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Calculations the Dresselhaus effect of the electron spin relaxation momentum time in a GaAs cylindrical quantum dots: Including ionic strain YUNG-SHENG HUANG — The electron spin relaxation momentum time (SRT) of a GaAs quantum dots varying with some physical parameters is presented. We propose the model of the GaAs cylindrical quantum dots which is embedded in AlGaAs bulk material. We deal with the polar coordinate ionic strain displacement field (IDF) and piezoelectric effect to calculate Dresselhaus effect of the electron SRT. The scattering between electron and acoustic models via the piezoelectric interaction. Since the system is under very low temperatures and high magnetic fields, the assumptions of equipartition are failed. The fact that piezoelectric scattering is important for low energies makes a parabolic approximation a good one. Besides, we assume that GaAs material is a very pure semiconductor, so the neutral-impurity scattering is ignored. One can find that SRT decreases while the four parameters: external magnetic field, surrounding temperatures, both quantum wire width and thickness increase. The reason is that more and more phonons result in a higher scattering probability between electrons and phonons. The theoretical results used for comparing with experiments.

Yung-Sheng Huang

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