

Abstract Submitted
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Thickness dependence of weak localization in thin films of Ni/Cr alloy KYLE VIVIAN, PHILLIP BROUSSARD, Covenant College — In order to study the weak localization effect in thin films, Ni and Cr were simultaneously deposited using DC magnetron sputtering onto sapphire substrates at 573 K. These thin films ranged from ≈ 100 nm to 0.3 nm and contained $\approx 80/20$ Ni/Cr by weight. The samples were then cooled from room temperature to ≈ 6 K in order to measure the sheet resistance (measured using the standard Van der Pauw technique) vs. the temperature of the sample. Normal metallic behavior during cool down is observed in thicker films. However, the films exhibited a metal-insulator transition at a particular temperature which increased as film thickness was decreased. This transition can be attributed to the electrons becoming weakly localizing as different scattering behaviors begin to dominate.

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