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Possible evidence of electron pockets beyond optimal doping

JAMES STOREY, MacDiarmid Institute for Advanced Materials and Nanotechnology, JEFFERY TALLON, Industrial Research Limited — In recent years the possibility of electron pockets in the Fermi surface of underdoped high- T_c cuprates has become of considerable interest, spawned by quantum oscillations, Hall effect and thermopower measurements of strongly underdoped samples where stripe order is known to be present. Direct proof of their existence and location in momentum space would put significant constraints on the origin of the mysterious pseudogap and possibly the origin of superconductivity in these materials. In contrast, several Fermi surface reconstruction models predict electron pockets appearing with the onset of the pseudogap in the slightly overdoped regime before disappearing at lower dopings. We have calculated the thermopower from the resonating valence bond spin liquid model developed by Yang, Rice and Zhang, and a spin density wave model. Comparing the results with experimental data, we find evidence for electron pockets in the slightly overdoped regime.

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