PHYS6377 - Physics of Nanostructures: Carbon Nanotubes, Fullerenes, Quantum Wells, Dots and Wires

PHYS 6377 (MSEN 6377) Physics of Nanostructures: Carbon Nanotubes, Fullerenes, Quantum Wells, Dots and Wires (3 semester credit hours) Electronic bands in low dimensions. 0-D systems: fullerenes and quantum dots. Optical properties, superconductivity and ferromagnetism of fullerides. 1-D systems: nano-wires and carbon nanotubes (CNTs). Energy bands of CNTs: chirality and electronic spectrum. Metallic versus semiconducting CNT: arm-chair, zigzag and chiral tubes. Electrical conductivity and superconductivity of CNTs, thermopower. Electromechanics of SWCNT: artificial muscles. Quantum wells, FETs and organic superlattices: confinement of electrons and excitons. Integer and fractional quantum Hall effect (QHE). (3-0) R