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Conductivity kinks in the transport of ultra-dilute GaAs two-dimensional hole systems in zero field JIAN HUANG, Wayne State University, L.N. PFEIFFER, K.N. WEST, Princeton University — Though Wigner crystal was first observed for electrons on helium in 1979, a Fermi Liquid-to-Wigner crystal transition has never been demonstrated. Important questions on how interaction drives such a transition and the nature of the transition remain unanswered. Apart from the complexity associated with the disorder which competes with or even dominates interaction by rendering the system into an Anderson insulator, an important question is whether there exists intermediate phases that hinder a direct first order transition. We report findings obtained via measuring ultra-high-purity GaAs two-dimensional hole systems with dilute charge concentrations down to 8x10^8 cm^{-2}. For fixed charge densities below 4x$10^9 cm^{-2}$, a conductivity (σ) kink is observed while sweeping the temperature across some characteristic value where the derivative dσ/dT exhibits a discontinuous step. For charge densities above 4x$10^9 cm^{-2}$, the kink evolves into a dip which diminishes for charge densities beyond 7x$10^9 cm^{-2}$. A possible first order phase transition will be discussed.

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