IAEA
International Atomic Energy Agency
Atoms for Peace and Development

IAEA support to utilization of large scale facilities by developing countries

Ian Swainson, Roman Padilla Alvarez, Alessandro Migliori, Mladen Bogovac, Mirta Sibilia, Nuno Pessoa Barradas, Francois Foulon, Danas Ridikas

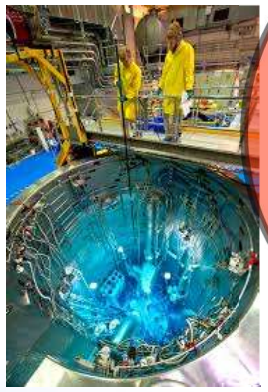
Physics Section: Main areas of Activity

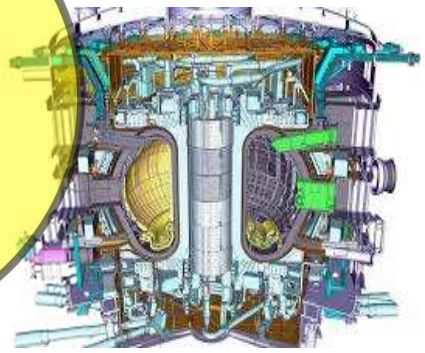
Accelerators

Instrumentation

Research Reactors (Applications)

Fusion





Contact: physics@iaea.org

Training and research opportunities available for synchrotrons (+ other fields) in developing countries…

WOMEN IN DEVELOPING COUNTRIES

Organization of women in science for developing countries OWSD

PhD Fellowships for Women Scientists from Science and Technology Lagging Countries

The Fellowship is offered to women scientists from **Science and Technology Lagging Countries (STLCs)** to undertake PhD research in the Natural, Engineering and Information Technology sciences at a host institute in the South.

The next call for applications will open on 1 March 2019.

Host institution must be in the South: could be in country with synchrotrons: Australia, Brazil, Thailand, etc…

3. **Eligible scientific fields**

- Agricultural Sciences
- Astronomy, Space and Earth Sciences
- Biological Systems and Organisms
- Chemical Sciences
- Computing and Information Technology
- Engineering Sciences
- Mathematical Sciences
- Medical and Health Sciences
- Neurosciences
- Physics
- Structural, Cell and Molecular Biology

Eligible African Countries: Angola Benin Burkina Faso Burundi Cameroon Central African Rep. Chad Comoros Congo Côte d'Ivoire Dem Rep. Congo Djibouti Eritrea Ethiopia Equatorial Guinea Gambia Ghana Guinea Guinea-Bissau Honduras Kenya Lesotho Liberia Madagascar Malawi Mali Mauritania Mozambique Niger Rwanda Sao Tome and Principe Senegal Sierra Leone Somalia South Sudan Sudan Swaziland Tanzania Togo Uganda Zambia Zimbabwe

https://owsd.net/career-development/phd-fellowship/

Organization of women in science for developing countries OWSD

Early Career Women Scientists

The Early Career Women Scientists (ECWS) fellowship is a prestigious award of up to USD 50,000 offered to women who have completed their PhDs in Science, Technology, Engineering and Mathematics (STEM) subjects and are employed at an academic or scientific research institute in one of the listed **Science and Technology Lagging Countries (STLCs)**. ECWS fellows will be supported to continue their research at an international level while based at their home institutes and to build up research groups that will attract international visitors.

Eligible African Countries: Angola Benin Burkina Faso Burundi Cameroon Central African Rep. Chad Comoros Congo Côte d'Ivoire Dem Rep. Congo Djibouti Eritrea Ethiopia Equatorial Guinea Gambia Ghana Guinea Guinea-Bissau Honduras Kenya Lesotho Liberia Madagascar Malawi Mali Mauritania Mozambique Niger Rwanda Sao Tome and Principe Senegal Sierra Leone Somalia South Sudan Sudan Swaziland Tanzania Togo Uganda Zambia Zimbabwe

https://owsd.net/career-development/early-career-women-scientists-ecws-fellowships

Trieste hosts the ICTP (International Centre for Theoretical Physics) and the Italian synchrotron (Elettra)

OPPORTUNITIES IN TRIESTE

ICTP/IAEA Sandwich Training Educational Programme

PhD fellowship opportunities in physics and mathematics

Through its Sandwich Training Educational Programme (STEP), ICTP and its UN partner, the International Atomic Energy Agency (IAEA), offer fellowships to PhD students from developing countries in the fields of physics and mathematics.

STEP's goal is to strengthen the scientific capability of young scientists and researchers from developing countries to better contribute and serve the scientific, technical, and economic development of their home countries. STEP fellowships enrich their doctoral studies by giving students access to ICTP's and the IAEA's international community and world-class research and training facilities.

