The Abdus Salam International Centre for Theoretical Physics

IAEA

UNIVERSITY OF SUSSEX

Physics for Development in Conflict Regions

Dr Kate Shaw

The Abdus Salam International Centre for Theoretical Physics (ICTP)

University of Sussex

CERN-IPU Science for Peace School

7th December 2022

Sustainable Development

Towards digital and green economies

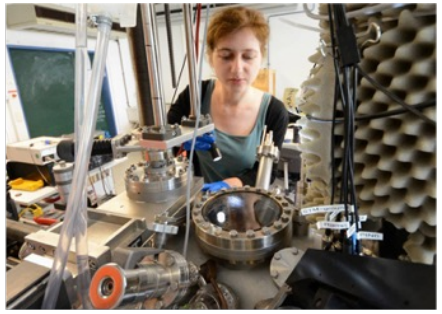
- Countries at all income levels are looking to transition towards digital and green economies
- This vitally involves investment into science, and accelerating technology transfer into industry

- Research communities depend on supportive policies and funding
- 8/10 countries are devoting < 1% GDP to research still
- To reach SDG by 2030 countries will need to invest more into research and innovation

Sustainable Development

Towards digital and green economies

- The need to solve environmental and developmental problems requires scientists and scientific and educational institutions



- This requires nations to have strong scientific educational system from early childhood through to PhD

- Scientific research at universities drives and improves the level & quality of education at all stages

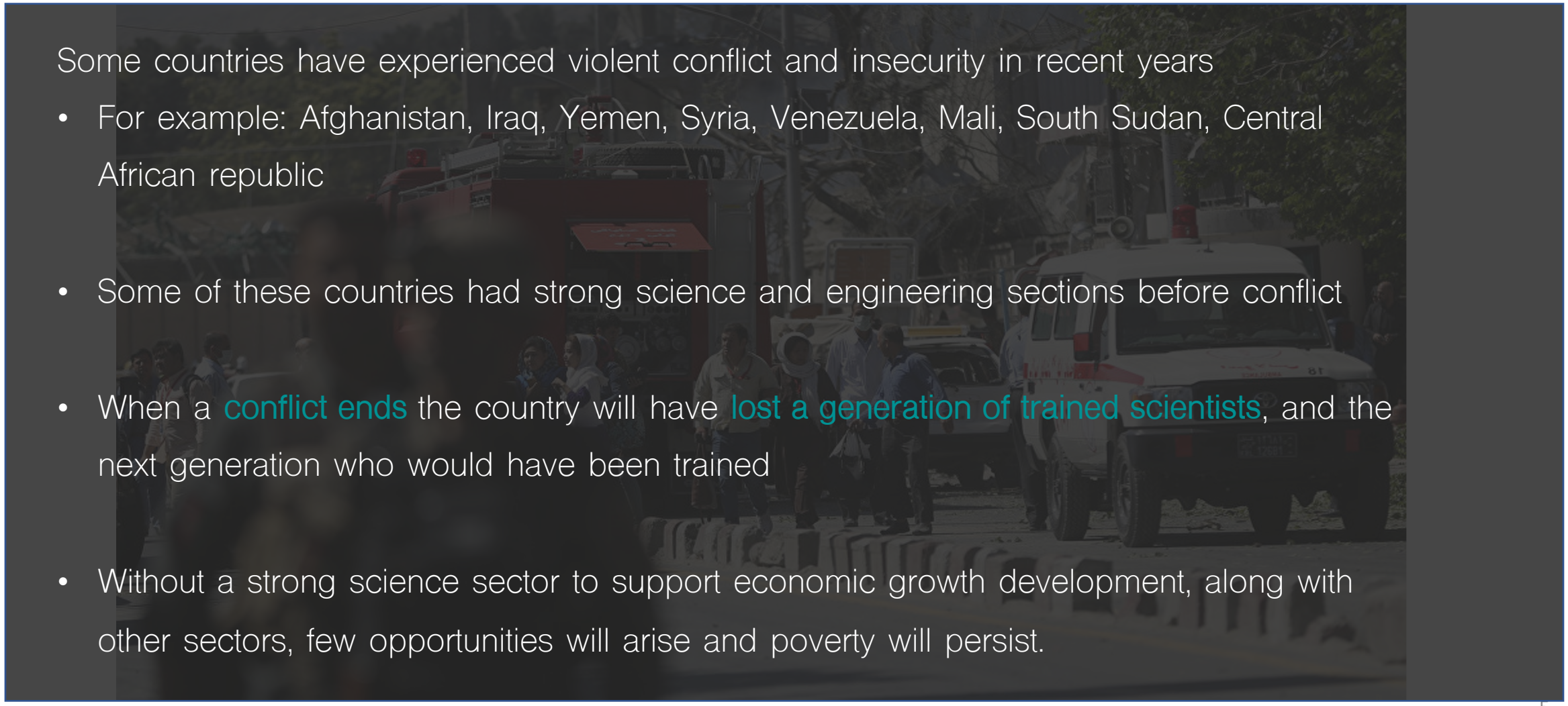
- Countries where faculty at universities are not encouraged to do research, with little or no national laboratories and without funding initiatives and latest communications technology will be left behind.

