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【123】 Charge correlations and charge fluctuations in cuprate superconductors

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A major difficulty in understanding cuprate superconductors is the presence of strong correlations which give rise to the rich phase diagrams of these systems. I will discuss the charge density wave (CDW) order, which was demonstrated to be intrinsic to cuprates. This modulation is observed in the intermediate carrier concentration range, below the optimal doping. While resonant X-ray scattering allowed us to establish the doping-temperature range of the static CDW order in $\text{HgBa}_2\text{CuO}_{4+\delta}$, resonant inelastic X-ray scattering enabled the discovery of the short-range CDW fluctuations at temperatures exceeding the onset of the static correlations. Such coexistence of static and dynamic CDW correlations is consistent with theoretical predictions

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