

# Resonant Coherent Diffractive Imaging for Quantum Fluctuation

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## Abstract

Resonant Coherent Diffractive Imaging (CDI) beamline will be developed on the existing sector-33 ID. Symmetry-breaking ordering and fluctuation in spin, charge, pairing and superfluid density from high temperature superconductors, topological insulators, and other highly correlated electron systems will be the focus of the program. One advantage of 33-ID is *in-situ* capability to synthesize these materials in thin films with atomic perfection. The beamline will be designed for optimum coherent x-ray flux and resonance effects below 20 keV with selectable bandpass. Imaging weakly scattering fluctuations can be a monumental challenge. Combination of the MBA upgrade, resonance and/or wide bandpass would make this task possible. To aid the observation of inhomogeneity up to mesoscales, x-ray reflection interface microscopy will be integrated to CDI techniques. The new paradigm of investigating inhomogeneous fluctuation in real space, instead of momentum space studies of average ordering, will lead us to new understanding and transformational discovery.