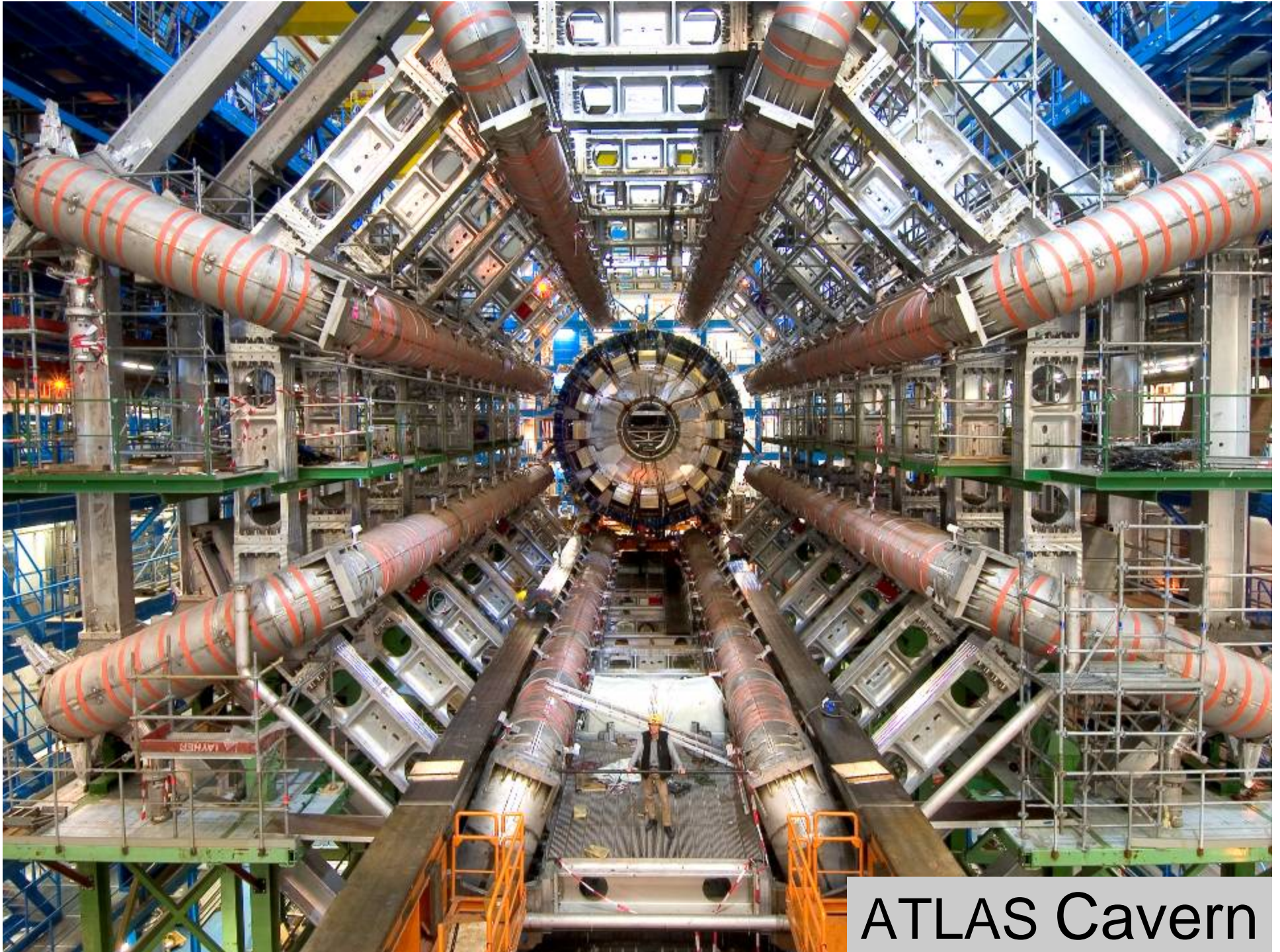
Magnet installation

ATLAS (spokesperson Peter Jenni)



	Detector characteristics	
	Width:	44m
	Diameter:	22m
	Weight:	7000t
<small>CERN AC - ATLAS V1997</small>		

