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Realistic Model of Cuprate High-Energy Pseudogaps J.C. PHILLIPS, Rutgers University — Cuprates become metallic only when doped, much like semiconductor impurity bands. The unique properties of the cuprates are the result of self-organization of the dopants to form off-lattice filamentary networks ("pearls on strings"). The internal structure of these glassy networks is optimized by maximizing their dielectric screening of internal ionic fields. At low energies ARPES peaks in energy and momentum distributions give similar quasiparticle dispersions, but Lanzara has identified a spectral domain between 0.3 eV and 0.8 eV where the two distributions yield orthogonal dispersion relations. I explain this quasiparticle bifurcation with my model, which also explains: why the cuprate phase diagram exhibits an intermediate phase (IP), and only the IP is superconductive; chemical trends in Tcmax (R), where R is the average number of Pauling resonating bonds; the unique architectonic properties of the CuO2 planes; the nature of the glassy Davis 3 nm nanodomains, and the glassy Davis dopant sites; the two Ando lines in the planar resistivity occurring at the pseudogap transition temperature T* and at optimal doping; the Shen Fermi arcs that evolve with doping, whose angular strength ratio has a step-function at optimal doping; a similar step-function jump in the relaxation of spectral holes at 1.5 eV; all the Lanzara angular isotopic trends observed across the phase diagram by ARPES, and the diamagnetic anomalies associated with the pseudogap, with onset temperatures To as large as 2Tcmax.

J. C. Phillips
Rutgers University

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