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Charge ordering in three-band models of the cuprates ALEXANDRA THOMSON, SUBIR SACHDEV, Harvard University — We examine trends in the wavevectors and form-factors of charge density wave instabilities of three-band models of the underdoped cuprates. For instabilities from a high temperature state with a large Fermi surface, we extend a study by Bulut et al. (Phys. Rev. B 88, 155132 (2013)) to include a direct antiferromagnetic exchange coupling between the Cu sites. As in previous work, we invariably find that the primary instability has a diagonal wavevector $(\pm Q_0, \pm Q_0)$ and a d-form factor. The experimentally observed wavevectors along the principal axes $(\pm Q_0, 0)$, $(0, \pm Q_0)$ have higher energy, and their form factor is found to be predominantly d. Next, we gap out the Fermi surface in the anti-nodal regions of the Brillouin zone by including static, long-range antiferromagnetic order at the wavevector (π, π): this is a simple model of the pseudogap in which we assume the antiferromagnetic order averages to zero by 'renormalized classical' thermal fluctuations in its orientation, valid when the antiferromagnetic correlation length is large. The charge density wave instabilities of this pseudogap state are found to have the optimal wavevector $(\pm Q_0, 0)$, $(0, \pm Q_0)$, with the magnitude of the d-form factor decreasing with increasing magnetic order.

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