Number of scientists: 2000
Number of institutes: 164
Number of countries: 35

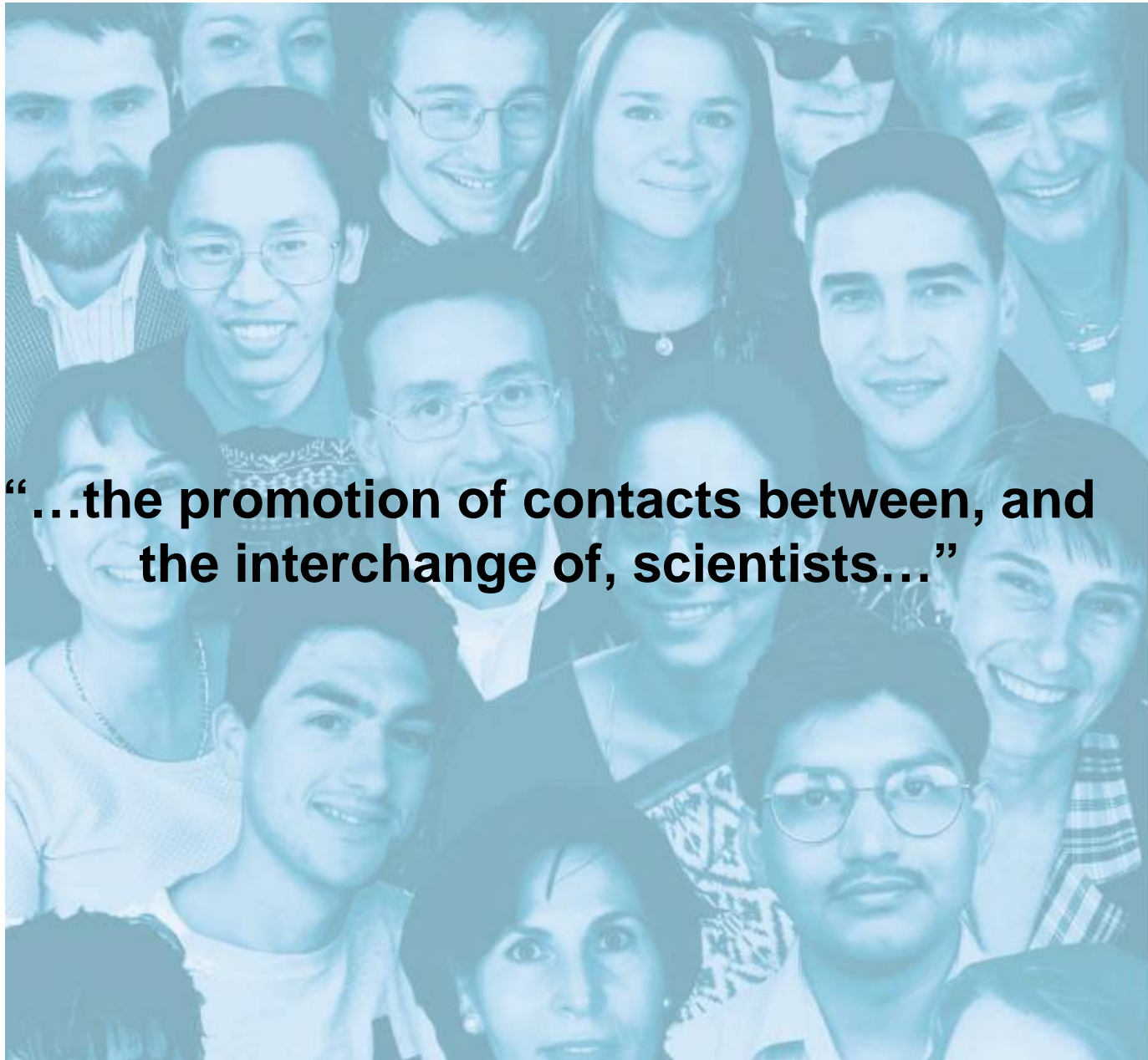


ATLAS Cavern

CERN as an Educator



Bringing Nations Together



“...the promotion of contacts between, and the interchange of, scientists...”



CERN....

- Seeking answers to questions about the Universe
- Advancing the frontiers of technology
- Training the scientists of tomorrow
- Bringing nations together through science