



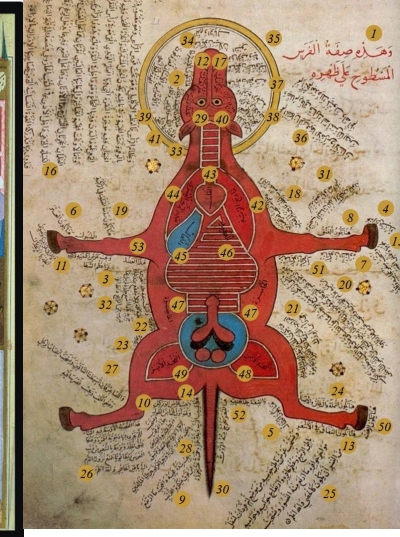
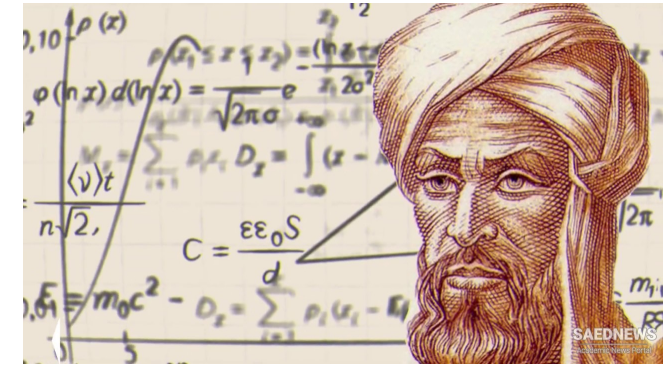
Global Scientific Cooperation builds bridges between Nations

Farida Fassi

University Mohammed V in Rabat, Faculty of Sciences, Morocco

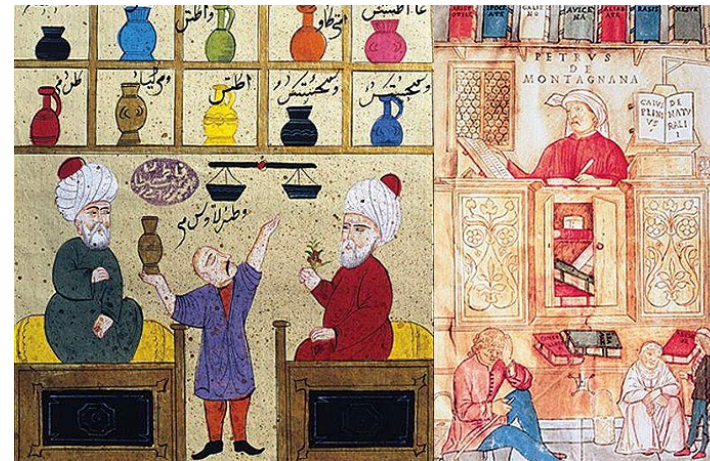
Islamic Golden Era (8th –14th centuries)

- Muslim world embraced Science as a state's defining policy, ushering in a golden age of the Muslim civilization.
 - An avid movement of translation and studying of ancient books, including advancing new knowledge ensued on an unprecedented scale.
 - Muslim scholars scored achievements in each field of Science: mathematics, physics, astronomy, medicine, optics, philosophy, sociology, etc.
- In that Era, Muslim's Leaders encouraged learning and the use of reason to investigate and explore nature.



