Comment on "Heat Capacity of a Condensed Electron System in the Dilute Metal n-$Hg_{0.8}Cd_{0.2}Te$"

In a recent Letter,[1] Stadler and Nimtz reported measurements of the energy relaxation time τ_ε for hot electrons in n-$Hg_{0.8}Cd_{0.2}Te$ in quantizing magnetic fields. Using a simplified energy-balance equation, they deduce the heat capacity C_v of the hot-electron system from the dependence of τ_ε on the electron "effective temperature" T_e. They interpret a broad and shallow peak in C_v at $T_e \sim 2$ K and the fall-off of C_v below this temperature as evidence that the system goes through a magnetic-field–induced liquidlike phase and into a Wigner crystal at low temperatures.

In this Comment we argue that the data presented in Ref. 1 do not provide evidence for Wigner crystallization of electrons in this material. Rather, the data indicate that there is a decrease of τ_ε (and C_v, as calculated in Ref. 1) with decreasing T_e as T_e approaches the lattice temperature T_L ($T_L = 1.5$ K in Ref. 1). We point out here that similar measurements of τ_ε vs T_e on insulating InSb made at *zero* magnetic field and at different T_L show essentially the same behavior.[2-4] Therefore, in Ref. 1 the primary significance of the temperature range 1.5–1.9 K where C_v rapidly decreases is that it lies just above the experimental T_L. The fall-off of C_v in this range does not provide evidence for and should not be associated with the formation and/or melting of a Wigner crystal.

M. Shayegan and V. J. Goldman
Department of Electrical Engineering
Princeton University
Princeton, New Jersey 08544

H. D. Drew
Department of Physics and Astronomy
University of Maryland
College Park, Maryland 20742

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