

Abstract Submitted
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Charge fluctuations in a disordered superconductor, $\text{LaO}_{1-x}\text{F}_x\text{BiS}_2$ ANUSHIKA ATHAUDA, SEUNGHUN LEE, DESPINA LOUCA, Univ of Virginia, YOSHIKAZU MIZUGUCHI, Tokyo Metropolitan University — $\text{LaO}_{1-x}\text{F}_x\text{BiS}_2$ is a disordered, non-magnetic superconductor with a transition temperature of 10.8 K at $x = 0.5$. The parent compound, LaOBiS_2 , is a band insulator with a layered tetragonal structure. The evolution of the crystal structure and nano-scale atomic fluctuations are investigated as a function of temperature and composition using neutron scattering. Even though the symmetry remains unchanged with doping, lattice strain develops along the c -axis and buckling of the BiS_2 plane changes orientation. In addition, strong local distortions are observed around the Bi ion that are in response to charge fluctuations. Two distinct Bi-S plaquettes are present due to atomic displacement of in-plane sulfur because the Bi ion undergoes a charge disproportionation. The charge fluctuations along with spin-orbit coupling most likely play important roles in the mechanism of superconductivity in this system.

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