

## ABSTRACT

### OVERSAMPLING, LENSLESS IMAGING AND APPLICATION OF X-RAY FREE ELECTRON LASERS

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When a coherent diffraction pattern is sampled at a frequency sufficiently finer than the Nyquist interval, the phase information is encoded inside the diffraction intensity and can be directly retrieved by using an iterative algorithm. In a combination of this oversampling method with coherent scattering, a novel form of microscopy, i.e. lensless imaging, has recently been developed to image nanostructured materials and biological systems by using X-rays or electrons. In this talk, I will present the principle of this microscope, discuss some applications in nanoscience and biology, and illustrate the future opportunities with X-ray free electron lasers.