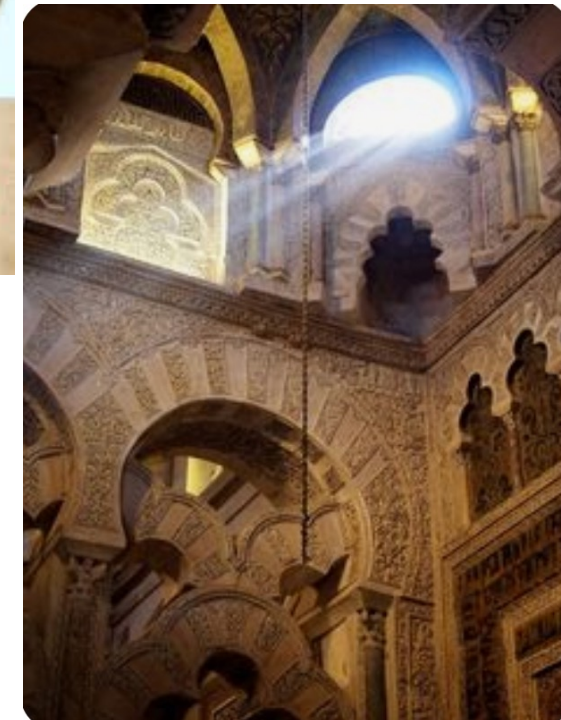
Gathering Nations through Science Revolution

- The scientific revolution in Europe (16th & 17th centuries) laid the foundations for today's Science
- This revolution was built upon the foundation of the Arabic-Islamic Sciences and Greek Muslim scholars studied Greek writings and advanced new knowledge
 - The Arabic versions were translated into Latin, which were read in Europe
- This endeavor preserved ancient knowledge and spread interest in Science to Europe.
 - In the early stage of the European scientific revolution the Islamic Sciences played a pivotal and catalytic role.
- The revolution was the emergence of Modern Science,
 - developments in mathematics, physics, astronomy, biology, chemistry, etc, transformed Societal views about nature.



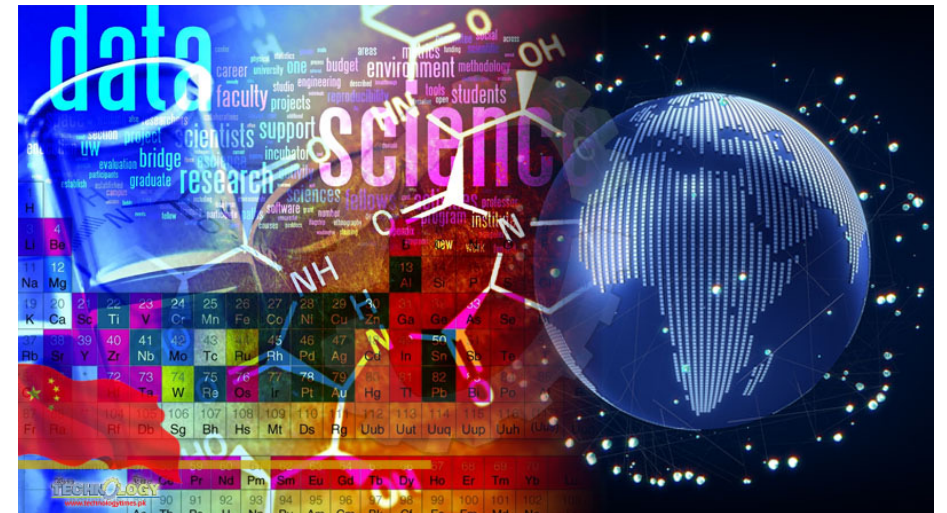
Islamic Golden Age Legacy

- The real pride from the Muslim Golden Era legacy is the ambition for seeking knowledge and investigating nature, which are the power for inspiration.
 - Reforming and transforming the current Scientific Research and Higher Education in the Islamic region, require a serious engagement in producing a long-term strategy with effective implementation
- This is essential to revive the Islamic Golden Era and take place as a co-leader in the Global Scientific process.
 - Adoption of Science by the states,
 - Encouragement of free Scientific inquiry,
 - Promotion efforts to popularize Science among people,
 -
- No doubt that Physics has laid the foundation for enormous transforming technologies over the last two centuries.
- Society will increasingly depend on Physics to solve its problems



