

The role of CEI in promoting the development of a knowledge-based society in the region

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Sincrotrone Trieste

CEI: an
intergovernmental
forum for political,
economic and cultural
co-operation One of
CEI's objectives is to
bring the countries of
Central and Eastern
Europe closer
together



CEI schemes for S&T

- Conferences & schools
- “From Research to Enterprise” awards
- CEI Research Fellowships

Seed money (15 k€) to finance feasibility studies of business ideas stemming from research.

Eligible applicants:

citizens of the CEI Member States, graduated in any discipline of science, currently employed in universities and other public research institutions in CEI countries.

Preference to applicants from Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Moldova, Romania, Serbia and Montenegro, Ukraine.

Selection criteria:

- Scientific and technological quality of the research results
- Feasibility in terms of practical application
- Potential market value of the research results
- Appeal for potential investors
- Age of the project team leader (not older than 32 years) and the average age of the team.

Selection Committee:

- Chairman of CEI S&T Working Group
- A representative of the CEI Executive Secretariat
- A representative of the EBRD
- A business advisor
- Ad hoc specialists within the relevant field of science as scientific advisors.

CEI Research Fellowships

Past program

- Program established in 2005
- Scientists (at the post-doctoral level) from the CEI countries carry out research in one of the **CEI Science & Technology Network's** Institutions.
- 6 to 8 Junior Fellowships per year,
- Budget (2005-2008)
 - 300 k€ CEI
 - 300 k€ research institutions

CEI Research Fellowships

Future

- Co-financing from the EU
- 10 fellowships/year for 3 years
- Budget (2009-2011)
 - 300 k€ CEI
 - 400 k€ EU
 - 300 k€ research institutions

The CEI Scientific and Technological Network

Individual agreements between the CEI Secretariats and Centres of Scientific and Technological Excellence willing to dedicate a part of their activities to the CEI region Agreements with institutions belonging to the “Trieste System”:

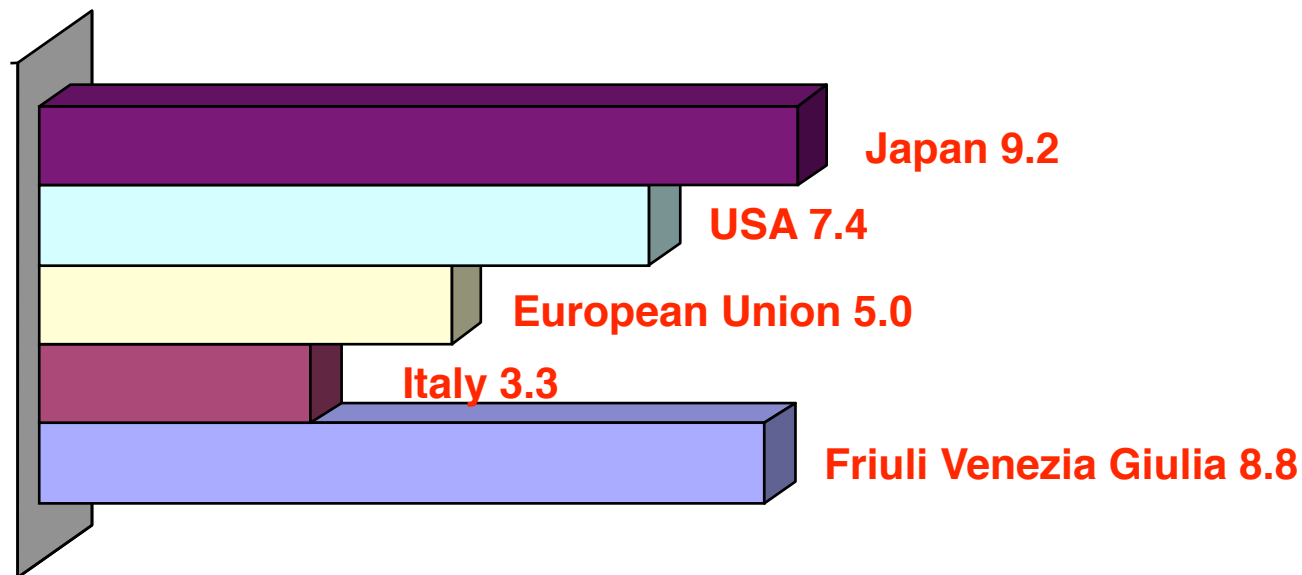
- ICTP (International Centre for Theoretical Physics)
- ICGEB (International Centre for Genetic Engineering and Biotechnology)
- SISSA-ISAS (International School for Advanced Studies)
- Elettra-Sincrotrone Trieste
- CBM (Centre for Molecular Biomedicine)

The Trieste Research system:

One of the highest concentration of research centers in Europe:

- ICTP (International Center for Theoretical Physics)
- Area Science Park
- ICGEB (International Center for Genetic engineering and Biotechnology)
- ICS-UNIDO (UNIDO International Centre for Science and High Technology)
- ISAS (International School for Advanced Studies)
- The Elettra synchrotron radiation laboratory

