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Fermi surface and anisotropic scattering in overdoped cuprates[1]

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In the light of recent results detailing the emergence of small Fermi pockets and anomalous Hall coefficients in underdoped cuprates, we review here our measurements on the Fermiology and low temperature transport of cuprates that reside on the other side of the superconducting dome. Analysis of angle-dependent magnetoresistance and Hall coefficient data in $Tl_2Ba_2CuO_{6+\delta}$ and $La_{2-x}Sr_xCuO_4$ has uncovered a wealth of structure, not only in the (un-reconstructed) Fermi surface in overdoped cuprates, but also in the basal-plane transport scattering rate, in both the elastic and the inelastic channels. A striking correlation between the superconducting transition temperature and the strength of the anisotropic scattering is also revealed suggesting an intimate link between anisotropic scattering and the pairing mechanism itself. Finally, we discuss possible origins of these various anisotropic terms and how they might impact on our understanding of the evolution of the resistivity and the Hall coefficient across the entire cuprate phase diagram.

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