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Anomalous Resistance Behavior in Ferromagnet/Superconductor Heterostructure LU-KUEI LIN, Institute of Physics, Academia Sinica, JIN-HUA HUANG, Department of Materials Science and Engineering, National Tsing Hua University, SHANG-FAN LEE, Institute of Physics, Academia Sinica — We report on anomalous resistance peaks larger than the normal-state values in ferromagnetic NiFe wires with superconductor Nb electrodes. The resistance peaks occurs just below the onset of superconducting transition. The peak resistance temperature was suppressed and the peak height diminished by magnetic field together with the reduction of onset transition temperature. It is distinct from the charge imbalance behavior which is sensitive to magnetic field. The spin accumulation is one possible mechanism but the resistance peak is three-order larger than the predicted value. Contrary to the typical interfacial resistance contribution from band structure mismatch and electron spin imbalance, which should increase as the size of superimposed area was reduced, when we reduced the size of the ferromagnet/superconductor overlapping area, the resistance peaks vanished. Possible mechanisms of the electronic transport in the ferromagnet/superconductor interface will be discussed.

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