Number of researchers/1000 working units

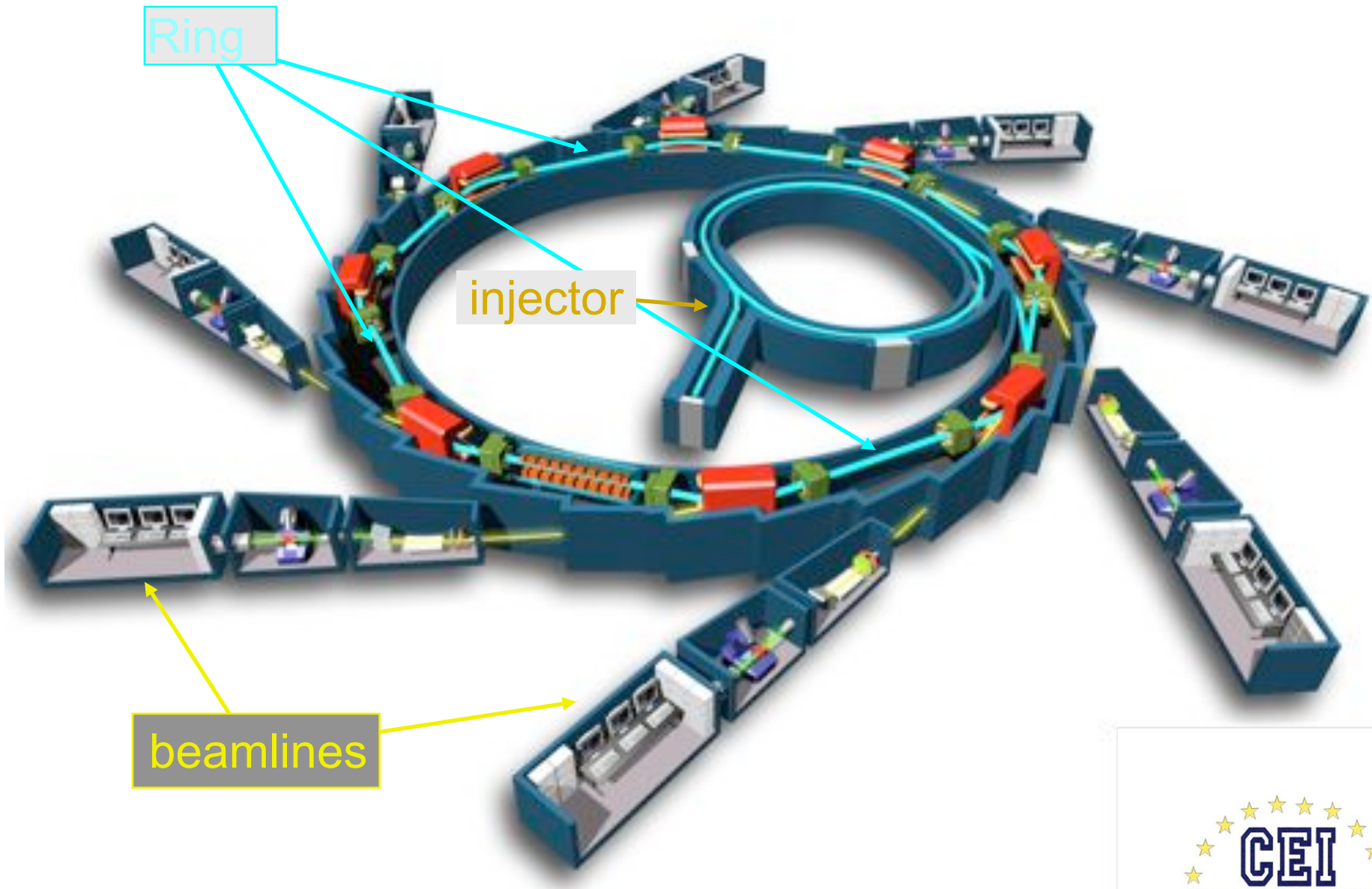


Elettra: one of the centers in the Trieste System



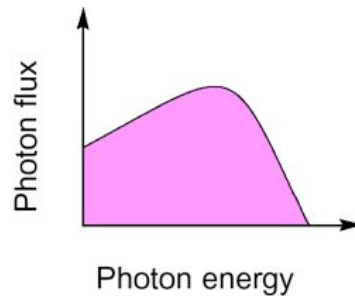
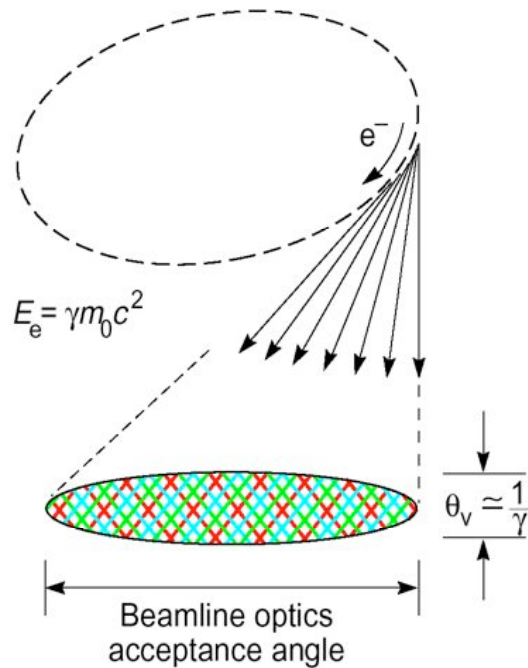
CEI and IAEA training center

A synchrotron

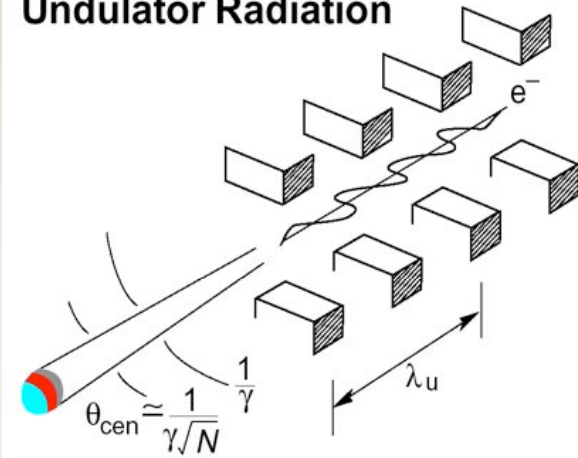


Radiation production

Bend-Magnet Radiation



Undulator Radiation

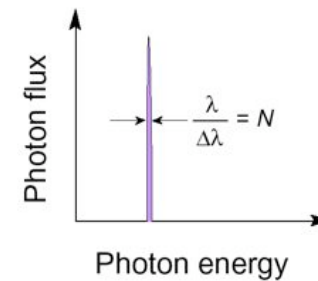


$$\lambda_x = \frac{\lambda_u}{2\gamma^2} (1 + \frac{K^2}{2} + \gamma^2 \theta^2)$$

