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Linear-T resistivity and change in Fermi surface at the pseudogap critical point of a high-T_c superconductor RAMZY DAOU, NICOLAS DOIRON-LEYRAUD, DAVID LEBOEUF, SHIYAN LI, FRANCIS LALIBERTE, OLIVIER CYR-CHOINIERE, Universite de Sherbrooke, Y.J. JO, LUIS BALICAS, NHMFL Tallahassee, J.-Q. YAN, J.-S. ZHOU, JOHN GOODENOUGH, Texas Materials Institute, LOUIS TAILLEFER, Universite de Sherbrooke and Canadian Institute for Advanced Research — A fundamental question of high-temperature superconductors is the nature of the pseudogap phase which lies between the Mott insulator at zero doping and the Fermi liquid at high doping p. Here we report on the behaviour of charge carriers near the zero-temperature onset of that phase, namely at the critical doping p* where the pseudogap temperature T^* goes to zero, accessed by investigating a material in which superconductivity can be fully suppressed by a steady magnetic field. Just below p^*, the normal-state resistivity and Hall coefficient of $La_{1.6-x}Nd_{0.4}Sr_xCuO_4$ are found to rise simultaneously as the temperature drops below T^*, revealing a change in the Fermi surface with a large associated drop in conductivity. At p^*, the resistivity shows a linear temperature dependence as $T \to 0$, a typical signature of a quantum critical point. These findings impose new constraints on the mechanisms responsible for inelastic scattering and Fermi-surface transformation in theories of the pseudogap phase.

Ramzy Daou
deSherbrooke University

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