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**Closed cycle refrigeration for routine magnetotransport measurements** BINUKA GUNAWARDANA, TIANYU YE, Georgia State University, WERNER WEGSCHEIDER, ETH-Zurich, RAMESH MANI, Georgia State University — Condensed matter physics is often interested in the behavior of materials at very low temperatures. Low temperatures have traditionally been realized using liquid helium. However, the recent scarcity of liquid helium and the rapid rise in its cost has encouraged the development of alternative approaches, based on closed cycle refrigerators, for realizing low temperatures. Here, we convey our experiences in developing a home-made, low cost, variable temperature closed cycle refrigeration system for routine magnetotransport measurements down to 10K, and present measurements obtained with this system relating to the electronic properties of the high mobility GaAs/AlGaAs 2D semiconductors system. The setup was constructed to examine  $0.5\text{cm} \times 0.5\text{cm}$  semiconductor chips including up to 49 leads and reach  $\sim 10\text{K}$  within 3 hours. A computer controlled data acquisition system was assembled to collect resistivity and Hall effect data, and extract the carrier Hall mobility and density as a function of the temperature.

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