

## **Electronic & Thermoelectric Properties of Semiconductor Nanostructures**

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### **Abstract:**

Due to the unique properties of low-dimensional systems in comparison with those of bulk or thin film materials, nanostructures enable the tailoring of materials for new device applications. In this project, we explored the effects of dilute concentrations of impurities and highly ordered arrangements of quantum dots on the properties of GaAs-based heterostructures for electronics and thermoelectrics, respectively.

In the case of GaAs with dilute nitrogen concentrations, we used gated Hall measurements to explore the electronic states associated with pairs and clusters of nitrogen. In the case of highly ordered quantum dot arrays, we used Seebeck coefficient measurements, to determine the effects of quantum dot alignment on thermoelectric properties.

We focused on the design and implementation of test structures to facilitate these electronic and thermoelectric measurements.