Global Society & Science

- The role of Science: innovate, discover, publish and share within a trustable communities to compete and collaborate.
 - Science contributes significantly to the production of knowledge.
- To ensure a sustainable development and achieve a global well-being of the present and future generations,
 - Cooperative rivalry could only developed in a fostering manner, through innovation and creative productivity among people from different Cultures and Nations.
- **The global Society needs to act together with unity and renewed multilateralism to create an enabling global environment free of structural.**



Global Cooperation & Science

- The role of the International Cooperation is to:
 - develop, strengthen and maintain institutional relations with the competent authorities of different Nations.
 - ensuring coherence of the agency's support to those authorities, in close cooperation with the relevant internal and external stakeholders.
- The culturally-dominant view of the Global Leaders is that scientific collaboration is essential to tackle imminent threats such as climate change, where Physics plays a central role.
- Creating international linkages in Science and Technology can benefit many of the involved parties;
 - Political and Scientific benefits are often intertwined



Global Cooperation & Science

- In the realm of Science, and in the context of International Scientific Research, Global Cooperation offers successful modes for peaceful Cooperation.
 - People coherently working together towards common goals by sharing knowledge, learning and building consensus.
- Humankind is able to achieve that unity through Science cooperation.
- Nowadays, inclusive cooperation is needed more than ever, including developed, emerging and developing countries.
- We must act to exploit all potential synergies.
 - Come together bringing the best brains from all regions of the world for the benefit of a sustainable Society.
- The European Organization for Nuclear Research (CERN) is an amazing place for such Global Cooperation.



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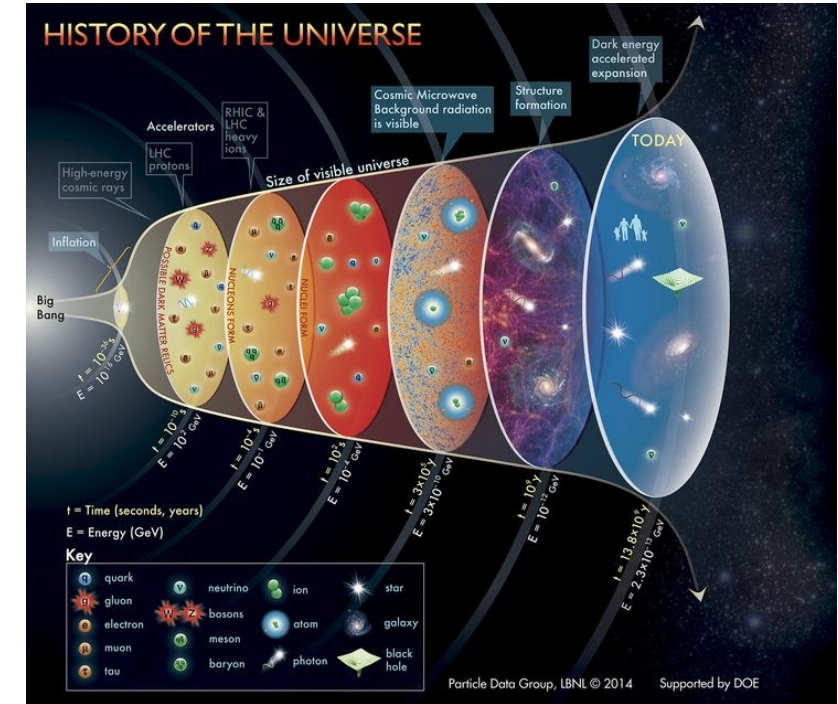
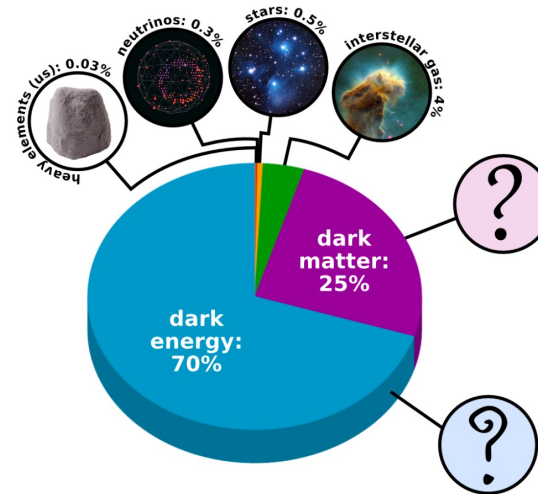
CERN vision. mission & values

