

X-ray coherent and decoherent imaging

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Coherence, a fascinating physical property, can be a powerful tool to transmit and transfer unambiguously information about a physical system. In the case of imaging, X-ray coherence can be used for lensless imaging, providing access to high-resolution signal for the full complex-valued transmission function of a sample. Although it is often assumed, complete coherence is technically very difficult to obtain. Fortunately it is becoming clear that ptychography, one of the lensless imaging techniques introduced relatively recently in the X-ray world, provides an especially robust solution to multiple sources of systematic measurement errors, including decoherence effects. In this talk I will show how decoherence can be managed, characterized, and even used, for various imaging applications. In particular, I will show how ptychography closely mirrors other techniques used to carry out quantum state measurements.

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