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A model of electron spin relaxation momentum time in GaAs cylindrical quantum dots: including the Dresshaus effect YUNG-SHENG HUANG, ISU University , Taiwan, JUNGSHEG HUANG, ISU University — A model of GaAs quantum dots embedded in a quantum wire is studied. We show that how the electron spin relaxation momentum time (SRT) is varying with some physical parameters. Under this model, a general conclusion is given : SRT decreases while the four parameters (external magnetic field, surrounding temperatures, quantum wire width and thickness) are increasing. The phenomena is understood by more and more phonon modes resulted in a higher electron-phonon scattering probability when the system is under high magnetic field and high temperature. Thus the SRT is reduced. The most important reason for us to study such topics is that it is related with quantum information processing ability. In the present model, we deal with rectangular acoustic strain with deformation potential theory including the Dresshaus effect. Next step, we want to deal with how the SRT varies of quantum dots under very low temperature. A model of piezoelectric scattering with cylindrical acoustic strain is considered in which the ionic displacement field (IDF) based on Born-Huang equation is shown. We are working on this line.

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