

NM6605 Laboratory 2: Design and Modelling of Nanodevices

Quantum blockade, quantum Ohm law, quantum conductance, quantum capacitance, quantum confinement, coherent transport, and transmission. Nanowire, transistors, influence of interface properties, low current to high current regime, scattering to ballistic regimes, noise spectrum. Quantum well. Energy subbands and wave functions. k.p methods. Band structure calculation by using single band and 6-band k.p methods. Density of state, doping concentration, and Fermi energy level calculations by using single band and 6-band k.p methods. Intersubband(intraband) transition. Squared transition element calculation. Absorption spectrum. Cut-off wavelength of photodetector. Influence of Ge composition and well width on peak wavelength of photodetectors. Transition energy. Emission wavelength. Doping concentration. Fermi level. Organic devices (Organic thin film transistors, OLED, organic solar cells). Molecular diodes and switches. Carbon Nanotubes.