Application deadline: 15 April

With a STEP fellowship, PhD students study at their home universities but have the financial support to visit ICTP or a collaborating institute for a three- to six-month stay each year for up to three successive years. Fellows work on their PhD theses with their advisors at their home institutes and co-advisors at the hosting institutes. Their PhD is awarded at their home institutes.

IAEA Fellowships: Financial support is provided by the IAEA Department of Technical Cooperation through the IAEA Technical Cooperation Fund. Candidates should be from an IAEA member state. The IAEA must receive an official endorsement for the fellow from the fellow's country. Fields of research include:

- atomic and nuclear physics
- nuclear, isotope and laser techniques applied to:
- human health
  agriculture
  biotechnology and biophotonics
  water resources and environmental studies
- synchrotron radiation and applications
- medical radiation physics

https://www.ictp.it/programmes/step.aspx

ICTP/IAEA Sandwich Training Educational Programme

OFID Fellowships: ICTP and the OPEC Fund for International Development (OFID) announce joint fellowships for research and training opportunities to PhD students in developing countries.

ICTP Fellowships: Fellowships are also provided by ICTP, within its scientific and technical competence, to candidates from developing countries in the fields listed below:

- condensed matter and statistical physics
- high energy physics
- mathematics
- earth system physics
- applied physics (including micro- and nano-electronics, fluid dynamics)
- quantitative life sciences

For further information please contact:

ICTP-IAEA Sandwich Training Educational Programme
c/o Postgraduate Diploma Programme
The Abdus Salam International Centre for Theoretical Physics
Strada Costiera, 11
I-34151 Trieste, Italy

Ms. Sandra Alimanovic
LB Room A/bis
Telephone: +39 040 22 40 362
Telefax: +39 040 22 40 388
e-mail: step@ictp.it

Financial Support

The STEP fellowship includes a stipend of EU 1,400 per month during each stay at the host institute as well as the costs of travel and medical insurance.

It is understood that, during all other periods not covered by the STEP fellowship, i.e. when at the home institute, all support needed for continuing and finishing the fellow's research work is provided by other funding sources.

Application Procedure

The STEP fellowship application forms can be downloaded herebelow. Applications should be submitted to the ICTP Office of External Activities (OEA).

Deadlines to submit applications are:

- 15 February
- 15 August

of each year, for applications to be considered at the Spring meeting and at the Fall meeting, respectively, of the STEP selection Committee.

https://www.ictp.it/programmes/step.aspx

ICTP-TRIL (Training in Italian Labs)

The TRIL Programme offers scientists from developing countries the opportunity to undertake training and research in an Italian laboratory in different branches of the physical sciences.

The aim of the programme is to promote, through direct contacts and side-by-side high-level research, collaborations between the Italian scientific community and individuals, groups and institutions in developing countries. This programme thus addresses an important aspect of the mission of ICTP, namely to help form and strengthen a permanent scientific expertise in developing countries, cognisant of local needs and resources and of the frontiers of science and technology, and to provide support towards a sustainable capacity in basic and applied research that can help their nations' progress.

The ICTP has established agreements of collaboration with more than 400 Italian research institutes, providing young scientists with numerous options. TRIL partners include:

- CNR (Italian National Research Council) institutes
- Elettra-Sincrotrone Trieste (Elettra Synchrotron Light Source)
- ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development)
- INFN (National Institute for Nuclear Physics)
- INGV (Istituto Nazione di Geofisica e Vulcanologia)
- OGS (National Institute of Oceanography and Experimental Geophysics)

  and several others

TRIL fellows are matched to laboratories that best meet their needs. Over the years, the TRIL experience has benefitted hundreds of developing world scientists, boosting their research careers through collaboration with world-class scientists and the latest equipment, and exposing them to Italian culture as well.

https://www.ictp.it/tril.aspx

ICTP-Elettra Users Programme

The ICTP-Elettra Users Programme is offering access to the synchrotron radiation facility Elettra-Sincrotrone Trieste in Trieste in the years 2002-2021 to scientists who are citizens of and work in developing countries.

A minimum of 1500 hours of beamtime can be made available for measurement and applications at any of the Elettra beamlines.

The programme is offering **a limited number** of grants to cover travel and living expenses of individuals and small groups using beamtime at Elettra:

- up to 2 scientists for experiments with less than 12 shifts
- up to 3 scientists for experiments with 12 shifts or more.

The programme is not available for monthly applications.

In order to allow experiment preparation and/or sample disposal, support can be offered up to **three days before** the experiment beginning date and **one day after** its ending date.

In exceptional cases, training on a specific topic for longer periods can be arranged if it is meant to improve the expertise of relevance to a project. In that case a quota will be deducted from the total of annual hours.

Travel support provided by ICTP will follow ICTP standards: that is economy air tickets or second class train fares. Once Users have received their official invitation letter from ICTP, they must contact ICTP Operation and Travel Unit prior to purchasing their ticket. Reimbursement will only be provided upon presentation of the original ticket stubs.