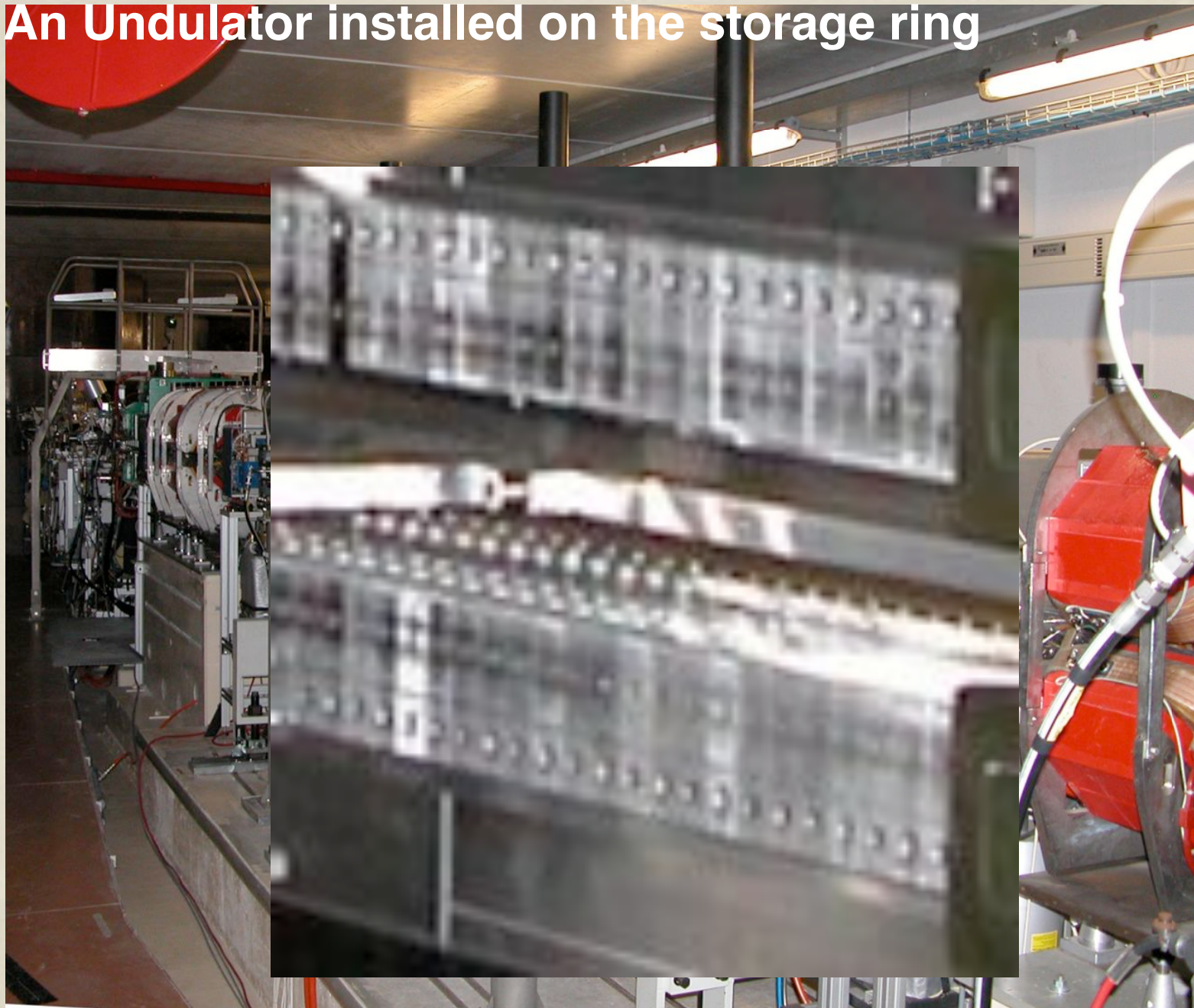
In the central radiation cone:

$$\frac{\Delta\omega}{\omega} \approx \frac{1}{N}$$

$$\theta_{cen} \approx \frac{1}{\gamma\sqrt{N}}$$



An Undulator installed on the storage ring



Elettra history and milestone

- Early 80's
proposal by the European Science Foundation for two new synchrotron radiation laboratories one for hard x-rays and a complementary one for vuv/soft x-rays
- 1986
Decision to build the two infrastructure: ESRF (several European countries including Italy, 15% of the shares) and Elettra as a *national* facility
- 1991-1993
construction
- October 1993
start of commissioning
- January 1995
first user groups

