

# Electrons and photons in mesoscopic structures: Nano-optics versus nano-electronics

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Electron processes in solids and nanostructures which are not directly related to spin and charge in many features replicate electromagnetic phenomena in the relevant spatial structures. A non-exhaustive list of these include reflection, elementary and resonance tunneling, weak localization, localization, splitting of energy states and formation of energy bands and gaps. The only difference is the length scale which is determined by de Broglie wavelengths for electrons and optical wavelengths for electromagnetic processes. The lecture will provide a systematical overview of such properties/phenomena with the emphasis of their potential application in nano-opto-electronics.

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