Sustainable Development

Countries in conflict or political turmoil

Sustainable Development

Countries in conflict or political turmoil



Some countries have experienced violent conflict and insecurity in recent years

- For example: Afghanistan, Iraq, Yemen, Syria, Venezuela, Mali, South Sudan, Central African republic

- Some of these countries had strong science and engineering sections before conflict

- When a conflict ends the country will have lost a generation of trained scientists, and the next generation who would have been trained

- Without a strong science sector to support economic growth development, along with other sectors, few opportunities will arise and poverty will persist.

Countries in conflict or political turmoil

Afghanistan

Four physics departments in Afghanistan (Kabul, Heart, Nangarhar and Balkh) : **Undergraduate BSc Physics**

Little research, **no funding or no research facilities, no international physics networks**

Lecturers: Little to no opportunity for further study

20 Years of War have meant we have lost a generation of scientist. However young new lecturers started international cooperation!

ICTP PWF-Afghanistan have worked to support Afghan scientists and students since 2018

Countries in conflict or political turmoil

Afghanistan

- Annual HEP Schools 2018, 2019
- Transferable skills and coding, lectures in HEP. To facilitate international collaborations and networks (VV with CERN)
- Working with the department to develop BSc and MSc courses

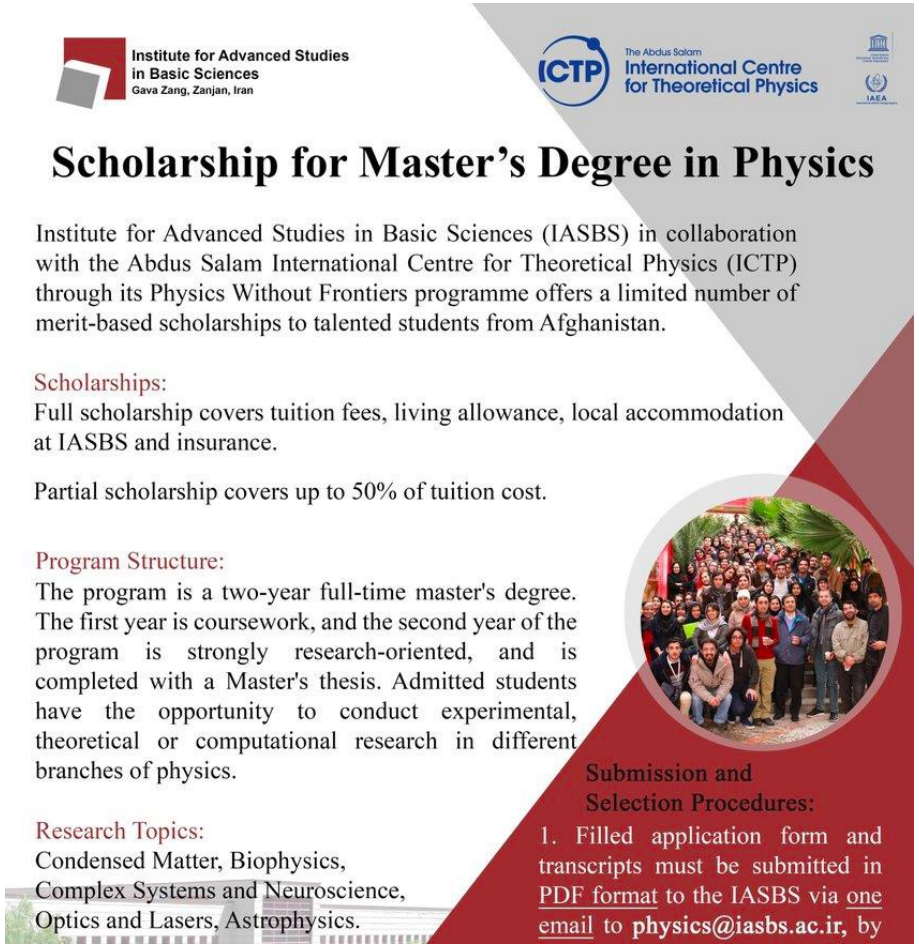
Kate Shaw, Baktash Amini, Encieh Erfani, Marco Celoria, Fawad Hassan, Zainab Nazari, Sajad Nazari, Jawad Ahmedi