The daily allowance per person will be EUR 71,00.

The minimum grant for a long period training will be EUR 1.200,00 per month.

https://www.elettra.trieste.it/userarea/ictp-elettra-users-programme.html

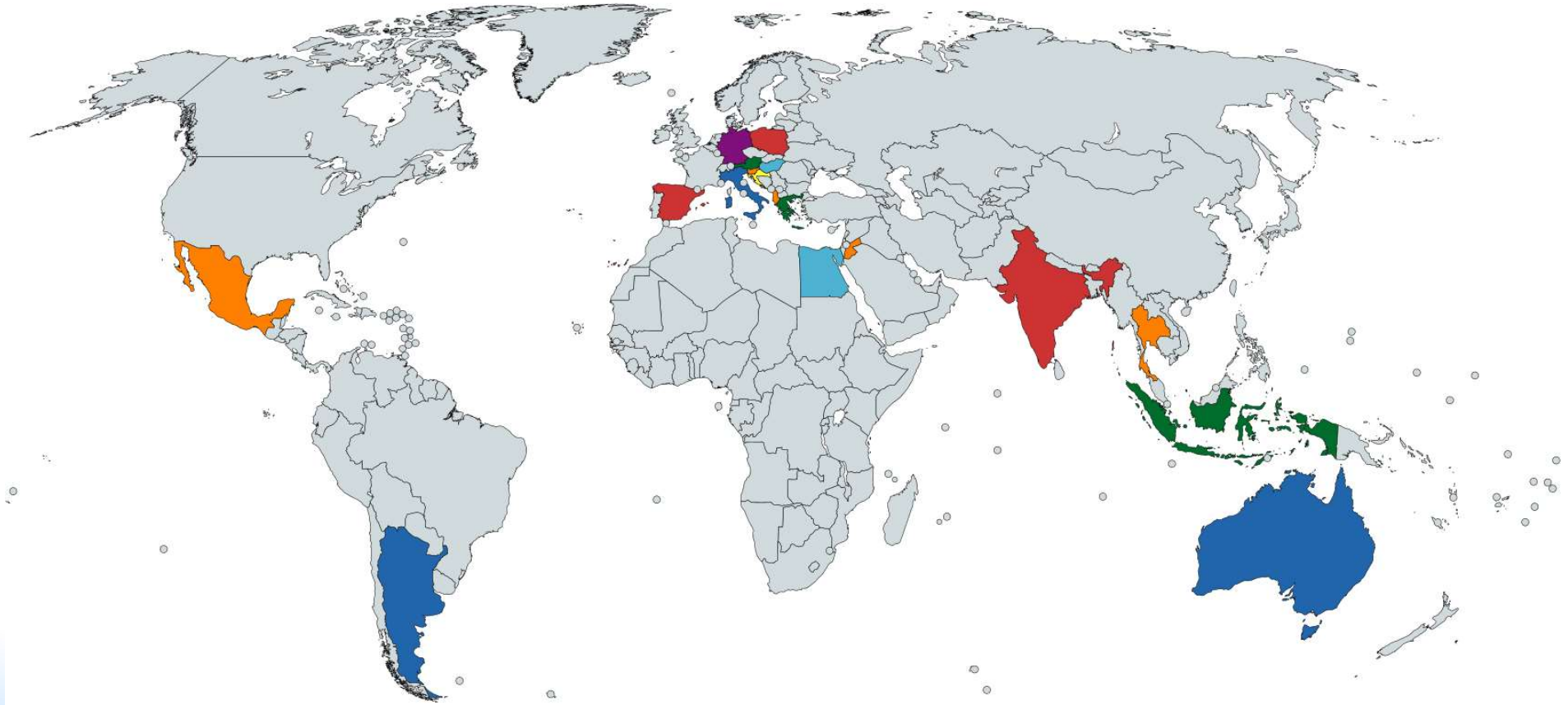
IAEA-Elettra XRF beamline & endstation

- IAEA and Elettra have an agreement so that an IAEA high-vacuum chamber is operated with the Elettra XRF beamline
- Some additional travel money is available for people from developing countries for approved experiments
- We intend to run a joint training course at Elettra in the Fall (*likely*: October 7-13).

http://www.elettra.trieste.it/lightsources/elettra/elettra-beamlines/microfluorescence/x-ray-fluorescence.html

Elettra Sincrotrone Trieste & IAEA International Atomic Energy Agency *Atoms for Peace*

