

## Phase Coherence in Mesoscopic Kondo Wires

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We report our recent studies on the phase-coherent transport in Kondo/superconducting hybrid loops. Hybrid structures consisting of a magnetic metal and a superconductor are a subject of extensive research effort because of their rich physical phenomena [1]. Especially, the existence of the superconducting proximity effect in a magnetic metallic film in contact with a superconductor is the focus of high research interest [2]. In this study we have fabricated a mesoscopic hybrid loop consisting of a dilute magnetic AuFe wire (with Fe concentration of 26 ppm) and a superconducting Al wire, and have studied magnetoresistance under dc bias current through the sample. The AuFe films of various Fe impurity concentration up to about 80 ppm were made by implanting Fe ions into gold films. We have observed the Aharonov-Bohm-type magnetoresistance oscillations that arose from phase-coherent transport in the AuFe Kondo wire in contact with a superconducting Al film. We interpret the results in terms of interplay between the spin-flip scatterings in a Kondo wire and the phase coherent proximity effect at the AuFe/Al interfaces, while comparing with the empirically determined single-electron phase coherence length.

keywords : Phase coherence, Kondo wire, Aharonov-Bohm oscillation, proximity effect

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