Countries in conflict or political turmoil

Afghanistan

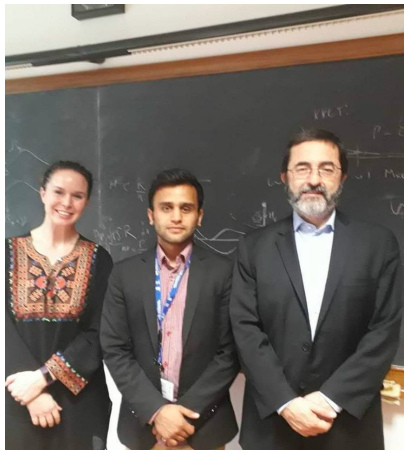
With no MSC in Afghanistan we provide scholarships with 3 Iranian Universities

30 students have been supported to date, 5 have graduates, 4 of whom have PhD positions abroad



Countries in conflict or political turmoil

Afghanistan



Working with early career faculty:

- Jawad: awarded ICTP STEP programme to stay at ICTP
- Baktash: 2019 CERN Summer School, MSC thesis with ICTP ATLAS group, currently PhD in Germany
- Sajad: MSC thesis with ICTP ATLAS group, (2020 CERN Summer school was postponed)
- Research facilities for two female faculty members in Italy

Countries in conflict or political turmoil

Venezuela

- Socio-economic and political instability that has propelled more than five million Venezuelans, almost 20% of the population, out of the country, as of 2020 due to instability.
- Major Venezuelan universities have lost around 45% of their academic staff
- PWF BrainGain Team supported 14 fellows in 2020 and 2021, to help keep talent in the country and 2022 we organised an intensive two-week Physics School
- With economic collapse, quick reactions are necessary to ensure the scientific community continues

Organizing committee: Gabriel Abellán (UCV), Hermann Albrecht (USB), Nelsón Bolívar (Bariloche, UCV), Mario Cosenza (Yachay), José Fermín (LUZ), Rolando Gaitán (UC), José Antonio López (UCV), Kevin Ng (Northeastern), Rafael Torrealba (UCLA), Juan Villegas (ULA).

Project coordinators: Ismardo Bonalde (ACFIMAN), Reina Camacho Toro (CNRS-LPNHE), Anamaría Font (UCV), Arturo Sánchez (Creative Commons Venezuela)

Countries in conflict or political turmoil

Palestine Territories

- The West Bank is under military occupation
- Gaza is under total block-aid (since 2005)
- With > 6 universities providing BSc and some MSc in Physics, the students are extremely strong
- The physics departments suffer from the usual problems of lack of funding
- But due to conflict, they have huge problems to travel, to get visas, to be recognized and to receive governmental or others support
- This costs us valuable scientists!

Dr Wafaa Khater, Birzeit University, Palestinian Territories.

- Lacks time for research
- No access to research grants
- No funding to travel to conferences to present results and meet new collaborators

Physics Without Frontiers

Countries in conflict or political turmoil

Over 25 students now onto further study, many working with experiments at CERN

How can science community and organisations help

- Problems to go to certain conferences and schools
- Access to research opportunities

Refugee Scientists

Countries in conflict or political turmoil

- Refugees flee conflict or economic turmoil, a number of whom are scientists, (~1600 displaced Scientists from Iraq alone)
- If they remain in refugee camps their knowledge and skills go untapped and they may loose their career