Countries awarded beamtime at the Trieste XRF beamline 2015-2018

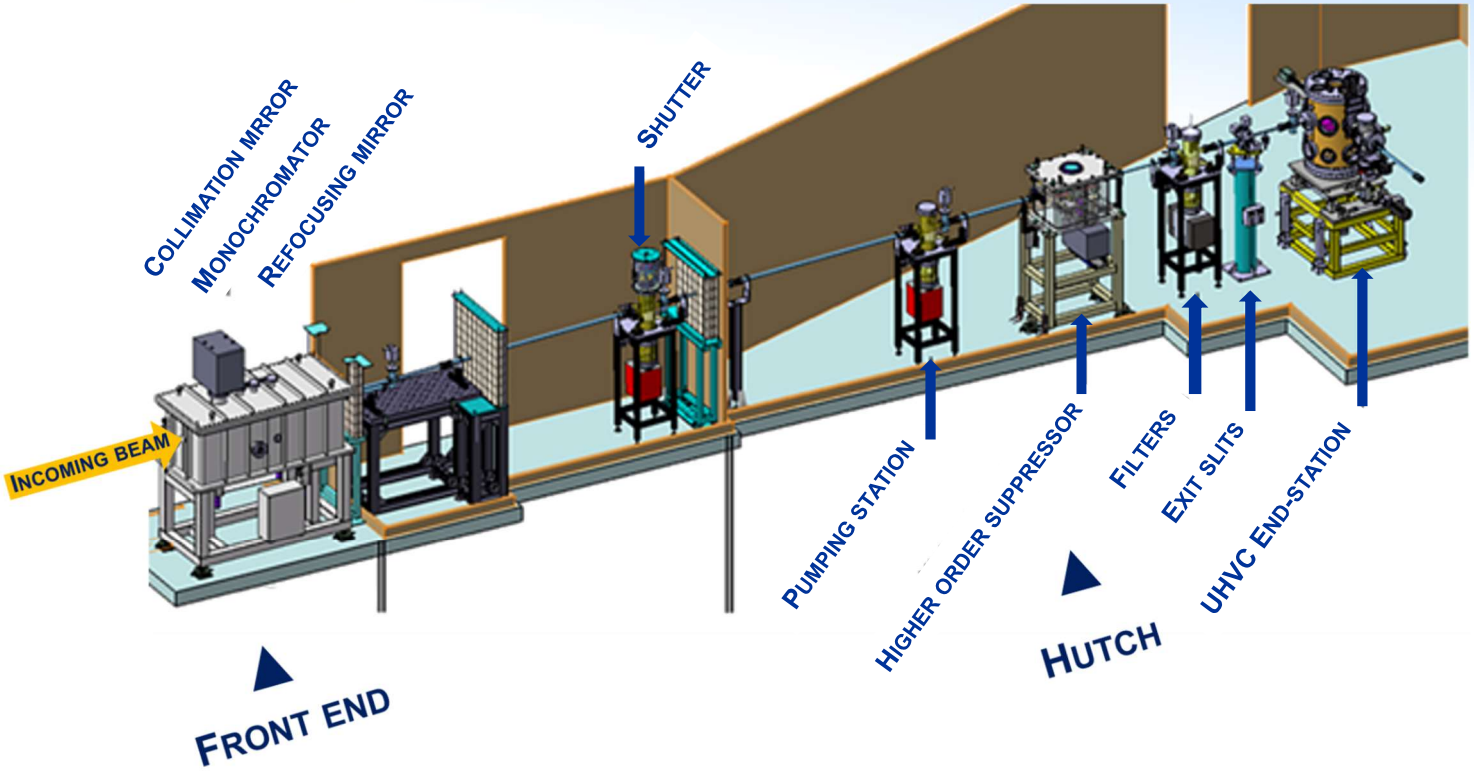


Distributions of beamtime to proposals by Country and by Technical Area 2015-2018

1	2	3	4	5	6	7	8
ALBANIA							
ARGENTINA	ARGENTINA						
AUSTRALIA	AUSTRALIA						
AUSTRIA	AUSTRIA	AUSTRIA					
CROATIA	CROATIA	CROATIA					
EGYPT							
GERMANY							
GREECE	GREECE	GREECE	GREECE	GREECE	GREECE	GREECE	GREECE
HUNGARY							
INDIA	INDIA	INDIA	INDIA	INDIA	INDIA	INDIA	
INDONESIA	INDONESIA	INDONESIA					
ITALIA	ITALY	ITALY	ITALY				
JORDAN							
MEXICO	MEXICO						
POLAND	POLAND	POLAND	POLAND	POLAND	POLAND		
SLOVENIA	SLOVENIA	SLOVENIA	SLOVENIA				
SPAIN	SPAIN						
THAILAND							
	IAEA						
	Elettra						