- The CERN convention established in 1954 laid down the main missions for CERN- European intergovernmental organization, globally used an infrastructure be owned by all its member states.
- **Vision:** Collaboration among Nations through Science is the basis of a peaceful cooperation and stands at the forefront of Science independent of National and Cultural frontiers.
- **Mission and Values**
 - **Research:** Pushing back the limits of knowledge and expands our understanding of natural and social phenomena
 - Seeking and finding answers to questions about the Universe
 - **Technology:** Advancing the frontiers of Technology
 - **Collaborating:** Bringing Nations together through Science
 - **Education:** Training the Scientists of tomorrow
 - Adding value through partnerships and working together



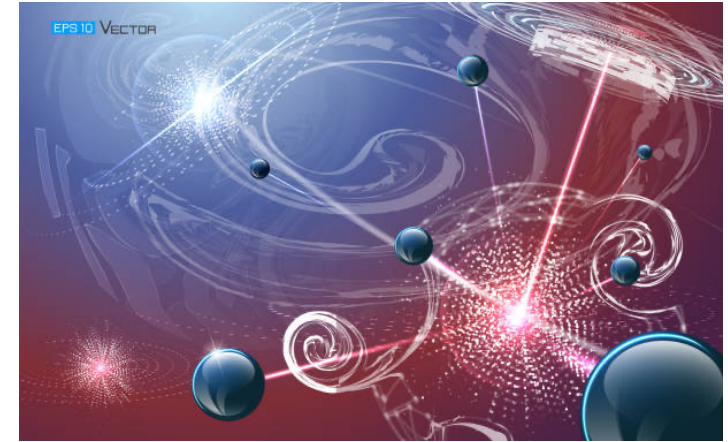
Fundamental Science at CERN

- Particle Physics aims to understand how the Universe works at its most fundamental level:
 - Discover the elementary constituents of matter and energy
 - Probe the interactions between them
 - Explore the basic nature of space-time
- Particle Physics carries its role out by:
 - Building projects that enable discovery Science,
 - Operating facilities that provide the capability for discoveries,
 - Supporting a research program that produces discovery Science