- Host nations would do well to identify and support highly-trained individuals rapidly and integrate them in universities, research institutions, teaching hospitals and private enterprises.
- Allows one to live in dignity, many of them will return to their countries of origin where they will help rebuild their societies

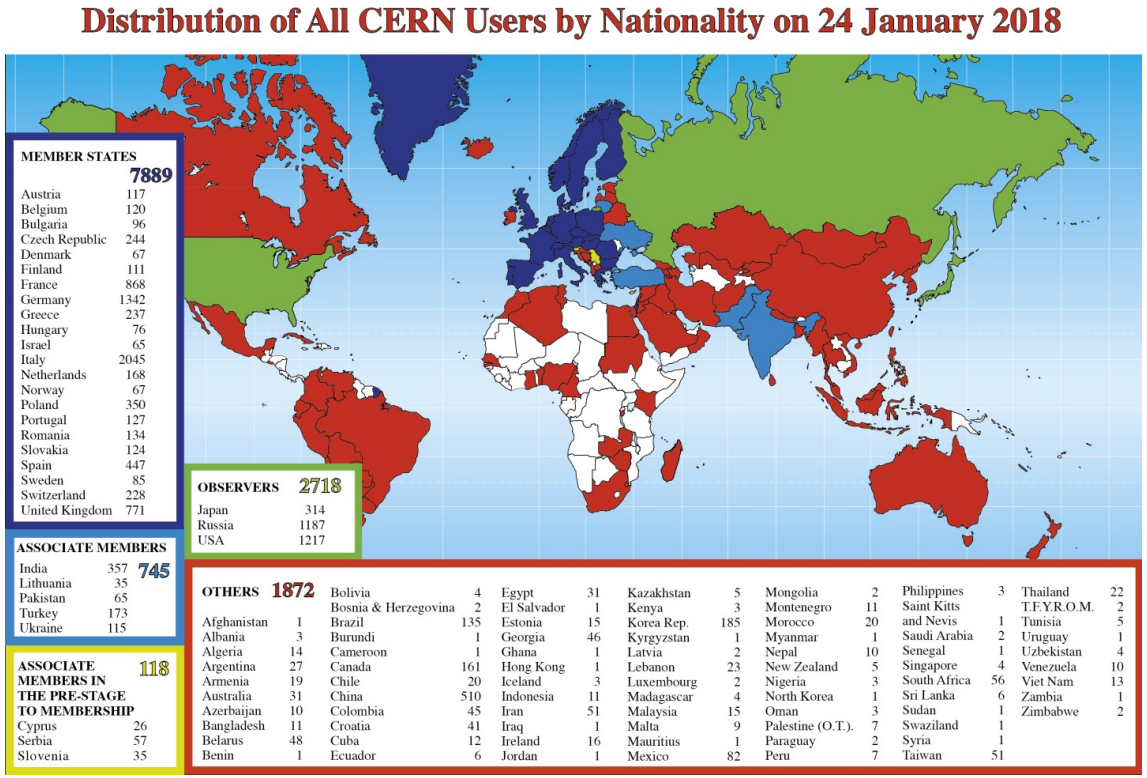
All countries have a responsibility to provide sustained support to our colleagues

TWAS: The World Academy of Science
https://twas.org/article/refugee-scientists-way-forward

"The scientific community has too often not been proactive in taking care of colleagues arriving from war-torn areas"
TWAS

International Cooperation

- Scientific international cooperation builds bridges across nations
- We must intensify and improve **scientific cooperation** particularly between countries in the Global South
- Today, CERN has become a model for cooperation in terms of research, embodying the 'one-earth' approach that the world needs to tackle the global challenges we are facing.