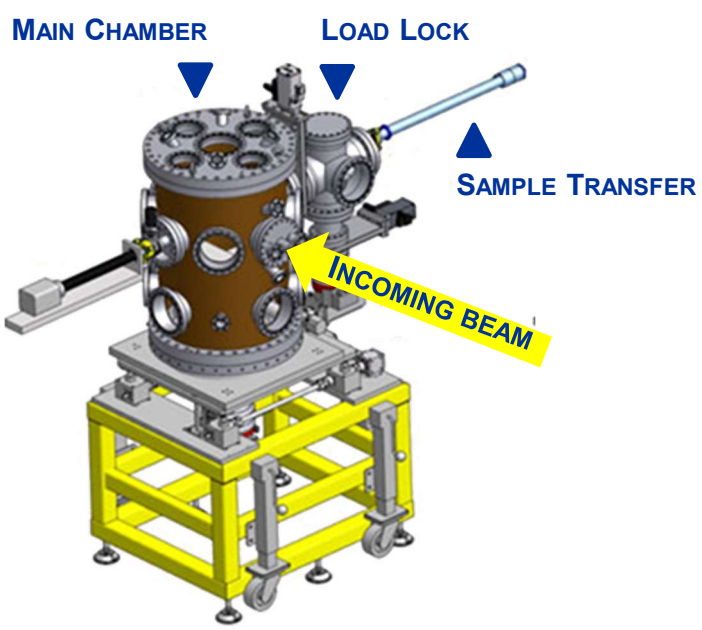
Technical Area	No.
Atoms Molecules and Plasma	3
Catalytic Materials/Surface Science	3
Condensed matter - Electronic and Magnetic Structure	1
Environmental and Earth Science	12
Hard condensed matter - Structures	4
Instrumentation and Technological materials	4
Life and Medical Sciences	19
Polymers and Soft Matter	1

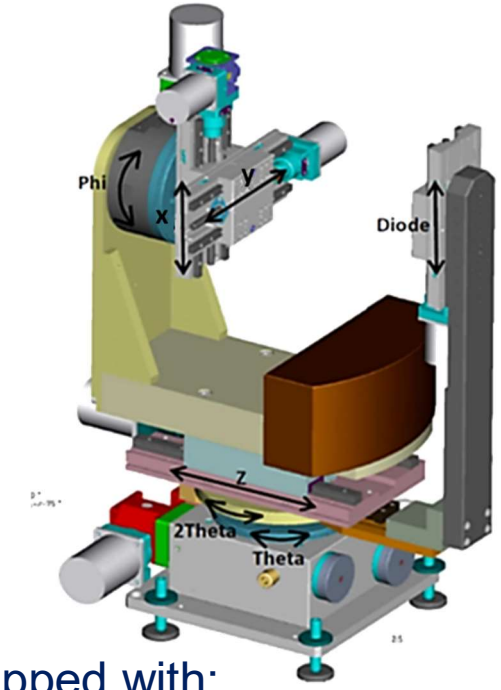
Beamline description



- **ENERGY RANGE:** *Si* (111) → 2 −14 keV
  Multilayers → 0.7−14 keV,
- **BEAM SIZE:** at sample position ~ 250 × 90 μm^2 ,
- **FLUX:** 1 × 10^{10} ph·s^{-1} @ 5.5 keV (2 GeV) and @ 7keV (2.4 GeV)
- **END STATION:** Ultra-high Vacuum Chamber (10^{-8}–10^{-9} millibar).

Ultra High Vacuum Chamber





It is equipped with:

- 4 linear stages (X, Y, Z, Diode)
- 3 goniometers (θ, 2θ, φ).

On the left the exp. chamber seen from outside.

On the right, maniuplator seen from inside

Available techniques at the Trieste XRF beamline/endstation

- **2D micro-XRF and micro-XANES:**

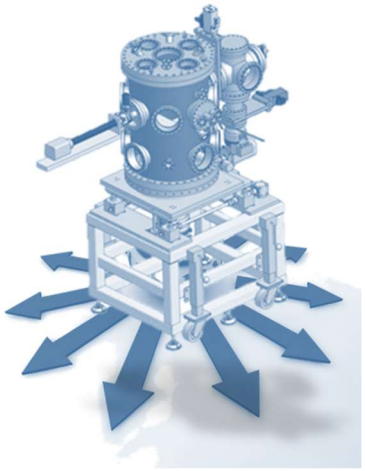
  for studying and quantifying the distribution of elemental composition and chemical speciation over different areas of the sample;

- **Total-reflection XRF (TXRF) and TX-XANES:**

  for ultra-trace elemental/chemical characterization of liquid samples residues and micro/nanoparticles on smooth surfaces;

- **Grazing Incidence XRF (GI-XRF) and GI-XANES:**

  for investigation of nano-layered structures or shallow dopants in advanced materials with nm depth resolution;



- **X-ray Reflectometry (XRR):**

  for structural analysis (thickness, density) of thin films and multi-layered structures.

Additional XRF training opportunities in Austria

IAEA SEIBERSDORF

“Mirror Chamber” & XRF training

A Group Fellowship is usually annually available covering all aspects of XRF from the ground up at Seibersdorf. Applicants must come from countries with a valid Technical Cooperation Project with the IAEA. Last year the training lasted ca. 2 months and was attended by 2 Nigerians and 2 Sierra Leoneans and 1 Brazilian.

