

Imaging Quantum Devices

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The development of electronic devices with sizes comparable to the wavelength is an important goal. New imaging techniques will be needed to study and understand their behavior. A cooled scanning probe microscope (SPM) can image electron flow through a two-dimensional electron gas (2DEG) and directly measure the Fermi wavelength via coherent interference. For closed systems, the SPM can image the location of a quantum dot, control the number of electrons inside, and measure the energy of quantum states. These techniques will allow us to visualize electron motion through quantum devices and circuits made from heterostructures, nanowires and new materials.