ECE 600 Advanced Device Electronics

The aim of this course is to analyze the properties of submicron scale electronic devices with an emphasis on current flow. This topic has become increasingly relevant as advances in fabrication technology make it possible to engineer devices with near atomic dimensions, and limitations in standard device technologies impact the semiconductor industry’s need for increased integration densities. We will provide a general method to calculate the conductance from a microscopic viewpoint and discuss electronic phenomena observed at reduced device dimensions, including quantized conductance, tunneling and Coulomb charging. Finally, we will discuss several advanced device concepts based on these principles.

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