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Entangled-photon absorption in semiconductor nanostructures FELIPE VALLEJO, LUIS QUIROGA, Universidad de los Andes — We present a comparative study of two-photon absorption by semiconductor nanostructures for two kind of light: (i) Light with wave-like classical properties (laser light) and (ii) A new type of quantum entangled light. First, we report on results concerning entangled-photon absorption processes due to s and d final states in core-shell quantum dots. Second, within the framework of the effective-mass approximation both the classical as well as the entangled two-photon absorption in quantum wells (QWs) and quantum wires (QWRs) have been addressed. Results for non-entangled light with polarization both parallel and perpendicular to the directions of confinement are in perfect agreement with the ones already known. We proceed to extend those results to the less explored case of entangled light absorption in semiconductor nanostructures. The absorption spectra for entangled light is richer in structure and complexity as compared with the classical light case. We find that the absorption rate (cross-section) for entangled light depends additionally of a new important parameter, the entanglement time T_e, which gives rise to quantum interference effects. As a result, entangled photons produce entangled-induced transparencies.

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