Non-monotonic electron interactions and charge order in the copper oxide plane.

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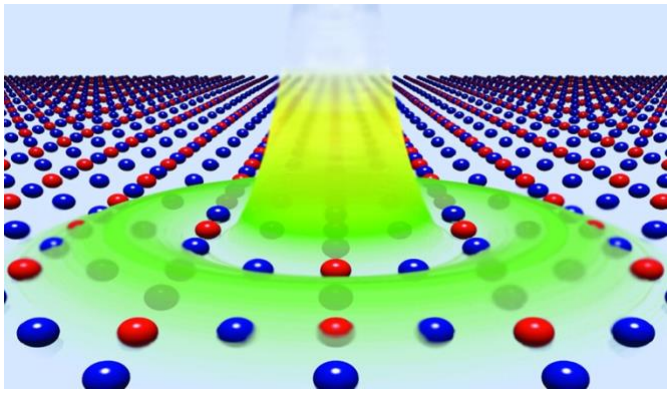

In strongly correlated systems the strength of Coulomb interactions between electrons, relative to their kinetic energy, plays a central role in determining their emergent quantum mechanical phases. I will discuss resonant x-ray scattering experiments on $Bi_2Sr_2CaCu_2O_{8+\delta}$, a prototypical cuprate superconductor that probe electronic correlations within the CuO_2 plane. We discovered a dynamic quasi-circular pattern in the *x*-*y* scattering plane with a radius that matches the wave vector magnitude of the well-known static charge order [1]. Along with doping- and temperature-dependent measurements, our experiments reveal a picture of charge order competing with superconductivity where short-range domains along *x* and *y* can dynamically rotate into any other in-plane direction. This quasi-circular spectrum, a hallmark of Brazovskii-type fluctuations, has immediate consequences to our understanding of rotational and translational symmetry breaking in the cuprates. I will discuss how the combination of (screened) short- and long-range Coulomb interactions results in an effective non-monotonic potential (see figure) that may determine the quasi-circular pattern. – I will also present experiments where we demonstrate a very modest amount of uniaxial stress (0.1GPa causing 0.04% uniaxial strain) results in a very large reduction of the onset of charge stripes (~50K) [2]. I will also disucss how to interpret these results in the context of the quasi-circular dynamic correlations.

[1] F. Boschini, *et al. Nature Communications* **12,** 597 (2021).
https://doi.org/10.1038/s41467-020-20824-7
[2] T.J. Boyle, *et al. Physical Review Research* (accepted, 2021).
https://arxiv.org/abs/2012.09665