

A unique nanocharacterisation platform

- A team of 80 researchers and technicians with groundbreaking expertise in nanocharacterisation.
- About 50 state-of-the-art characterisation tools spread over 3500 square meters of laboratories.
- An average of 4 patents filled per year in advanced material/device analysis and nanotechnology.
- About 70 publications per year in the most prestigious peer-review journals.
- Strong partnership with equipment manufactures and academic labs to develop new analytical capabilities

- Joint R&D development projects in the frame of material/device analysis with many industrial partners worldwide.



Accelerator based neutron source

- Leading research center in particle and nuclear physics, astrophysics, cosmology and accelerator physics.
- A team of 250 researchers, engineers and technicians.
- About 300 publications per year in peer-reviewed journal.
- Dedicated infrastructure for accelerator R&D and irradiation platform operation.
- Several collaborations with industrial partners for neutron irradiation SEE studies.



Platform for Advanced Characterisation

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Serving industry and accelerating your R&D



Finally a unique world leading service platform, industry tailored, which brings together:

- ➔ State-of-the-art and groundbreaking laboratory nano-characterisation
- ➔ The power and complementary capabilities of neutrons and synchrotron X-rays to probe matter non-destructively
- ➔ Real-time tests under real operational conditions

- ✓ Wafer manufacturers
- ✓ IC manufacturers
- ✓ High Reliability sector



With a single entry point !

Easy | Fast | Confidential

The brilliance of synchrotron light serving industry

- The most powerful synchrotron radiation source in Europe, fully funded by 21 different countries since 1994.
- 7000 users/year conducting cutting edge experiments
- More than 1500 publications in the most prestigious peer-reviewed journals.
- More than 40 specialised experimental beamlines which offer unique capabilities in chemistry, material science, physics, biology, medicine, meteorology, geophysics, archaeology, etc.
- Over 100 industrial clients work with the ESRF for service and R&D characterisation requirements.

The unmatched detection capabilities of neutrons

- World's most intense neutron source and flagship centre for neutron science, fully funded by 15 different countries since 1971.
- 1500 researchers from over 40 countries visit the ILL each year.
- About 500 papers per year in the most prestigious peer-reviewed journals.
- 40 state-of-the-art instruments, which are constantly being developed and upgraded to offer unique capabilities in chemistry, materials science, physics, biology, medicine, etc.
- Collaboration with industry to provide real solutions for R&D departments.

▼ The characterisation service tailored for your needs

- ✓ Wafer manufacturers
- ✓ IC manufacturers
- ✓ High Reliability sector

▼ Surface, interface and 3D characterisation

Reliability and failure analysis

- Defects: voids, precipitates, delamination, dislocations
- On bulk devices and thin films
- Neutron induced single event upset

Stress & strain, mechanical properties

- On single crystals, polycrystals
- Thin films and epitaxial layers

Morphological and structural characterisations

- Roughness
- Thickness of thin films and multilayers
- Analysis of full sheets and patterned wafers
- 2D and 3D imaging

Microstructure

- Crystal orientation map
- Grain size

Chemical analysis

- Composition
- Dopants, depth profiling, diffusion
- Contamination

Physico-chemical properties

- Band structure, work function
- Magnetic properties

▼ Main Techniques

Electrons, ions, optics and scanning probe microscopy

Electron microscopy (tomography, SEM, TEM, HR-STEM, EELS, EDS), ion beam techniques (TOF-SIMS, FIB), atom probe (APT), optical analysis (Raman ellipsometry, PL, CL), scanning probe microscopy (AFM, STM, KFM, SCM, SSRM, EFM, PFM, MFM).

X-rays

Diffraction and scattering (XRD, GIXRD, SAXS, GISAXS, XRR), Spectroscopy (NEXAFS/XANES, EXAFS, XRF, GIXRF, XPS, Auger Emission), Imaging/Mapping (micro and nano-tomography, topography, micro-XRD, micro-XRF, micro-Laue).

Neutrons

High energy and thermal neutron irradiation: Single Event Effect, dose; gamma spectroscopy (NAA, PGNA), neutron imaging, neutron scattering techniques (diffraction, SANS, stress/strain measurement neutron reflectivity, neutron inelastic scattering), tomography.

▼ Unique experimental conditions

Characterisation in real operational condition

- Maintaining the functionalities of the sample
- In-situ and operando
- Dynamic or static, time-resolved

Customised setup

- Multimodal
- Multitechnique
- Multiscale

▼ A complete customer focused service