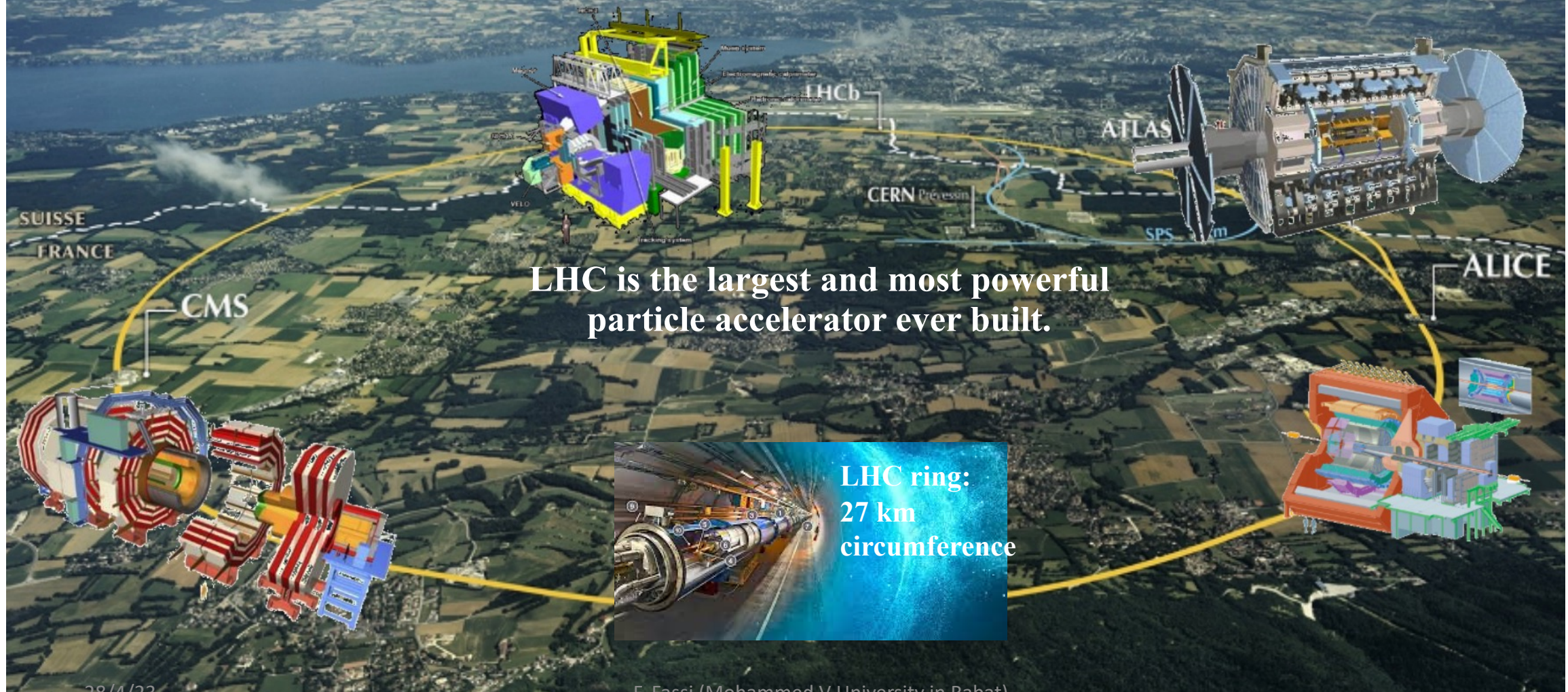
Fundamental Science at CERN

- Building the Giant particle accelerator require years of collisions to gather enough data to properly study a particle.
- **Theory** provides the mathematical and phenomenological framework to understand and extend our knowledge of elementary particles, forces and the nature of space-time.
 - Theory program is necessary to support current experiments and identify new directions for Particle Physics.
 - Theoretical research is critical for proper interpretation and understanding of the experimental research activities.
- **Computing** plays an essential role in Particle Physics
 - Advanced computing tools are important for designing, operating and interpreting experiments and simulations.



Tools: New Era in Fundamental Science at CERN

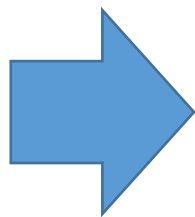
The Large Hadron Collider (LHC)



ATLAS Collaboration: a Global community

ATLAS Collaboration

181 institutions (247 institutes) from 42 countries



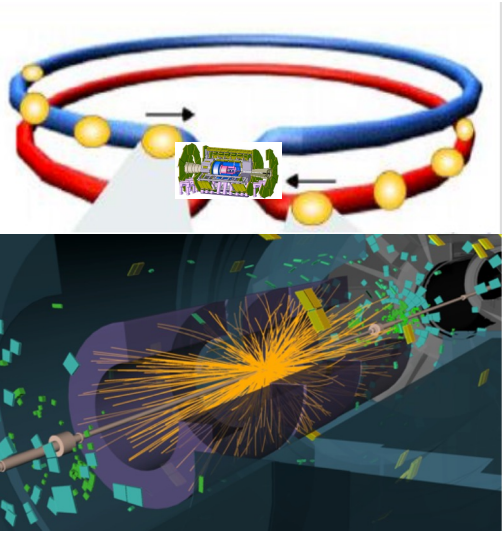
181 Institutions

247 Universities and Labs

From 42 Countries,



How Particle Physicists process Big Data?



