

Abstract Submitted
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Strong magnetic scattering from TiO_x adhesion layers¹ D. NATELSON, A. TRIONFI², S. LEE, Department of Physics and Astronomy, Rice University — Electronic phase coherence in normal metals is incredibly sensitive to magnetic scattering. As a result, the weak localization magnetoresistance and time-dependent universal conductance fluctuations are powerful probes of magnetic impurities. We report measurements of these effects in Au and Ag nanowires, comparing samples with and without an underlying 1.5 nm thick Ti adhesion layer. Because of background oxygen, this layer is likely TiO_x , with $x < 2$. Samples with no adhesion layer show no sign of magnetic contamination. Samples with adhesion layers measured immediately after fabrication show clear evidence of strong magnetic scattering. Annealing in air reduces the concentration of scatterers, as does evaporation under conditions that encourage the formation of TiO_2 . This strongly suggests that the magnetic scattering and its evolution are related to the oxidation state of the Ti, and is consistent with recent reports of ferromagnetism in oxygen-poor $\text{TiO}_{2-\delta}$.

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