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Title:	Magneto- transport in the Presence of Spin - Orbit Coupling
Authors:	Sourabh
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Abstract:	This thesis explores the magneto-transport properties of various lattice systems in the presence of spin-orbit (SO) coupling and an external applied magnetic field. Spin orbit coupling is a momentum- dependent splitting of bands in electronic systems. It plays an important role in spintronics and is a rich area for the discovery of new physical properties. The work involves studying various components of conductivity for three simple models. The first model is the free electron model with SO coupling, the second model is a tight-binding model with SO coupling, and the third model is a full lattice model in which tight-binding and SO coupling are incorporated into the Hamiltonian itself. Experimental observations conducted on the LaVO3-KTaO3 interface, a highly spin-orbit coupled system, show interesting results where anisotropic magneto-resistance (AMR) displays two-fold oscillations below a certain magnetic field, which gradually transitions to four-fold oscillations. A similar type of behavior is also observed in the study of second model.
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