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**Exploring the Parameter Space of the Anti-Proximity Effect**[1]
MEENAKSHI SINGH, JIAN WANG, MINGLIANG TIAN, Physics Department, Penn State University, THOMAS MALLOUK, Chemistry Department, Penn State University, MOSES CHAN, Physics Department, Penn State University — The anti-proximity effect, in which the superconductivity of a nanowire is weakened by the superconductivity of measuring bulk electrodes, has been reported in Zn nanowires (Tian et. al., PRL 95, 076802 (2005), Chen et. al., PRL 103, 127002 (2009)). The mechanism of this effect is not completely understood. We have studied the anti-proximity effect in Al nanowires in a variety of configurations. The effect is found to manifest only when the critical temperature ($T_c$) of the nanowire is greater than the $T_c$ of its bulk form. The range of the effect is found to be $\sim 1\mu$m. The effect is seen in single nanowires in the absence of a magnetic field establishing that the effect depends on the nature of the measuring electrodes and is not caused by an external magnetic field. The anti-proximity effect has also been seen with the bulk superconductor not connected to the measurement circuitry.

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