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Magnetic Properties of Niobium-Permalloy hybrid system

JIYEONG GU, JILL PESTANA, DAVID CHRISTIANSEN, Department of Physics and Astronomy, California State University, Long Beach — Ferromagnet/superconductor hybrid system has been studied intensively due to the proximity effect between ferromagnetism and superconductivity. Not only the superconducting property changes because of the different magnetic configuration, the presence of the superconductivity can also often drastically change the magnetic properties of the ferromagnets. In our current work we focused on the investigation of the magnetic property change of the Nb-Py (Permalloy; NiFe) hybrid system through the superconducting transition. Nb-Py bilayer and trilayers were fabricated using Multi-target sputtering system. Magnetization was measured by Physical Property Measurement System using the Vibrating Sample Magnetometer (VSM) or Alternating Current Measurement System (ACMS) options. In addition to the magnetometry measurement, we also measured magneto optical Kerr effect. Magnetization changed when the system goes through the superconducting transition; however the result varied depending on many parameters, such as magnetic measurement history, cooling or warming rate, and measurement method. Magnetic responses obtained from different methods would be compared and discussed.

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