

**ROSSENDORF
BEAMLINE AT ESRF**



**Forschungszentrum
Dresden Rossendorf**

Facilities for Europe

The Rossendorf Beamline (ROBL) at ESRF

Synchrotrons provide extremely brilliant electromagnetic radiation across a wide energy range, covering the infrared, visible, UV, and X-ray regions, which can be used for a large variety of spectroscopic and scattering techniques. Especially hard X-rays with their small wavelength and high penetration depth provide versatile tools to probe physical and chemical states of matter in an almost unlimited variety of samples, from aqueous solutions and biological tissues to metal nanoclusters and thin films. The Rossendorf Beamline provides two experimental stations at the most powerful synchrotron in Europe, the European Synchrotron Radiation Facility (ESRF).

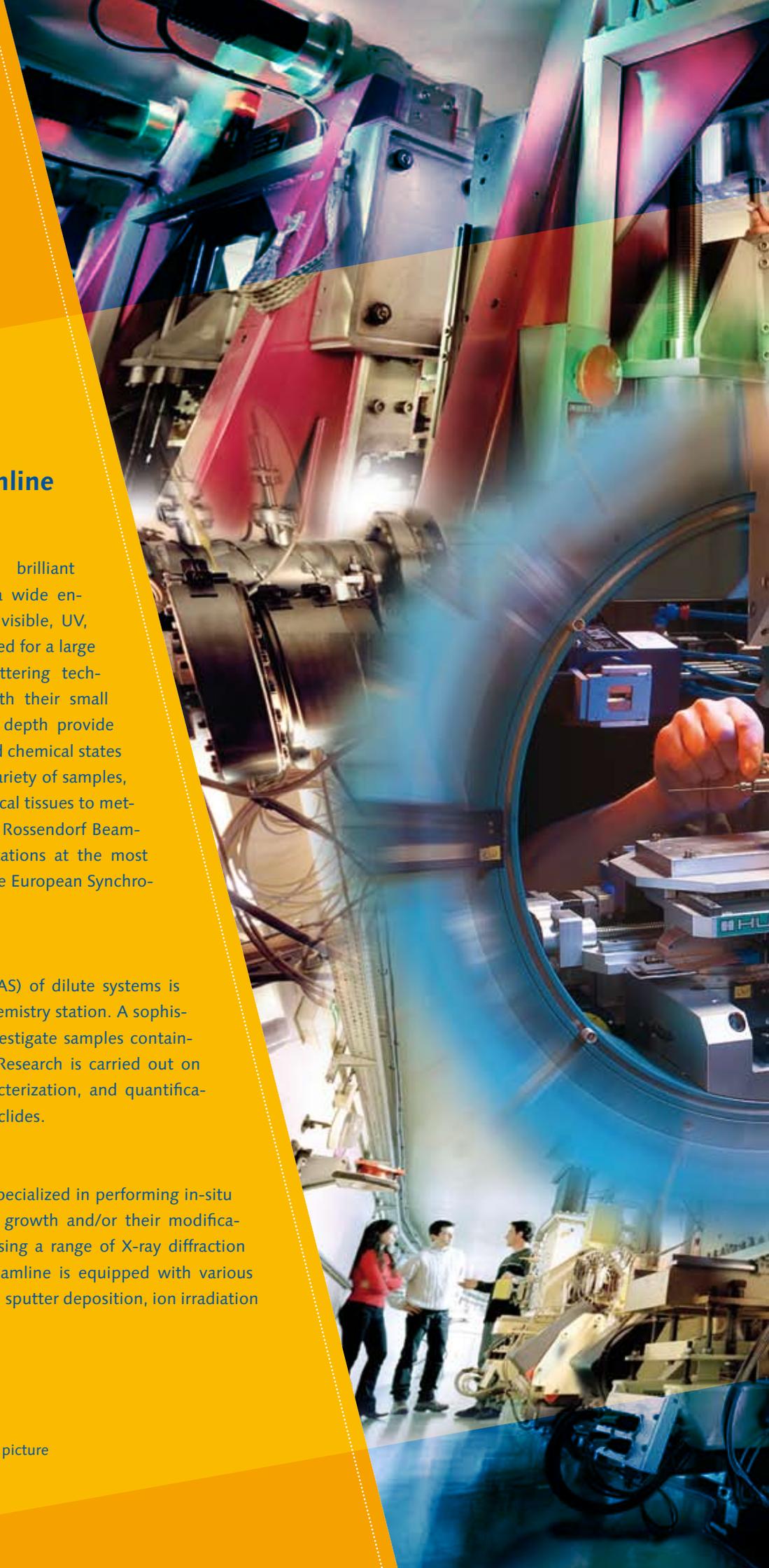
Radiochemistry Station

X-ray Absorption Spectroscopy (XAS) of dilute systems is the main technique at the Radiochemistry station. A sophisticated safety system allows to investigate samples containing alpha-emitting radionuclides. Research is carried out on the identification, structural characterization, and quantification of actinides and other radionuclides.

