

A Theoretical Determination of the Conductivity of a Thin Metal Film
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Abstract: The purpose of this project is to investigate how the conductivity of a thin metal film depends on the thickness, temperature, and “roughness” of the sample. The thickness and temperature dependence shows how the conductivity is affected by the mean-free path of the electrons. Also, the scattering of electrons off the surface of the film, which is related to the “roughness” of the film, will be taken into account for conductivity measurements. Theoretical determination of conductivity will include solving the Boltzmann transport equation with appropriate boundary conditions analytically and numerically (using Maple 10). The theoretical results will try to be verified by experimental data which will be collected using palladium gold films, prepared at Grand Valley State University. The conductivity of the thin films will be measured via the Sommer-Tanner Method, of electrodeless, conductivity measurements.

References:

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