



SEMINAR

Precession Electron Diffraction

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TVIPS and NanoMEGAS

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4 – 5 pm
Science Lecture Theatre S9, Building 25

Abstract

Electron diffraction is widely used as an ancillary technique in Transmission Electron Microscopy. However, due to highly dynamical effects caused by the great interaction of electron with matter, it is usually not possible to obtain kinematical diffraction patterns. For this reason, x-rays are still widely used in Material Science, especially for solving crystal structures.

Precession Electron Diffraction give a possibly correct answer to this old problem: by changing the beam orientation so that at any moment few beams are excited simultaneously, we achieve a sizable reduction of dynamical effects. If the work is carefully done, the precession diffraction patterns can be used to solve structures, even in the case of rather complicated ones. New procedures have also been established, that allow to collect a complete 3D set of data in the reciprocal space.

A more recent development has made available the possibility of obtaining high quality diffraction patterns at high speed on local areas, down to 1 nm size, that allows to establish the crystal orientation, hence to produce a crystal orientation map on the Region Of Interest. Such Orientation Maps are somehow comparable to EBSD maps, but they can be made at the resolution determined by the beam size, that is down to 1 nm with modern microscopes. Such maps are extremely useful for researches in metallurgical or semiconductor industries.

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