Aerial view of Eletra during construction



Picture taken on May 14 1992 by a Soviet spy satellite



Image © 2002 DigitalGlobe

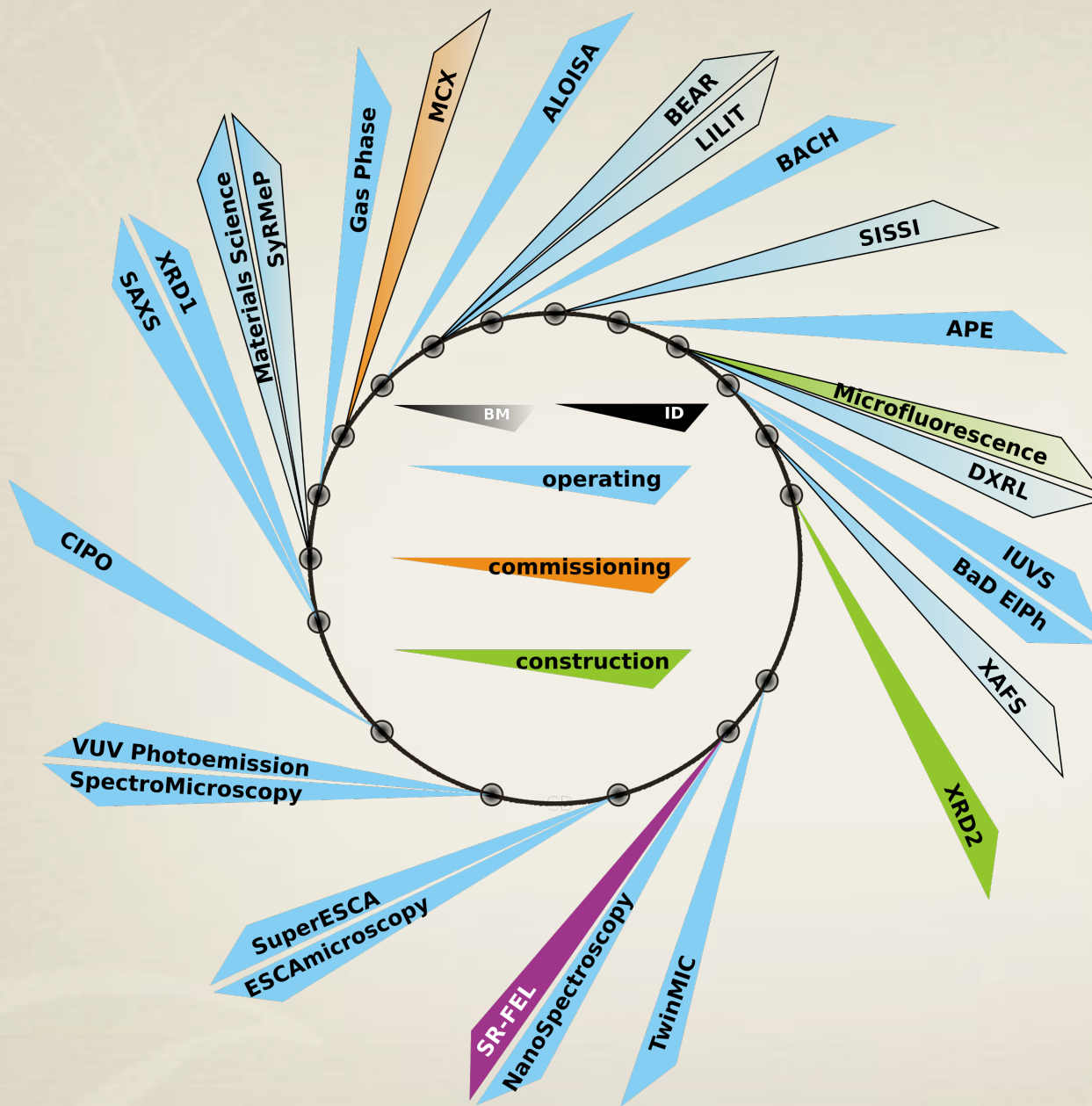
Google

Position: 45° 18' 42" N 113° 50' 53" W

Streaming: 311/1000000

Eye alt: 448 m



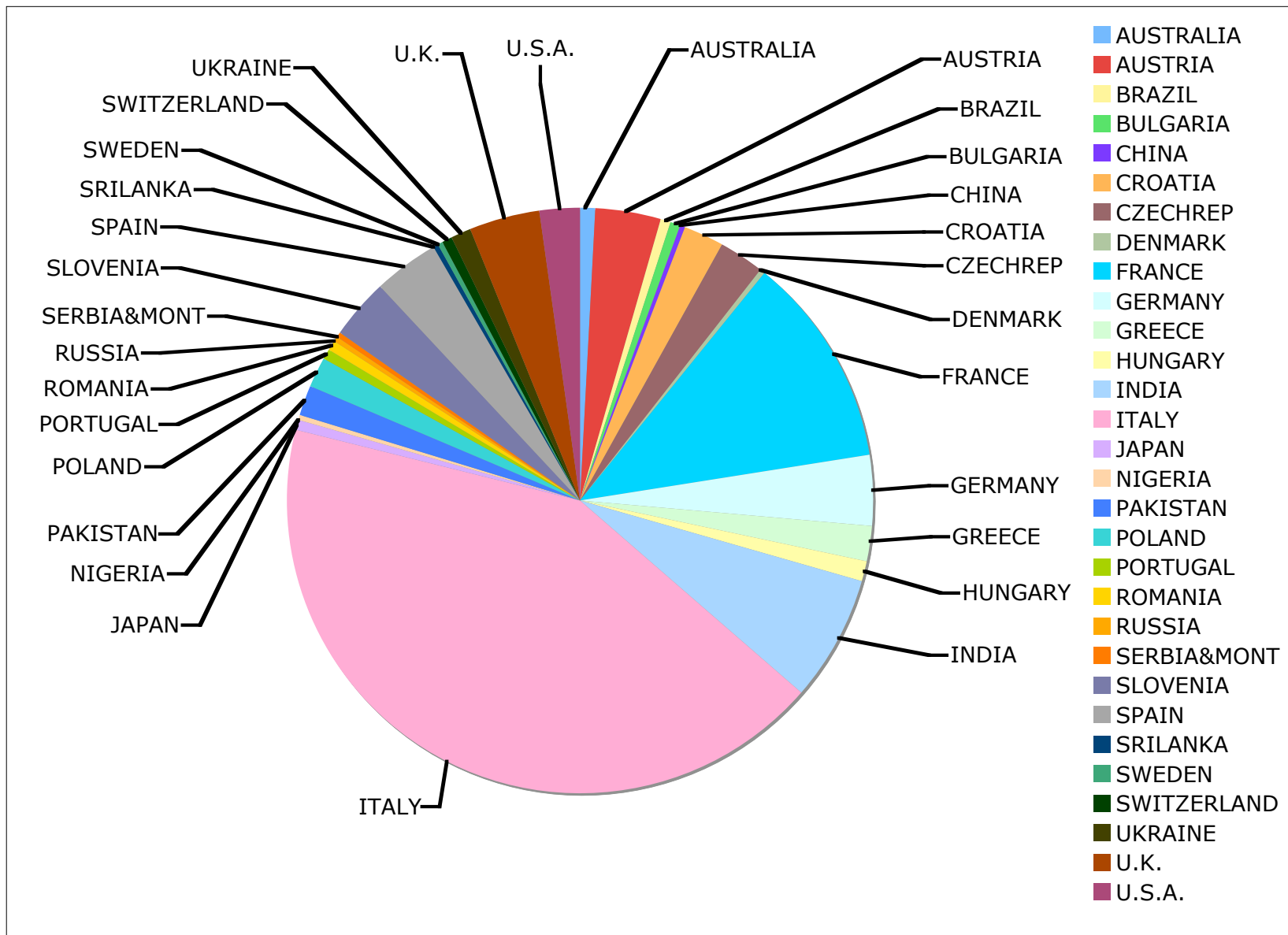


- 22 beamlines in operation and open to external users
- 1 beamline under commissioning
- 2 beamlines under construction
- 1 FEL test beamline

Fields

Elettra is a research infrastructure offering a research service to the community of materials analysis, from isolated atoms to human beings...

Proposals by country (march 2008 deadline)



