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In-plane resistivity anisotropy in underdoped cuprates due to scattering by charge and spin fluctuations[1] MICHAEL SCHÜTT, RAFAEL M. FERNANDES, University of Minnesota — The existence of strong in-plane electronic anisotropies in underdoped cuprates has been reported by a variety of experimental probes, such as transport measurements, scanning tunneling microscopy, and x-ray and neutron scattering. Understanding the origin of these anisotropies and their interplay is fundamental to elucidate the role played by electronic nematicity in the phase diagram of the cuprates. Here we employ a Boltzmann equation approach to investigate the resistivity anisotropy due to scattering by anisotropic spin and charge fluctuations. We show that while spin fluctuations give rise to larger resistivity along the a direction, charge fluctuations promote larger resistivity along the b direction. Because anisotropic charge and spin fluctuations compete, these behaviors give rise to a particular dependence of the resistivity anisotropy with doping, which is consistent with transport experiments performed in $YBa_2Cu_3O_7$. We discuss the important role played by the CuO chains in YBCO to select the observed type of nematic domains, and propose transport measurements in strained $HgBa_2CuO_4$ and $Bi_2Sr_2CaCu_2O_8$ to shed light on the interplay between anisotropic fluctuations and anisotropic resistivity.

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