

# Partially Coherent Wavefront Propagation Calculations for Third- and Fourth-Generation Synchrotron Radiation Sources

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**Invité par Marie-Emmanuelle COUPRIE**

**Lundi 28 mars à 14h00  
Grand Amphi SOLEIL**

New ultra-low emittance third-generation synchrotron radiation (SR) sources offer excellent opportunities for further development of experimental techniques exploiting X-ray coherence. However, even in these new SR sources, spontaneous radiation produced by relativistic electron beam in undulators, wigglers and bending magnets remains only partially coherent in X-ray spectral range. "Extraction" of a "coherent portion" of the radiation flux and its transport to a sample without loss of coherence, by maximally exploiting the source brightness, must be performed by dedicated SR beamlines, optimized for particular types of experiments. Detailed quantitative prediction of partially coherent X-ray beam characteristics at propagation through optical elements, which is required for beamline optimization, can only be obtained from accurate physical optics based numerical simulations. Results of such simulations, performed for beamlines of National Synchrotron Light Source II, which is currently under construction in Brookhaven National Laboratory (USA), will be presented. Obtained beamline performance characteristics, such as radiation spot size and flux "at sample" in ultra-high resolution microscopy experiments, and speckle intensity fluctuations "at detector" in photon correlation spectroscopy experiments, will be discussed. Special attention will be paid to numerical analysis of basic properties of partially coherent spontaneous undulator radiation and its distinctions from a Gaussian beam. The talk will also include topics related to time-dependent wavefront propagation calculations for free-electron lasers.



**Ce séminaire sera suivi d'une pause-café**



**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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