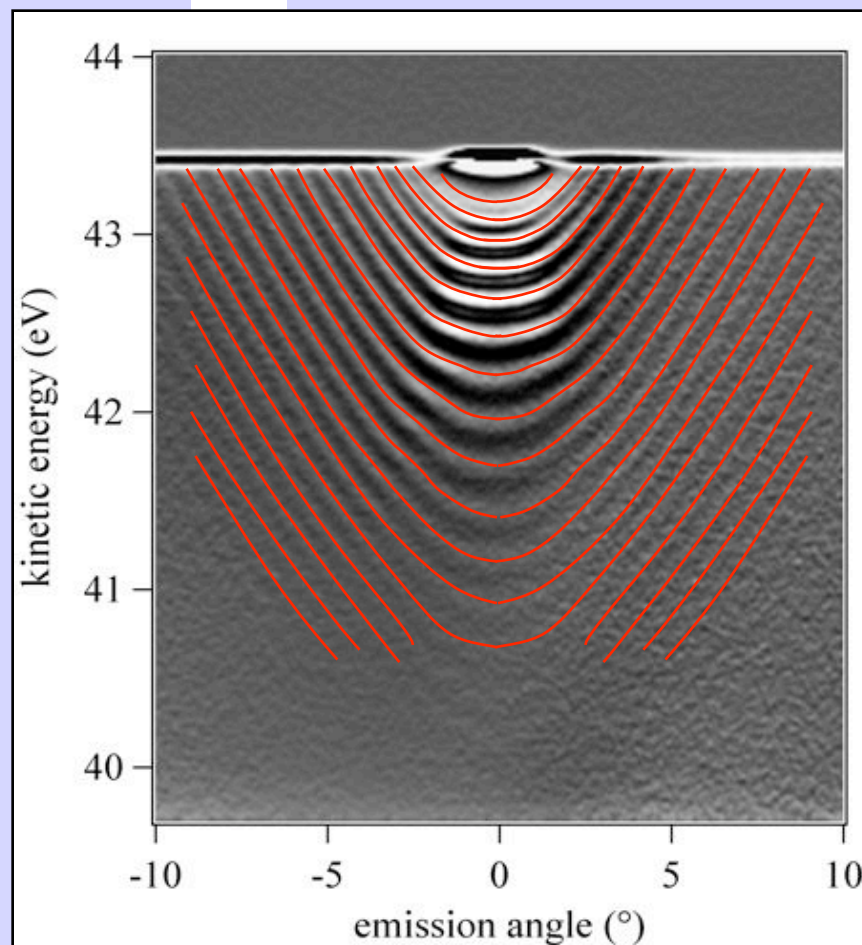
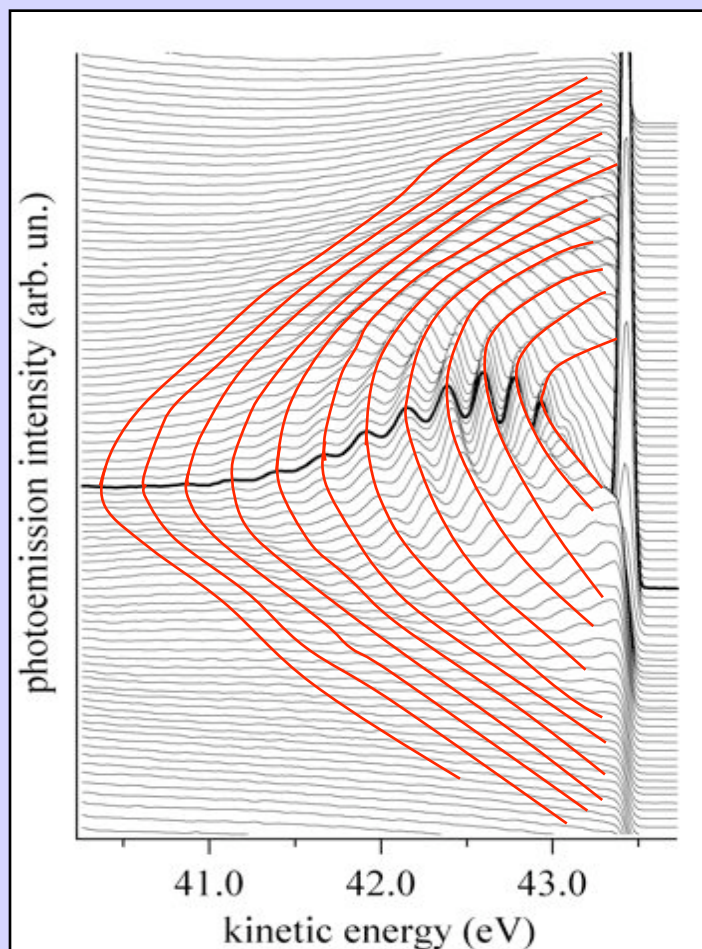
Mapping Two-dimensional band $E = E(k_{\text{par}})$

Istituto di Struttura della Materia

Consiglio Nazionale delle Ricerche



Discrete quantum well states of an atomically flat 150 Å Ag film on Pt(111)



Degradation of light emitting diodes: a SPEM analysis

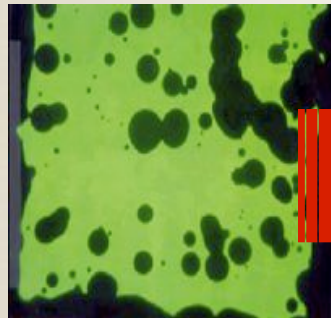
(in collaboration with P. Melpignano CRP, R. Zamboni CNR-ISMN)

OLED exposed to atmospheric moisture: failure due to light emission

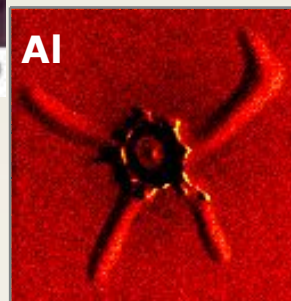
“Clean” experiment: OLED growth and operated in the SPEM (UHV ambient) : failure due to light emission



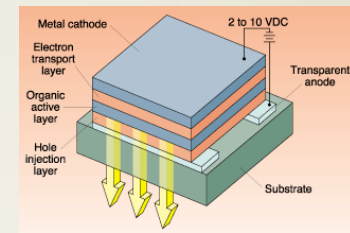
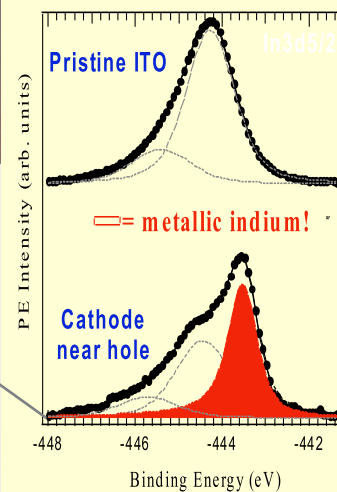
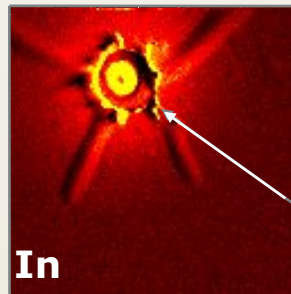
64 μm



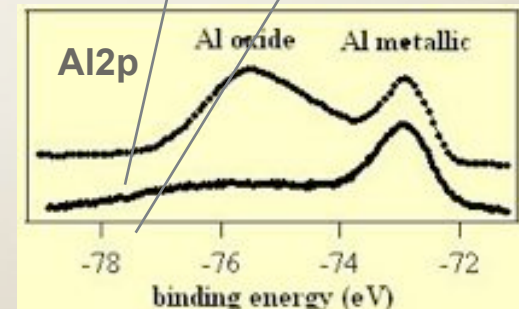
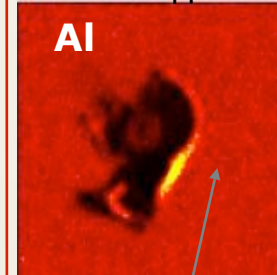
Dark spot in OLED