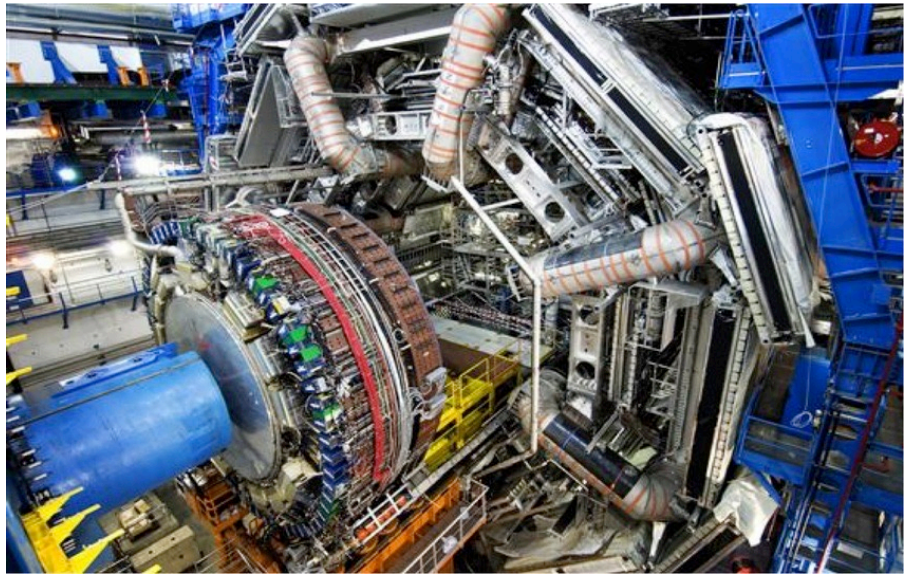


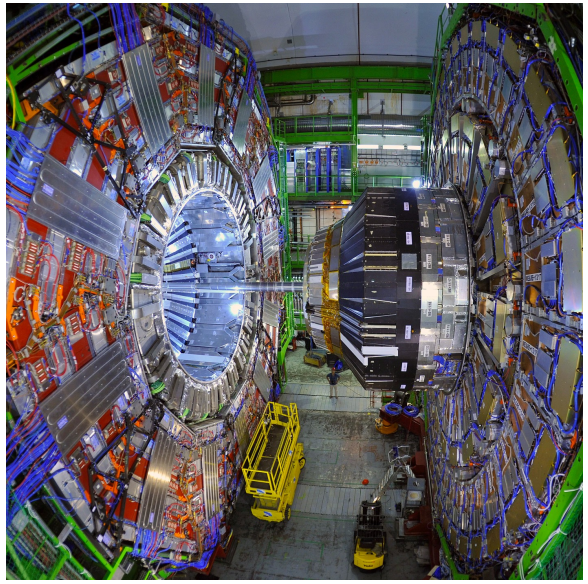
Working for Science for Peace!

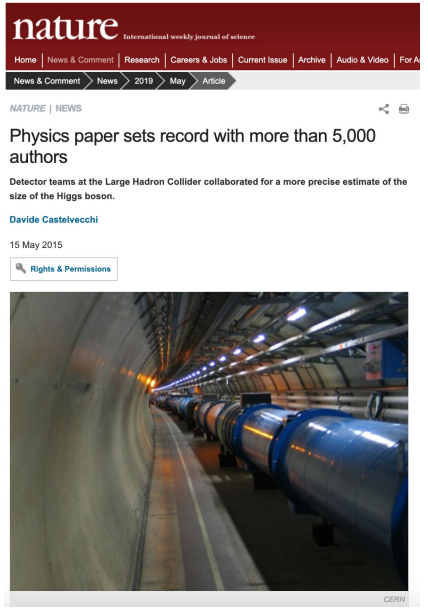
International Cooperation

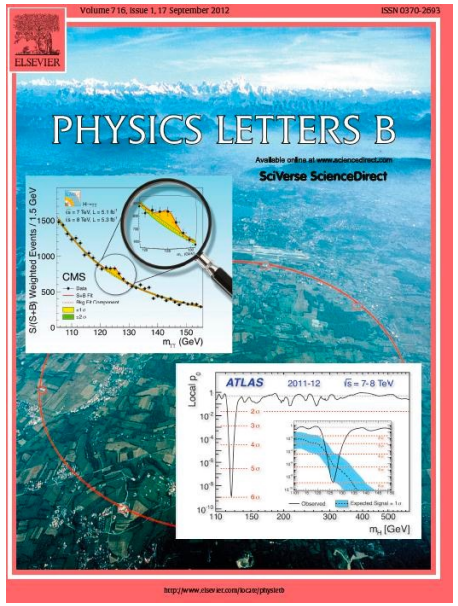
CERN

ATLAS and CMS work in competition with each other
ARCH Enermies!









