Title:	Fabrication of superconducting thin films and one- probe Tc measurements
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Abstract:	Superconducting thin lms are an active area of research for their applications in device fabrication like 2D circuits, 2 dimensional electron gas system, and research in 2D properties like quantum hall e ect, spin currents etc. Thin lm fabrication methods are instrumental in making devices like Josephson junction (trilayer devices), super conducting nanowire single photon detector, Superconducting Quantum Interference Devices, etc. The thesis discusses four methods of thin lm deposition which were used to deposit molybdenum, germanium, titanium, palladium and nickel. These methods have been used for depositing a variety of other materials and the process and theory behind each method will act as a guide for selection of a suitable method for each material to be deposited. [Chapter 2] The thesis goes on to describe superconductivity in Molybdenum-Germanium alloys and Titanium-Palladium alloys, and other properties suitable especially for supercon ducting nanowire single photon detectors (SNSPD) and for studying vortex motion in type II superconductors [Section 1.2]. Their deposition methods and resulting atomic concentrations are detailed in chapter 3 of the thesis along with an experimental and theoretical guide to Scanning Electron Microscope (SEM) imaging [subsection 3.4.1] and Energy-dispersive X-ray measurements [subsection 3.4.2]. Chapter 4 in the thesis discusses one-probe transition temperature measurement using two methods both of which use Meissner e ect. The methods have been detailed along with and a qualitative analysis using condensed matter theory (London equation). For the microstrip method, the analysis is done in combination with telegrapher's equations. The nal chapter [Chapter 5] discusses future work and experimental guide to fabricate and study SNSPD devices and for vortex motion studies using thin lm devices. The aim of this chapter is to detail ideas that could not be implemented, which will hopefully be carried out in the future. The appendix of the thesis details extra work, fabricating thin lm nickel capacitor which will help study magnetocapacitance e ects. This section details fabrication methods, dc measurements and future work in this experiment.
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