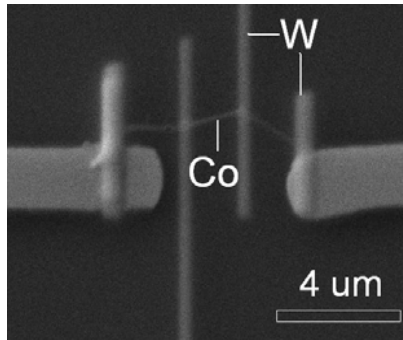


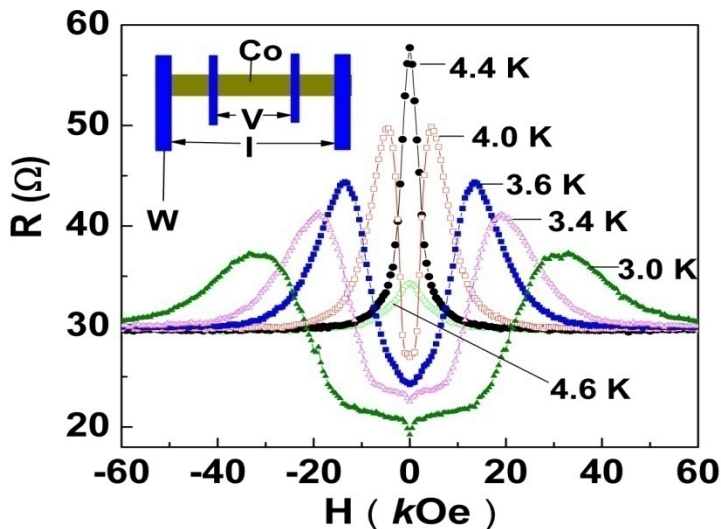
# Long-range proximity effect of Co nanowires with FIB deposited superconducting W-electrodes



SEM image of four-terminal probe on single-crystal Co nanowire by FIB technique. W is superconducting at 4.8 K.

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Superconductivity (S) and ferromagnetism (F) require long range ordering with different spin alignments. When a superconductor is in contact with a ferromagnetic material, the S-wave superconducting order parameter is expected to decay rapidly to zero within a few nanometers inside the ferromagnet. We made four-terminal transport measurements on an individual single-crystal Co nanowire with superconducting tungsten electrodes deposited by FIB. The low temperature resistance ( $R$ ) has two sharp peaks near the critical field  $\pm H_c$  of W and a very substantial (40%) drop in  $R$  at low field. Only one sharp peak in  $R$  near  $H=0$  kOe is observed below 4.8K. These data indicate that superconducting electron pairs survive over a length scale of at least 500 nm.



$R$  v.s.  $H$  at different temperatures. The peak corresponds to the  $H_c$  of W electrodes.