Title:	Investigation of ferromagnetic domains and atomic structures: Low- temperature spectroscopy and micromagnetic simulations
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Abstract:	This thesis consists of two parts. The first part consists of micromagnetic simulation studies on permalloy and iron nanoel- lipses using Object Oriented MicroMagnetic Framework (OOMMF) software. We have attempted to study the minimum energy configurations of permalloy nanoislands arranged in a lattice with varying spacing between the islands. We have also studied the magneti- zation reversal mechanism in permalloy and iron nanoislands of different dimensions and thicknesses at different field angle orientations. Available literature indicates that the mag- netization reversal in permalloy nanoellipse occurs via a single vortex or double vortex state. We have studied the dependence of thickness and dimensions of ellipses in the mag- netization reversal mechanism. The same is done using iron nanoellipses, which shows that magnetization reversal occurs via a single vortex or double vortex state in them. Vortex states are highly relevant in the field of technology because of their use in magnetic mem- ory devices. The second part focuses on low-temperature experiments: Point Contact Andreev Re- flection Spectroscopy (PCARS) and Scanning Tunneling Microscopy (STM). Using the method of PCARS, we have attempted to observe Andreev Reflection in Ti 3 Sb and Ti 3 Ir. The features of the thermal spectrum are found in both these samples. STM measurements were carried out to get atomic resolution imaging in PtSn 4 and graphene.
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