Course expected in July/August 2019

An identical copy (“mirror chamber”) of the Elettra chamber is present at IAEA’s Austrian laboratories. Training in how to handle samples, alignment for grazing incidence/reflectometry is available with a conventional X-ray source.

English العربية 中文 Français Русский Español

IAEA International Atomic Energy Agency

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Technical cooperation programme

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The technical cooperation programme is the IAEA's primary mechanism for transferring nuclear technology to Member States, helping them to address key development priorities in areas such as health and nutrition, food and agriculture, water and the environment, industrial applications, and nuclear knowledge development and management. The programme also helps Member States to identify and meet future energy needs, and assists in improving radiation safety and nuclear security worldwide, including through the provision of legislative assistance.

News

Projects

1611 Active Technical Cooperation Projects

Projects in focus

- Water in the Sahel

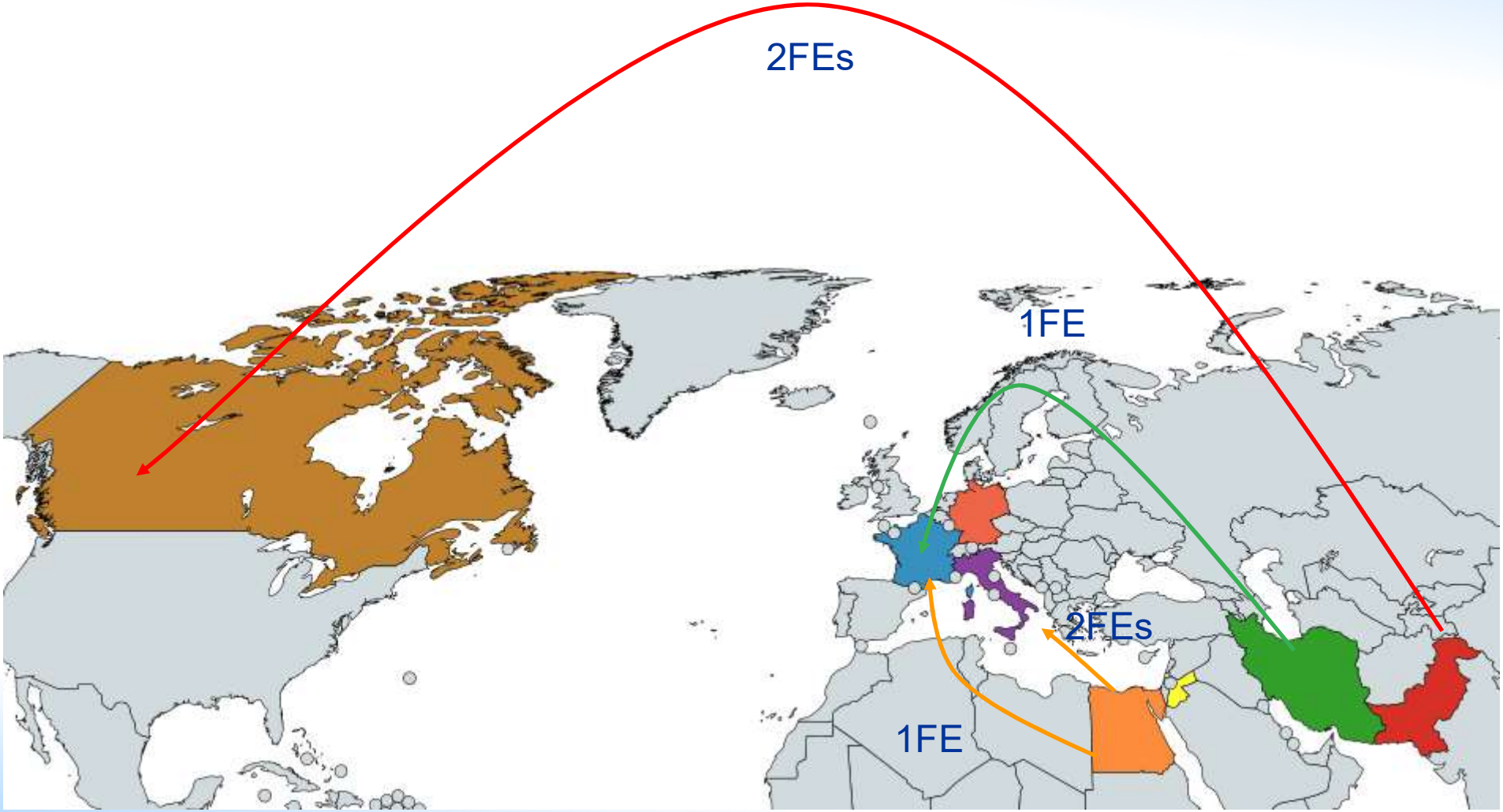
Related resources

- WNU Summer Institute
- Technical Cooperation Conference 2017, 30 May-1 June 2017
- Publications
- Technical Cooperation Report for 2017
- Technical Cooperation Report for 2017 - Supplement

IAEA has supported SESAME for ~15 years. Possible support to come to other developing countries for access to SESAME.

