



A LIGHT FOR EUROPE

The big challenge: Reaching the nanoscale

One of the most important aims of the Upgrade Programme, science at the nanometer scale starts to be a reality at the ESRF, where three pilot projects' beamlines use nanofocused beams. Over the next decade, these will become standard on the beamlines. Materials, surface science, biology and medicine are all areas set to benefit.

Important technical advances will make nanoscience real at the ESRF. These include nanofocus beamlines with hard X-ray nanoprobe and *in situ* experiments. Long beamlines will be another trademark. These will be 120—250 m long and will allow the source size (in both directions) to be exploited fully, while keeping the working distance large enough to accommodate innovative *in situ* experiments. New optics and detectors will have to be developed accordingly.

In nanoscale research at the ESRF, the preparation of samples, detectors, optics and visualisation systems will all be integrated into a common, dynamic framework. The Upgrade Programme therefore includes the creation of a nanoscience platform to join efforts among different techniques and use the nanoprobe beamlines in the most effective way.

THE RICHNESS OF EXPERIENCE

The ESRF has had nanobeams since 2005. Three beamlines (ID11, ID13 and ID22) were used in pilot projects in nanodiffraction and scattering in high and low energy and nanoimaging. These will provide a strong technological background and expertise for new beamlines. A coordination group called the nanotechnology platform, which groups scientists and engineers, has been created. It explores all of the engineering issues that will have to be addressed carefully on the new nanobeams.



Scientists at the ID22 nanoprobe. Credits: C. Argoud



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