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Nanoelectronics, Thermal Power and Electrical Properties, 2D Materials, DNA Memory, Novel Instrumentation

This is Nano and Quantum Phenomena Laboratory. Both scientific research and instrumentation are integrated in the laboratory. In research, we concentrate on nanodevice fabrication and measurements of electrical properties, thermal power, and memory effects.

Figure 1. Nanowire nanoelectronics. We start from nanowire and nanocrystal device fabrications. We explore electron transport, contact, and density of states.

Figure 2. We recently study electron transport in flakes of 2D materials, like MoS₂. Little disorder from the interface provides random trapping fields for carriers in the flakes. The trapped carriers can be delocalized either in high carrier concentration or under high electric field.

Figure 3. DNA memory devices. Read out memory states after a high voltage writing.

Figure 4. Ten-years' experiences in building scanning probe microscopes. We recently invent automatic nanoparticle generators, tip maker, hard-disk demagnetizer, and mask aligner.

Equipment: SEM, e-beam writer system, sputtering and thermal evaporation, probe station, cryostat, variable-temperature STM, TEM, 3D printer.

