

Abstract Submitted
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Fluctuating Charge-Order in Optimally Doped Bi- 2212 Revealed by Momentum-resolved Electron Energy Loss Spectroscopy¹ ALI HUSAIN, SEAN VIG, ANSHUL KOGAR, Univ of Illinois - Urbana, VIVEK MISHRA, Argonne National Laboratory, MELINDA RAK, MATTEO MITRANO, Univ of Illinois - Urbana, PETER JOHNSON, GENDA GU, Brookhaven National Laboratory, EDUARDO FRADKIN, Univ of Illinois - Urbana, MICHAEL NORMAN, Argonne National Laboratory, PETER ABBAMONTE, Univ of Illinois - Urbana — Static charge order is a ubiquitous feature of the underdoped cuprates. However, at optimal doping, charge-order has been thought to be completely suppressed, suggesting an interplay between the charge-ordering and superconducting order parameters. Using Momentum-resolved Electron Energy Loss Spectroscopy (M-EELS) we show the existence of diffuse fluctuating charge-order in the optimally doped cuprate $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ (Bi-2212) at low-temperature. We present full momentum-space maps of both elastic and inelastic scattering at room temperature and below the superconducting transition with 4meV resolution. We show that the “rods” of diffuse scattering indicate nematic-like fluctuations, and the energy width defines a fluctuation timescale of ~ 160 fs. We discuss the implications of fluctuating charge-order on the dynamics at optimal doping.

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