TC SUPPORT TO SESAME

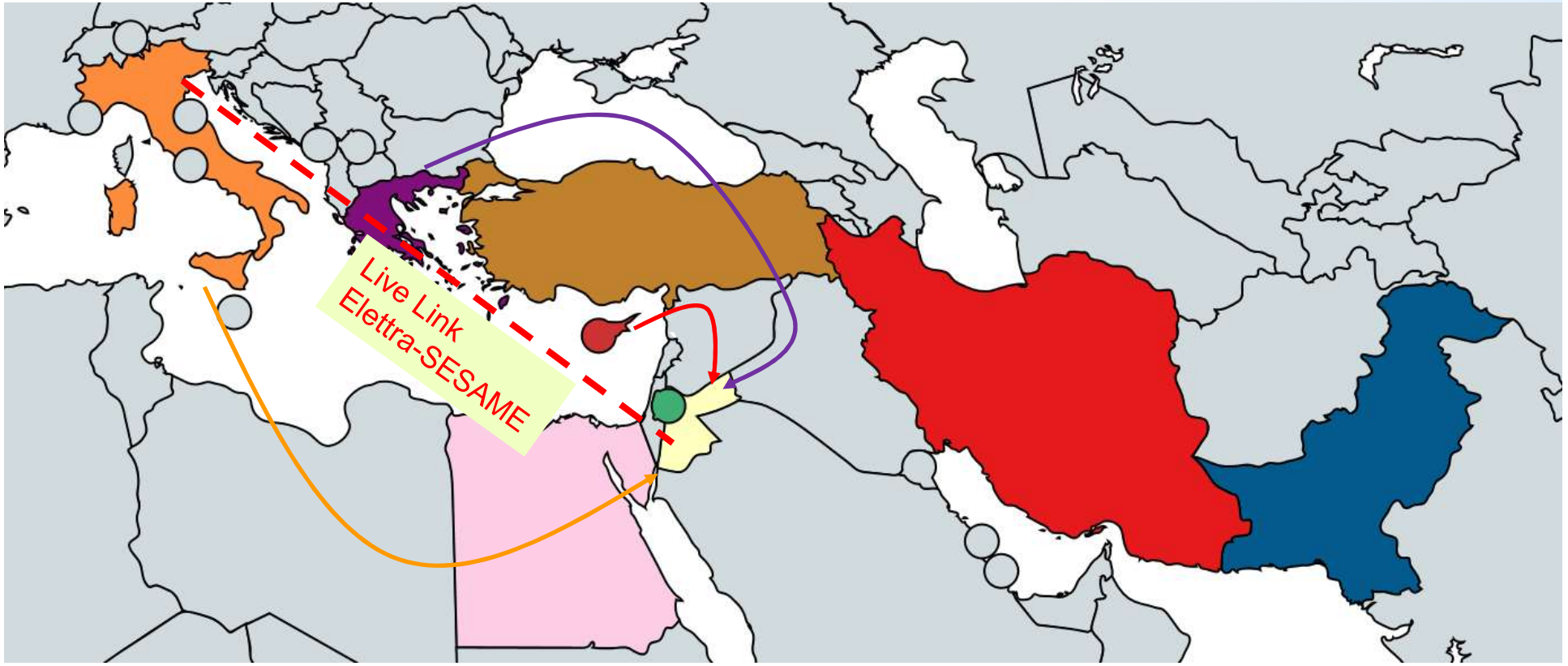
Each Fellowship Applications Agreed or In Place in 2018-2019
Each fellowship is 2-3 months



TRAINING COURSE ON SYNCHROTRON TECHNIQUES FOR CULTURAL HERITAGE AT SESAME

11-15 March 2018

Cultural heritage course: a partnership between SESAME, IAEA and Elettra



12 student attendees from SESAME Members.
Lecturers: SESAME staff experts + 3 outside experts: Giuliana Aquilanti (Elettra), Kirsi Lorenz (Cyprus Institute), Andreas Karydas (Demokritos).

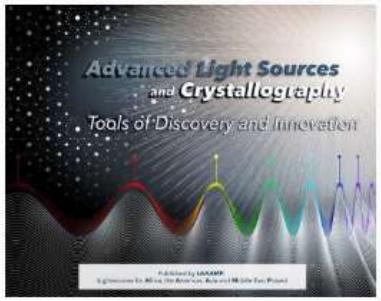
Work to date with LAAAMP, AfLS

- Provided translations to French and Spanish of the LAAAMP brochure.
- Possible support towards an Arabic version available (2019).

