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The Temperature and Thickness Dependence of Resistivity in Thin Copper Films DANIEL STANLEY, DENNIS KUHL, Marietta College — The bulk resistivity of a material depends on its temperature, and is a well studied affect. In thin metal films, however, the contribution to resistivity due to scattering from the surface of the film is expected to be significant. As the film grows thicker, surface scattering eventually becomes insignificant and the temperature dependent bulk resistivity of the material dominates. We present fits of experimental data to a Fuchs-Sondheimer classical size effect model to test the prediction that surface scattering is the dominant mechanism in thin copper films. We have tried to isolate temperature-dependent effects by monitoring the temperature of the film during growth in a thermal evaporator. Widely varying initial resistivity data suggests early film growth consists of island formation.

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