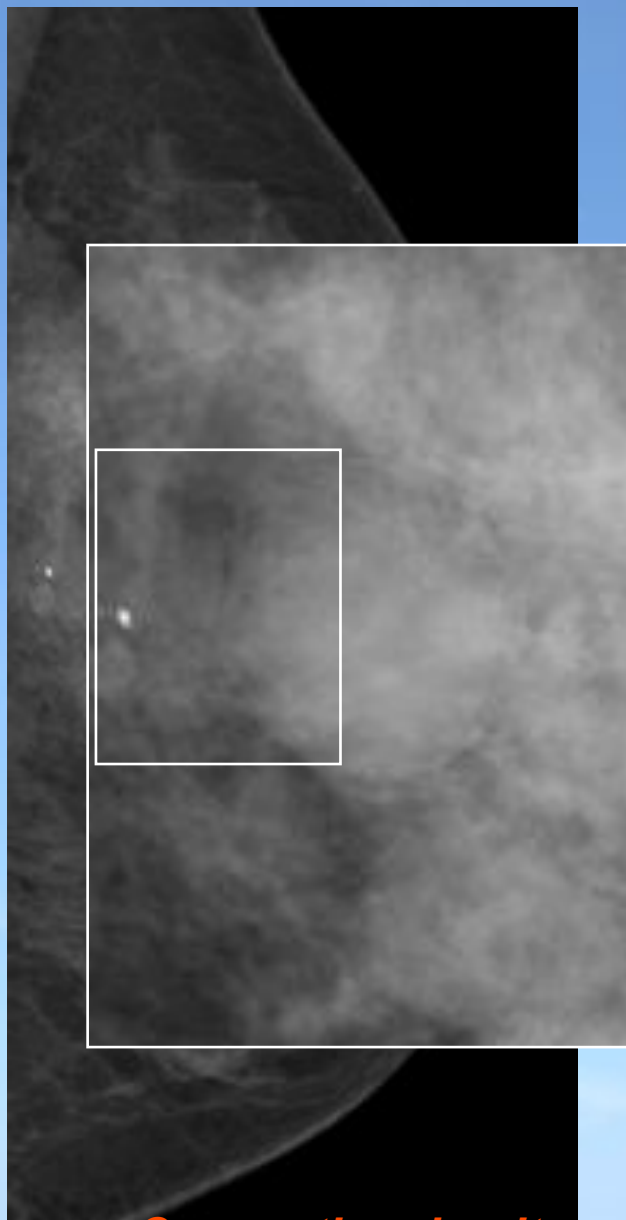
•Decomposition of ITO



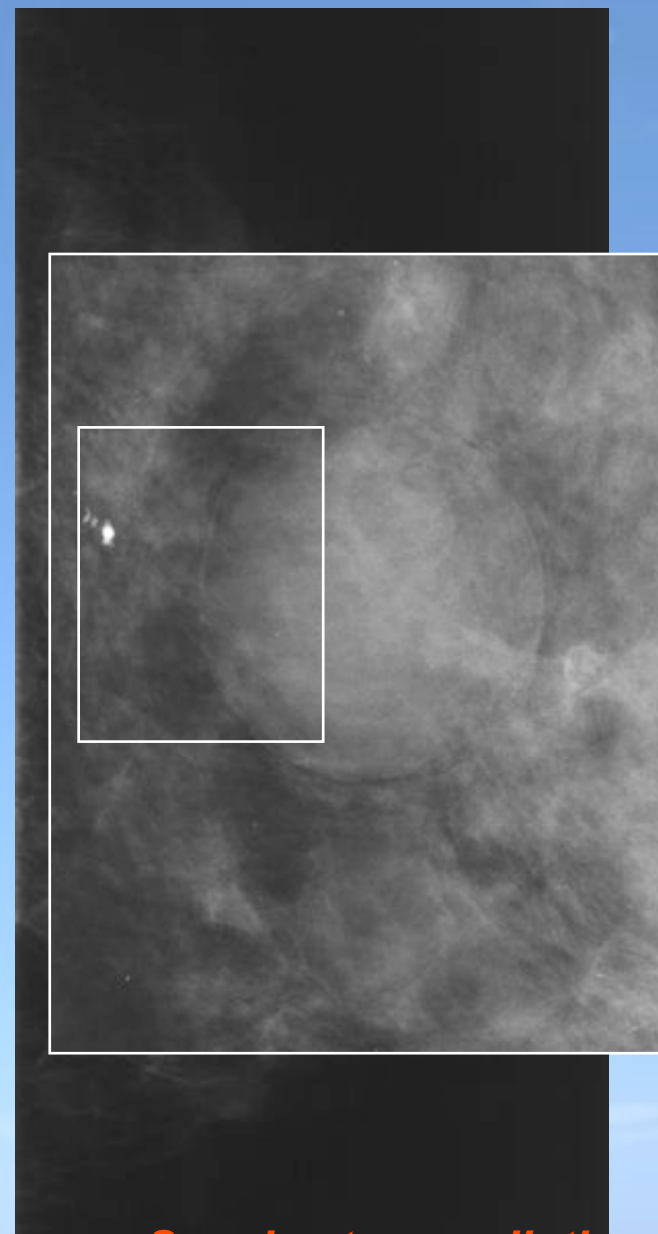
64 μm



increasing voltage and operating time

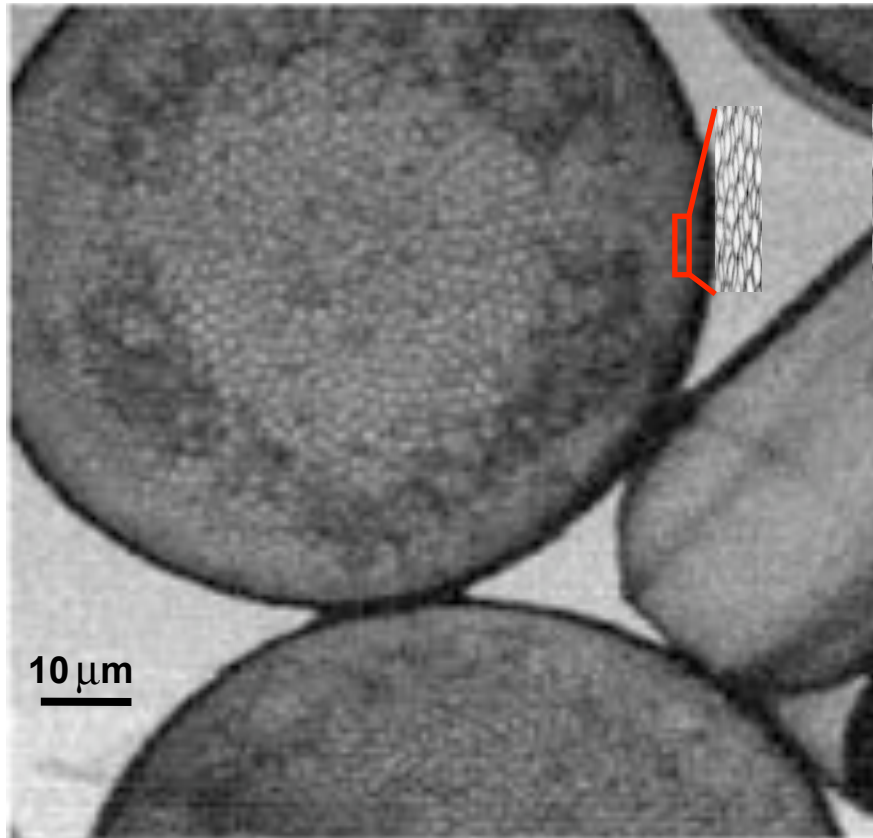


Conventional unit

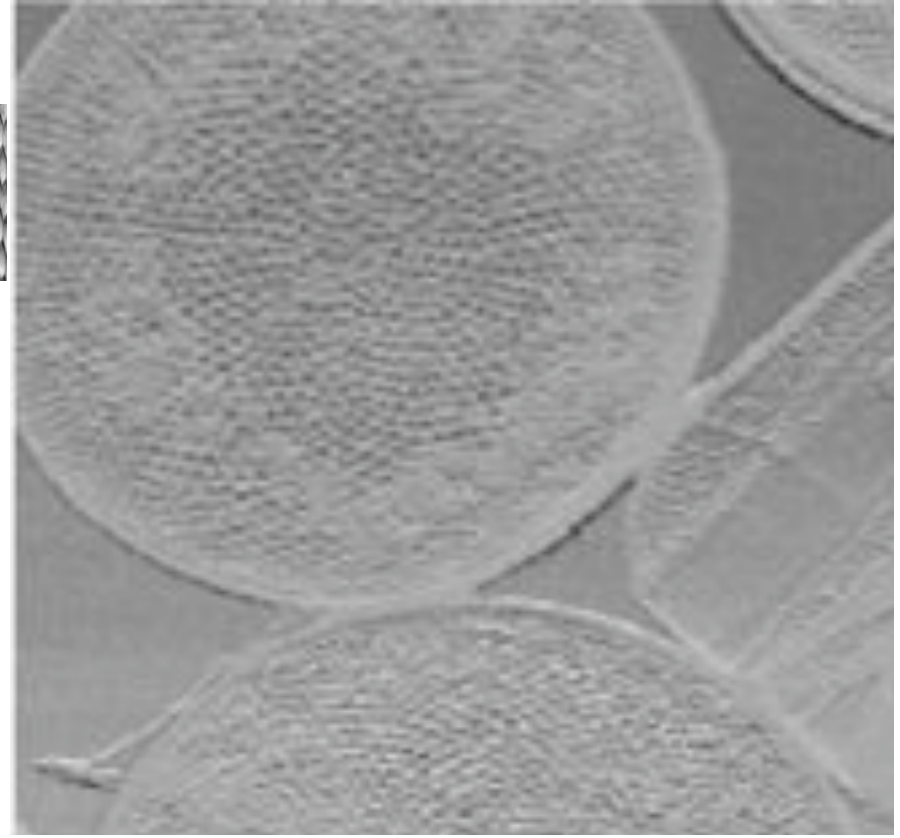


Synchrotron radiation

