

Nanostructures in the Light of Synchrotron Radiation

*- From Ensemble Average to the Study of Individual
Sub-Micron Objects by X-ray Techniques -*

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(ID-01 beamline @ ESRF)

**Vendredi 8 décembre à 15h00
Amphi du Bât. Accueil Soleil**

Séminaires

X-ray focusing optics are nowadays highly performant - we do talk more and more about micro- and nano-focusing with application in nanoscience, all this in a context in which "nano" is a key word for present and future technologies. These systems do exhibit interesting properties that are waiting to be revealed. Techniques like x-ray imaging or diffraction are just starting to tackle this new exciting domain. If up to now standard diffraction techniques are mostly dealing with large ensembles of objects and averaged (statistical) properties, it is of high interest to measure the structural properties of individual sub-micron sized objects in order to understand the change in physical properties, when the nanoscale is approached. Micro-diffraction techniques on individual objects are thus expected to bring light on the local properties of single objects.

To this aim, a new microdiffraction setup is now available on beamline ID-01 at ESRF. Different focusing elements can be used, each of them with advantages and drawbacks. After a brief description of the focusing optics and the microdiffraction setup at ID-01 beamline, I will give several examples of sub-micron-sized objects (1D and 0D) studied using the micro-beam diffraction technique, and the specific information that can be obtained :

- a) single one-dimensional rolled-up semiconductor nanotubes (for which the lattice parameter distribution and strain were measured, modeled and fully understood using elastic theory);
- b) single Ge pyramids (quantum dots) on Si(001) (structural parameters such as strain, composition and shape were measured from island to island);
- c) coherent diffraction imaging technique applied in study of individual nano-particles (shape reconstruction and strain).

Formalités d'entrée : accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi Soleil du Batiment Central, merci de vous munir d'une pièce d'identité et de prévenir le secrétariat en charge de l'événement.

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