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Charge Order in the Three-Band Model of Cuprate Superconductors[1] BILL ATKINSON, Trent University, ARNO KAMPF, SINAN BULUT, Augsburg University — Numerous experiments have pointed to the widespread occurrence in underdoped high temperature superconductors of charge order with a strong intra-unit cell component. Motivated by this, we have performed theoretical calculations of charge instabilities in cuprate superconductors. First, we discuss a persistent discrepancy between theoretical predictions and experimental observations of the ordering wavevector $\mathbf{q}^*$. We show that the correct direction and magnitude for $\mathbf{q}^*$ can be obtained under the assumption that the charge order emerges from a pre-formed pseudogap. Second, we show that this type of long-range charge order reacts sensitively to dilute concentrations of strongly scattering impurities such as zinc, unlike the pseudogap which has been found to be robust against zinc doping. Taken together, these suggest that the pseudogap is a distinct phenomenon from charge order.

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Bill Atkinson
Trent Univ

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