

Abstract Submitted
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Quantized Conductance and Residual Resistance in Nanowires

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— Conductance in nanowires is quantized in units of $G_0 = 2e^2/h$. Nanowires can be formed by momentary contact between the ends of macroscopic metallic wires. During the final stage of their rupture, the conductance of the wires drops in a stepwise fashion. However, these steps do not necessarily fall on integer multiples of G_0 , because of a possible presence of residual resistance in the system. Using gold, we have observed the characteristic steps of quantized conductance. We have also found evidence of residual resistance. Looking forward, we plan to increase the precision of our conductance statistics by implementing automated data acquisition in order to explore the origin of residual resistance in different metallic wires, such as copper and silver. By examining the sample dependence of quantized conductance, we hope to find particular characteristics in metals which give rise to residual resistance. We hypothesize that surface potential is one such characteristic.

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