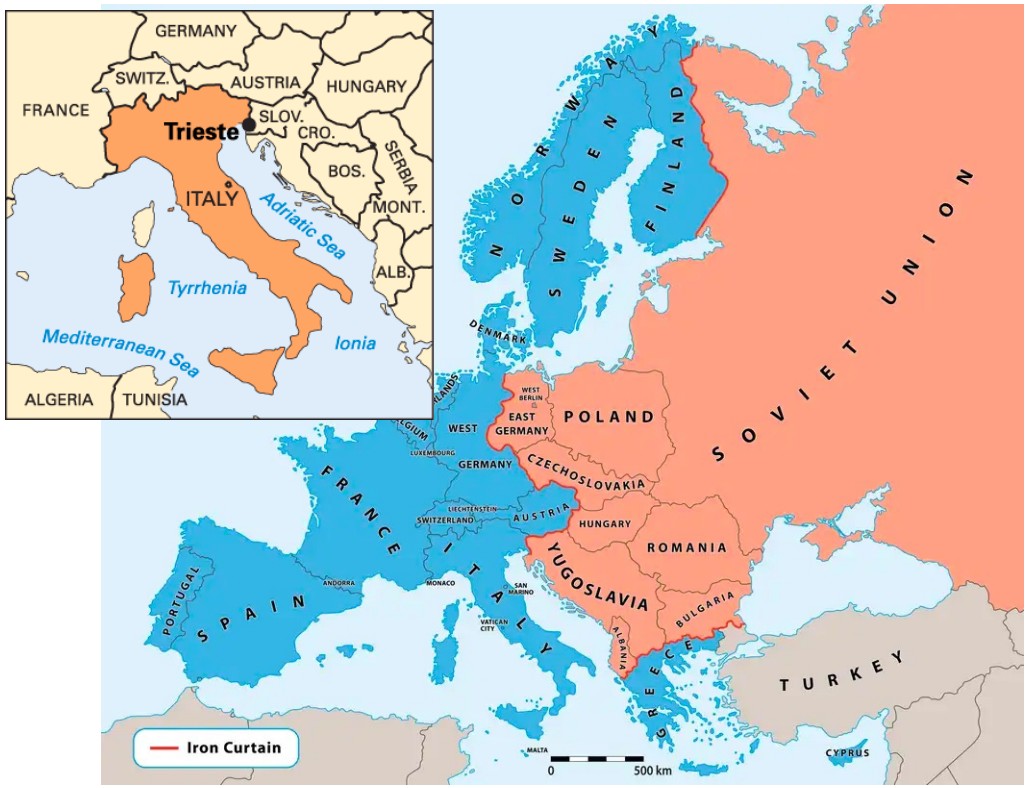
Then.. They compare and combine results and share new techniques.. Why? For the Good of Science, they together are part of CERN!

Working towards a common Goal!!

Understanding the Universe!

International Cooperation

ICTP



The international Centre for Theoretical Physics (ICTP), Trieste, Italy.

During the Cold War era in the heart of Europe, a continent separated by the iron curtain, ICTP provided a rare line of communication between scientists from the East and West, and those from developing nations.

SESAME

- The Synchrotron-light for Experimental Science and Applications in the Middle East, Allan, Jordan.
- Pooling resources to build scientific capacity within the region, create research and career opportunities that can limit the brain drain
- Excellence in science and technology
- Functions as a bridge between its diverse culturally and politically conflicting societies
- Building a community to address scientific and developmental challenges together

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PWF Website: https://www.ictp.it/physics-without-frontiers.aspx
Social Media: @ictpPWF

Summary

- We need to support scientists and scientific infrastructures in conflict regions
  - Not just a little but a lot! Especially in conflict regions we are loosing more scientists than anywhere
  - And the scientific gap will widen, leaving conflict or ex-conflict countries further and further behind

- International cooperation is a key tool to resolving conflicts
  - Creates soft diplomatic ties, break down barriers between countries.
  - What are our common goals! Be like ATLAS and CMS!
  - Creates networking opportunities between countries, inter-regional collaboration, shared infrastructure and resources

Sustainable Development

How do we address challenges and achieve the SDG by 2030

- Science brings technological, economic and educational development. Further investment is needed
- Open Science and Open Data are a vital part of the pathway towards the SDG goals, and important for accessibility to science
- Scientific literacy across the world citizens is necessary for all to benefit from science
- International cooperation is another important pathway, must be encouraged especially between countries in Global South
- Science must be for all, access to science and scientific training is vital, we must increase the access to careers in research to students from low-income countries