

Nanophotonics (RP 4.2.10)

Introduction: Semiconductor Nanostructures: Quantum well, Quantum Wire and Quantum dots, Superlattices, Subband Structures, Envelope Functions, Type II Structures

(1)

Basic Optical Processes in Quantum Nanostructures: Density of States, Effect of Electric Field, Excitonic Effects, Franz-Keldysh Effect, Quantum Confined Stark Effect (5)

Nano-LEDs: Quantum Well LEDs, Quantum Dot LEDs, Structures, principle of operation and applications; (3)

Nano-Lasers: Quantum Well Lasers, Quantum Wire and Dot Lasers, Quantum Cascade Lasers: Structures, principle of operation and applications; (5)

Nano-photodetectors: Quantum Well, Quantum Wire and Quantum-Dot photodetectors – interband and intersubband: Structures, principle of operation and applications; Emitters and Detectors for Special Area applications (UV and IR photodetectors) (6)

Surface Plasmon on noble metal and semiconductor surfaces, Surface Plasmon waveguides and devices, applications (4)

Molecular Optoelectronics: Materials and structures, Organic LEDs, applications (3)