

Abstract Submitted
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Two superconducting transitions and periodic magnetoresistance oscillations in the crystalline Au nanowire with superconducting electrodes¹ JIAN WANG, CHUNTAI SHI, MINGLIANG TIAN, JAINENDRA JAIN, QI ZHANG, NITESH KUMAR, MEENAKSHI SINGH, THOMAS MALLOUK, MOSES CHAN, Penn State University — Transport measurements were made on individual crystalline Au nanowire with four focused ion beam (FIB) deposited tungsten (W) electrodes, which are superconducting below 5 K. It was found that the 1.2 microns long (between the inner edges of the two voltage electrodes) Au nanowire is superconducting. Instead of a single sharp drop to zero resistance as seen in usual superconductors, here the resistance drops in two steps. Below TC, with a magnetic field applied perpendicular to the axis of the nanowire, we found “magnetoresistance mini-gaps” in low field regime. In addition, clear periodic magnetoresistance oscillations in the superconducting to normal transition region were observed. The 1 micron and 1.9 microns Au nanowires were also investigated to further reveal the anomalous superconductivity we found.

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