Materials Research Station

The Materials Research station is specialized in performing in-situ and real-time studies of thin film growth and/or their modifications during thermal treatments using a range of X-ray diffraction and scattering techniques. The beamline is equipped with various processing chambers for magnetron sputter deposition, ion irradiation and/or annealing.

All pictures: Peter Ginter; except inside picture in the middle: artechnique





Materials Research Station

Thin film diffraction by grazing incidence

- High resolution diffraction (low incoming beam divergence and exit Ge channel-cut)
- Powder diffraction and texture analysis
- Reflectometry (specular & diffuse scattering)
- Use of anomalous scattering
- Structural study on liquids with a free surface
- Thin film and nanocrystal growth during in-situ magnetron sputtering
- Phase transformations during annealing and/or ion-beam treatment
- Strain investigations with 100 μm beam spot

Radiochemistry Station

X-ray absorption spectroscopy in transmission and fluorescence mode

- Licensed radiochemistry lab
- 13-element Ge fluorescence detector with digital signal processing for **dilute systems** (>50 ppm EXAFS, >1 ppm XANES)
- Special equipment including a spectroelectrochemical cell and a closed-cycle He cryostat
- Optical Parameters
 - Energy range: 5 – 35 keV
with Si-mirrors: 5 – 12 keV
 - Energy resolution Si(111): $1.5 - 2.5 \times 10^{-4}$
 - Integrated flux (calc.): 6×10^{11} phot. / s
@ 20 keV/200 mA
 - Standard beam size: $10 \times 1 \text{ mm}^2$ (w x h)
 - Focused beam size: $\leq 0.5 \times 0.5 \text{ mm}^2$
 - Max. radioactivity
(of all samples): 185 MBq



About 2/3 of the beamtime at the Rossendorf Beamline is managed by the Forschungszentrum Dresden-Rossendorf (FZD), the other 1/3 by the ESRF. You can either apply for beamtime with the ESRF or the FZD.

In-house proposals may be submitted all year round, but should be turned in at least 3 months before the expected start of the experiment. All proposals are subject to in-house review. Beamtime is then assigned according to the results of the proposal evaluation. Please check the ROBL page about Beamtime Application for further instructions:

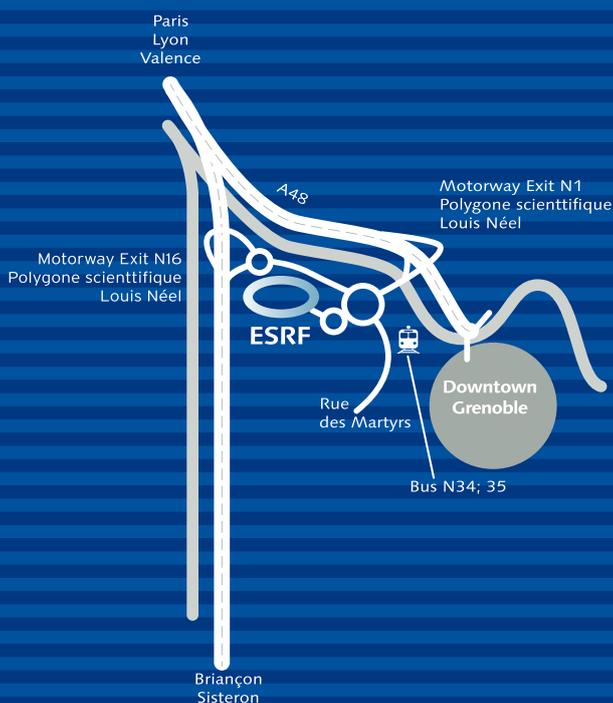
<http://www.fzd.de/ROBL/Beamtime>

The Rossendorf Beamline forms part of the Pooled Facilities of ACTINET: European Network of Excellence and provides beamtime for ACTINET Joint Research Projects in the frame of collaborations. Please visit the ACTINET webpage for further information:

<http://www.actinet-network.org/>

ESRF proposals are reviewed by the scientific advisory committee for the ESRF twice a year (deadlines March 1 and September 1). However, the beamline staff should be contacted before submission to discuss the technical feasibility of a planned experiment. The ESRF reimburses travel and accommodation expenses for accepted proposals. Please visit the ESRF homepage:

<http://www.esrf.fr/UsersAndScience/UserGuide/Applying/>



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