Simultaneous acquisition of images with different contrast using the fast read-out EMCCD camera:



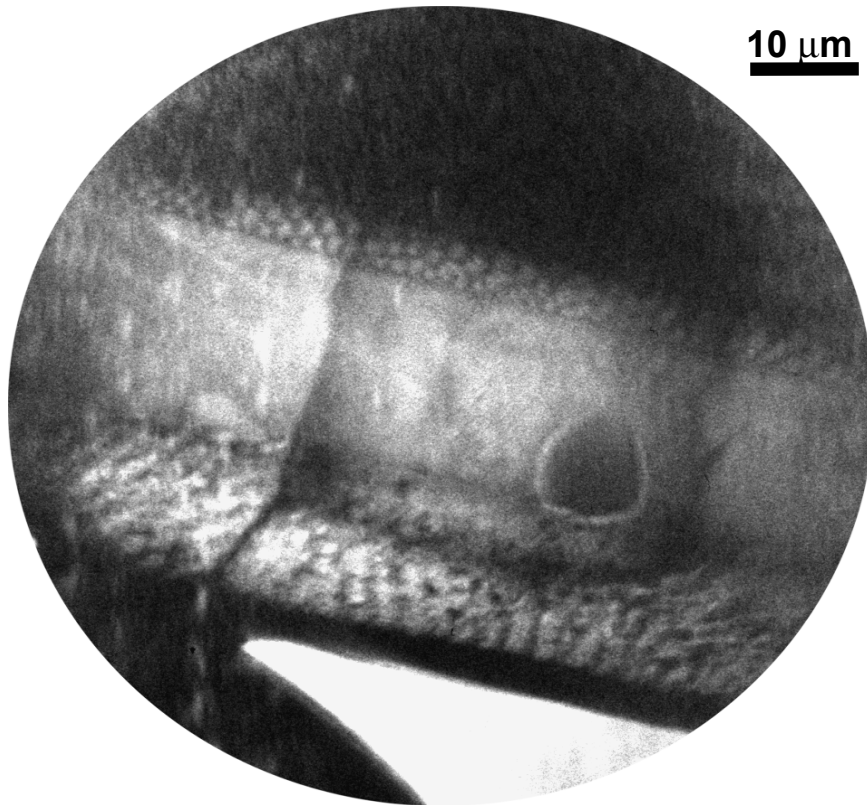
Bright field image



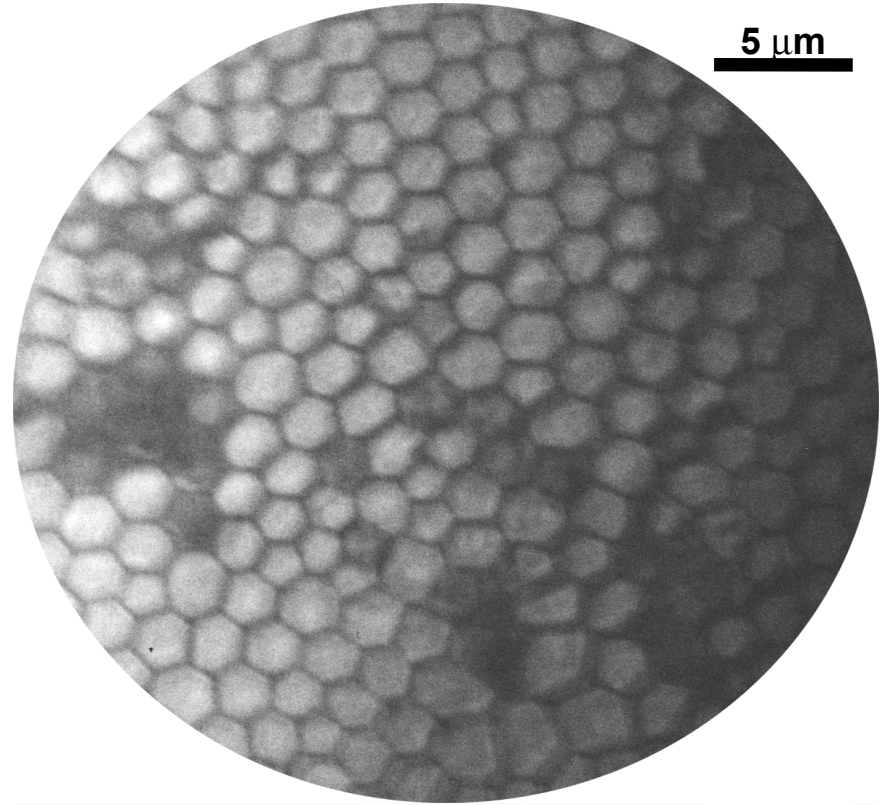
DPC mode – X-moment

Images acquired in STXM mode with FRCCD camera; E=1320 eV, 200x190 px, 50ms dwell/px

