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Absorption processes and their relationship with the transport processes in semiconductors

Ceballos Garzón Ricardo^{1,2}, Neytchev Nechev Plamen³ and Carrillo Guerrero Sergio²¹ Central University of Venezuela, Colombia² Foundation University San Mateo, Colombia³ Independent Researcher, Ukraine

We carry out the study of a theory based on the properties of transport, with the purpose of obtaining a detailed description of the process of optic absorption in the semiconductors. We have derived expressions that show the relationship between the spectra of absorption and the conductivity of the crystals starting from those properties of transport (conductivity) and of the optic transitions. Such a correlation settled down keeping in mind that the model Tight Binding can be used to show the correlation of the moment matrix elements with the optical matrix elements. The relationship between the conductivity and the influence of the external field was established, including the importance of the optical constants of the material. When delving into the relationship between the absorption spectrum and the electrical conductivity tensor in the semiconductors it was possible to obtain the description of the optical absorption spectrum in terms of the electric conductivity tensor. Intraband absorption in PbSe QD's is present in a broad wavelength range. Broadband response in near to mid-infrared range can be very relevant for ultra high speed all-optical signal processing (telecom applications). Dominant effect from the PbSe core in PbSe/CdSe QD's: electronic structure (bandgap, SP splitting), absorption. CdSe QD's show new high intraband peaks corresponding to hole transitions.

Biography

Ceballos Garzón Ricardo has a degree in Physics from the National Pedagogical University, Physics Specialist from the National University of Colombia, Magister in Geophysics of the Central University of Venezuela, PhD student in Engineering Sciences from the Central University of Venezuela.

Carrillo Guerrero Sergio is a Physicist from the National University of Colombia, M.Sc in Physics from the National University of Colombia, Ph.D in Materials Science from the University of Lille 1.

Neytchev Nechev Plamen is a Physicist at the University of Sofia, Ph.D. in Physics at the University of Kiev, Independent Researcher.

rceballog@unal.edu.co

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