

Séminaire SOLEIL

"Applications of Ptychography : Present and Future"

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Lundi 24 août 2009 à 11h00
Salle A1.0.59 – Bâtiment central SOLEIL

Séminaires

Coherent diffractive imaging achieves super-resolution in microscopy by replacing the image-forming optical system with phase retrieval algorithms. In this talk I will discuss ptychographic coherent diffractive imaging (pCDI), a technique which makes use of redundant information from overlapping exposures to solve the phase problem. First: "Present day" pCDI experiments using mirrors and lenses, which confirm that it is possible to simultaneously reconstruct the coherent focused wavefield incident on a sample during imaging, without *a priori* knowledge of the pupil function of the illuminating optics. The potential resolution achievable *via* pCDI far exceeds that accessible to methods directly probing the focus, and therefore it will be useful to characterize future X-ray optics providing nanometer scale X-ray focussing. Then: "Future" pCDI experiments using ultrafast X-ray free electron laser (XFEL) pulses for two-dimensional (2-D) crystallography of membrane proteins. Simulations show that it is possible to reconstruct the electron density distribution of a 2-D membrane protein crystal unit cell from realistic XFEL diffraction patterns, and that one can compensate for photon flux (and therefore Poisson noise) by simply increasing the number of measurements. The resolution achievable is therefore not limited by radiation damage, but by the reproducibility of 2-D crystals on the length scale of the focused X-ray beam size. This technique therefore should be applicable at all future ultrafast pulsed hard X-ray sources.

Formalités d'entrée : accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi Soleil du Bâtiment Central, merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès).

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