

Séminaire



CONFÉRENCIER
INVITÉ

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Visioconférence

Institut de biologie structurale - 71 avenue des Martyrs CS 10090 38044 Grenoble Cedex 9 - T.+33 (0)4 57 42 85 00

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Low-dose electron crystallography: fast, easy and powerful

Structure solution (and refinement) being a prerequisite of the understanding of the properties of materials and therefore also for their development, powerful crystallographic methods are of paramount importance. X-ray diffraction techniques have been incredibly successful for structure solution for more than 100 years, but there is an increasing number of cases where they don't succeed. In fact, when single crystals of complex structures can't be grown big enough ($> 1 \mu\text{m}^3$) even synchrotron radiation isn't sufficient to solve unknown structures.

Since electrons interact with matter much more intensely than X-rays, electron diffraction can be done on single crystals that are much smaller ($\sim 100 \times 100 \times 10 \text{ nm}^3$). Recent techniques like precession electron diffraction and electron diffraction tomography have overcome the initial difficulties related to dynamical diffraction effects. Nowadays data can be obtained and computer programs are available that allow not only the solution of unknown structures but also their refinement using the dynamical theory of diffraction.

In this seminar I will present an electron diffraction tomography method for beam sensitive materials. We optimized the data acquisition process in order to obtain high quality diffraction data with the smallest possible dose. The automated data collection is easy and fast to use and yields high quality data. I will present several examples of structures recently solved (and refined) in our group, including the refinement of hydrogen atoms in a water containing mineral. Even though we haven't tried it yet, an obvious extension of the application field of this Low-Dose Electron Diffraction Tomography (LD-EDT) would be biological crystals.

Hôte : Wai-Li Ling (IBS/groupe de Microscopie Electronique et Méthodes)

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