- **Bunches of protons at the LHC collide 40 million times per second**
- **Each bunch collision leads to 50 or more individual proton-proton collisions**
 - About one PetaByte (10^{15} bytes) of data per second generated by the LHC detectors
 - Up to 60 PB/year and per experiment of stored data

- **Enormous challenge for the detectors and for data collection, storage and analysis**
- Huge data volume and a Global collaboration
 - The statistical nature of LHC data analysis and the complexity of the algorithms
- **Big Data for Big Science need to be distributed across the globe**
- **It was clear that no Center could provide ALL computing even for one LHC experiment**
- The Worldwide LHC Computing Grid (WLCG) infrastructure was developed for this end.
- Highly successful software and computing systems, including Network.
- **WLCG Performed flawlessly for about 10 years**



WLCG for Big Data & Big Science

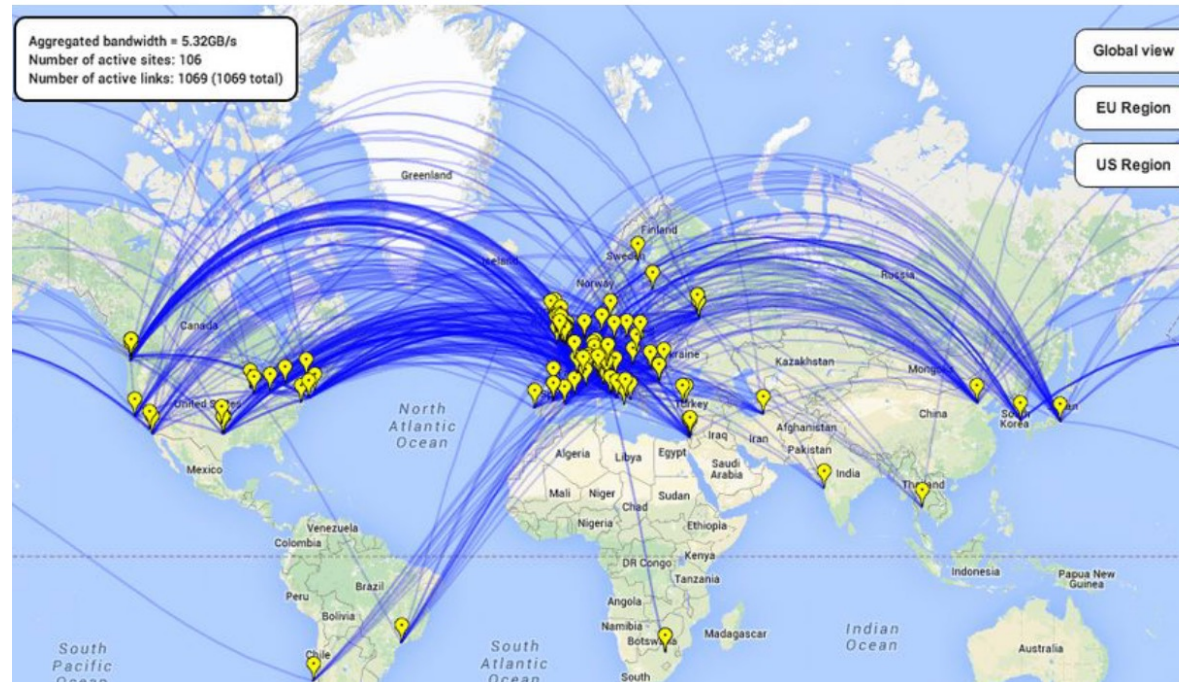
A key tool for physics

The most sophisticated data-taking & analysis system ever built for science, providing near real-time access to LHC data.

Enabling discovery

WLCG computing enabled physicists to announce the discovery of the Higgs Boson on 4 July 2012.

