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**Spin-switch effect in Permalloy-Niobium hybrid system**[1]
JIYEONG GU, MICHAEL HETMAN, Department of Physics and Astronomy, California State University, Long Beach — Proximity effect in ferromagnet ($F$)/superconductor ($S$) systems has become a center of attention recently. It has been well known that the superconducting property is modified when the magnetization of the adjacent $F$ layer changes. Especially when the superconducting transition temperature changes as a function of the magnetization of the $F$ layers, the system can work as a switching device. In this presentation we compare three different Py-Nb hybrid structures; Py/Nb bilayer, Py/Nb/Py/FeMn spin valve, and Nb/Py/Nb/Py/FeMn ($S-F$-$F'$) structure. We discuss the similarity and the difference in magnetic and transport properties of these three structures. When the Nb layer is thick in bilayer or $S-F-F'$ structure, the device showed a change between zero resistance (superconducting state) and finite resistance (normal state) by applying a small external magnetic field, where the shift in transition temperature is greater than the transition width, and this gave a huge magnetoresistance effect ($[R(0)$-$R(H)]/R(0)=\infty$).

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