An IUPAP-IUCr project within the 2016-2019 ICSU Grants Programme

LAAAMP

Lightsources for Africa, the Americas, Asia and Middle East Project

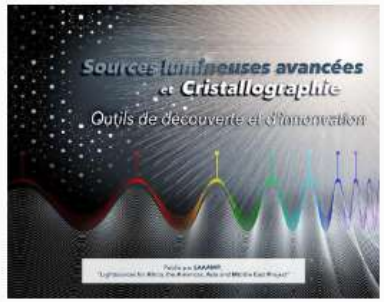


LAAAMP Brochure, Version 2
Language: English

(PDF file, 5.4 MB)

LAAAMP Brochure, Version 2
Language: Spanish

(PDF file, 4.7 MB)



LAAAMP Brochure, Version 2
Language: French

(PDF file, 4.7 MB)

- Financial support to the First African Light Source meeting in Grenoble, France, 2015.
- Supporting this meeting in cooperation with AfLS.

Possible steps for AfLS/LAAAMP with IAEA

- Propose a side-event on synchrotron applications with emphasis on developing countries at the IAEA General Conference 16-20 September 2019.
  - Needs to be soon, perhaps in conjunction with Jordan / other countries
- Organize a regional IAEA TC project in Africa focused on feasibility study/planning/training.
  - Requires: ~4-5 governments to come together to propose such a project.
  - Would need to lobby your NLOs.
  - May not be 100% funded by IAEA core funding, but third-party funders, e.g., EU, European or other donor countries may contribute "Footnote(a)" extrabudgetary funding
- IAEA-ICTP workshops. IAEA gives funding annually to ICTP and gets to propose workshops. Funding for participants included in this budget.

African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA)

Regional/Cooperative Agreements

News

AFRA is an intergovernmental Agreement established by African Member States to strengthen and enlarge the contribution of nuclear science and technology to socioeconomic development on the African continent.

The African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (AFRA), which entered into force on 4 April 1990, provides a framework for African Member States to intensify their collaboration through programmes and projects focused on the specific shared needs of its members. Its activities cover a wide range of peaceful applications of nuclear techniques that contribute to the achievement of national and regional development goals.

Projects

3 Active Technical Cooperation Projects

Related resources

- AFRA: Full text
- AFRA: Status list
- AFRA Website
- Technical Cooperation: Africa
- Treaties
- Treaties under IAEA auspices

General Conference

Governance
62nd General Conference
News
Events

The General Conference consisting of representatives of the IAEA Member States meets in a regular annual session, usually in September, to consider and approve the IAEA's budget and to decide on other issues raised by the Board of Governors, the Director General and Member States.

Representatives of IAEA Member States and invited non-Member States and organizations may register for the General Conference in accordance with such rules as the General Conference has approved.

The General Conference elects a President and members of the General Committee at the beginning of each annual session. They hold office for the duration of the session.

In conjunction with the General Conference, the IAEA regularly organizes a Scientific Forum on topics related to nuclear technology and science.

Annual IAEA General Conference

Events

16 – 20 Sep 2019
Vienna, Austria
63rd General Conference

More events →

Related resources

- Rules of Procedure of the General Conference
- General Conference archives
- List of Member States

Search

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Overview

Programme

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Support

smr2738@ictp.it

Joint ICTP-IAEA Workshop on Advances in X-ray Instrumentation for Cultural Heritage Applications | (smr 2738)

Starts 13 Jul 2015
Ends 17 Jul 2015
Central European Time

ICTP
LB (Euler Lecture Hall)
Strada Costiera, 11
I - 34151 Trieste (Italy)

Organizers

Andreas-Germanos Karydas (IAEA - Vienna), Claudio Tuniz (ICTP - Trieste)

Co-sponsors

IAEA International Atomic Energy Agency

The International Atomic Energy Agency (IAEA) and the Abdus Salam International Centre for Theoretical Physics (ICTP) organizes a Workshop on Advances in X-Ray Instrumentation for Cultural Heritage Applications, to be held at the ICTP in Trieste, from 13 to 17 July 2015.

The purpose of the workshop is to inform and educate scientists on recent instrumental developments that improve and expand the analytical merits of X-ray based techniques for Cultural Heritage (CH) applications. Nowadays, X-ray based methodologies are applied for the characterization of cultural materials in a broad context, in-situ in museum and archaeological sites, using versatile handheld and portable devices or at advanced accelerator charged particle and synchrotron radiation facilities. The end-user community of this technology rapidly expands including now conservation scientists, professionals, CH Institutions and researchers from museums analytical laboratories and archaeological departments. The workshop program will emphasize hands-on practical sessions to familiarize the participants with the instrumentation and analytical features of

Finally…

- Lots of “little” projects/pots of money exist. Suggestions for how we can work effectively together are welcome.
- Maybe AfLS could keep a list of training opportunities on its website/email bulletin and travel support available to Africans for SR experiments.
- Planning….activities in IAEA often need a long lead time. Never to early to start planning!

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Thank you!