- WLCG provides seamless access to computing power and data storage capacity distributed over the Globe.
- The resources available and integrate into a single infrastructure accessible by all LHC community,
 - No matter where they are!



Global collaboration

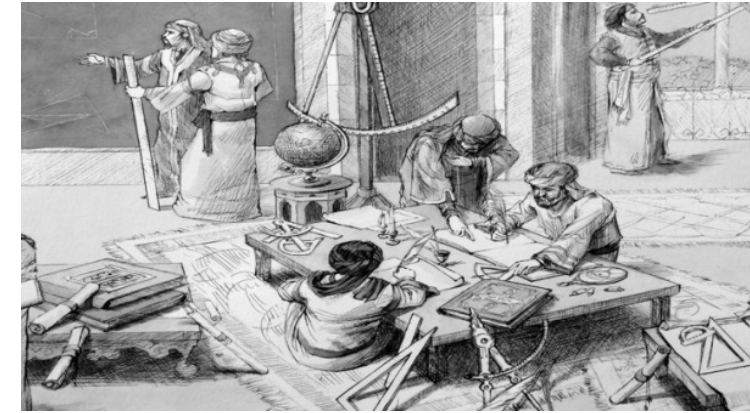
42 countries
170 computing centres
Over 1 million computer cores
2 exabytes of storage

Seamless access

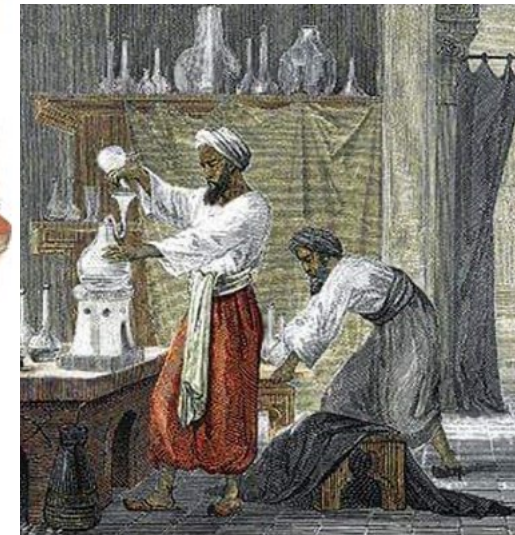
Computing resources which include data storage capacity, processing power, sensors, visualization tools and more.

Muslim World & Global Science

- Today, Muslim world is still modestly contributing to the Global Science process.
- **Nostalgia is powerful** -to revive the Muslim Science Age - the contributions to science and knowledge need to be re-addressed.
 - Learned lessons, values and legacy from Muslim Golden Era needs to be fostered.
- The awareness of the Global nature of Big Scientific challenges is necessary, as well as integrating the Global Science Cooperation.
- The role of Science in leading national development and supporting socio-economic needs must be enabled.



In the House of Wisdom, Muslims studied, taught and improved upon the sciences of other civilizations

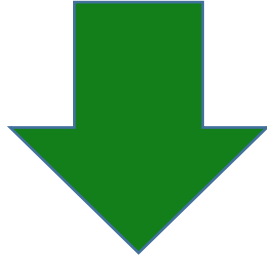


Muslim world & global Science

- The challenge is great to deal with the scientific and technological gap participation of the Islamic world.
- Engage Islamic Policymakers on the directions that impact Muslim world development and show how it is imperative to develop science to effectively confront the major challenges.
- Build scientific and cultural bridges between the Muslim world and the rest of the Globe
- Encourage research collaboration among researchers in the Islamic region and Globally
- Foster cooperation between peoples to achieve the broad range of scientific research
- Invest more serious efforts to help and create the conditions for which science can prosper



I Hope that I have convinced you that Global Scientific Cooperation can builds bridges between Nations



Hope is not a dream but a way of making dreams become reality and bring the world all together!