Planktonic diatom “Coscinodiscus sp.” in full-field imaging mode:



342x magnification, 30s exposure

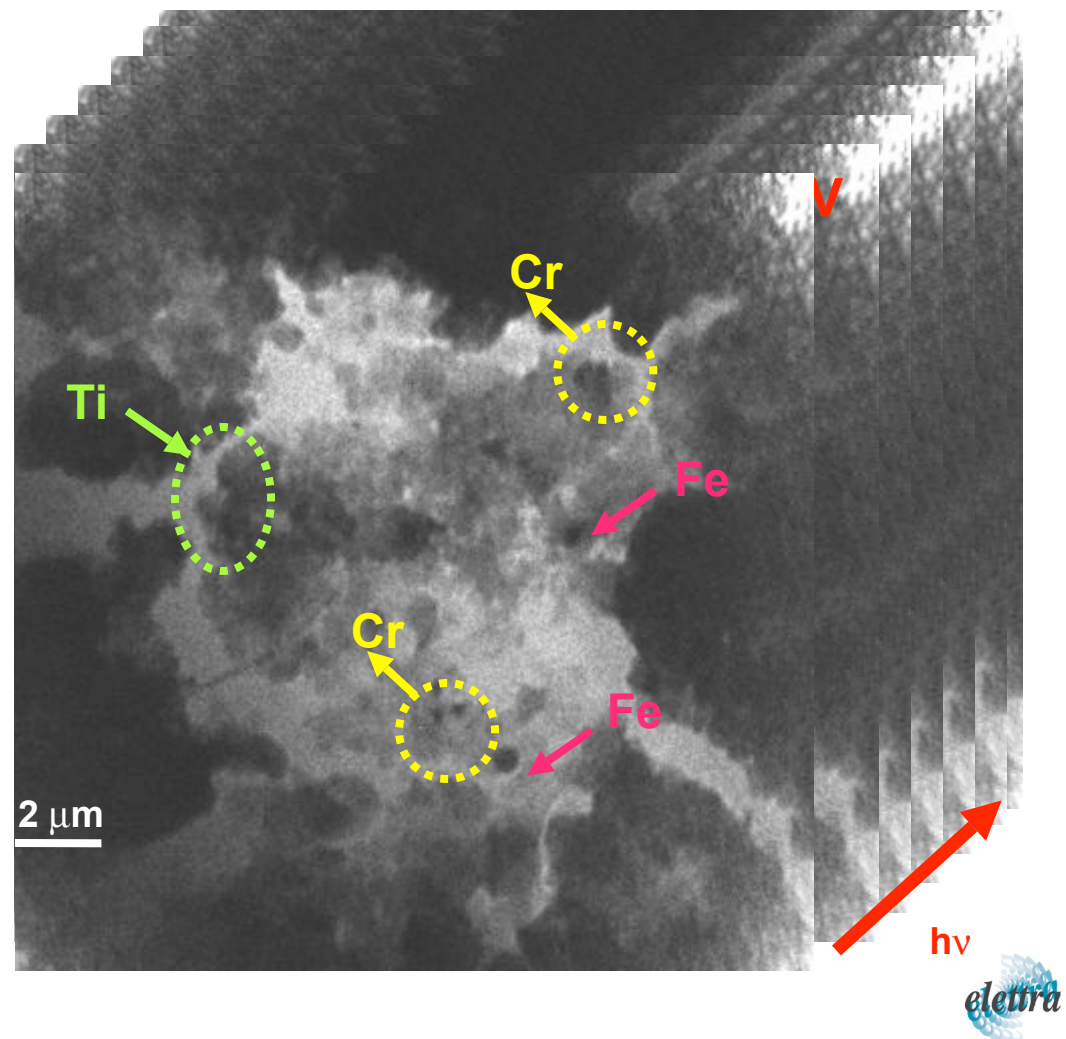
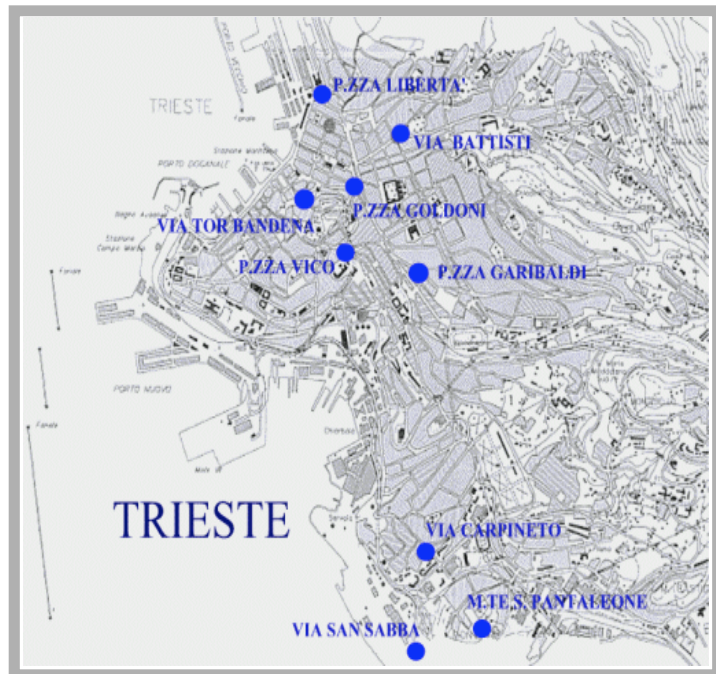


820x magnification, 60s exposure

**Photon energy: 518 eV, condenser concept: T. Wilhein, U. Vogt, P. Charalambous,
data not flat- and background corrected (Specimen from A. Beran, LBM Trieste, I)**

Environmental science: Analysis of air particulate matter

Elemental specification and XANES in FFIM mode



*P. Barbieri et al.,
Dept. of Chem., Univ. Trieste, I*

Today



Tomorrow

