

Theory of electrical transport and scattering at a metal-metal interface

Moraga,

The Schrodinger equation for an electron near a randomly rough metal-metal (or metal-vacuum) interface is approximately solved. The wavefunction and probability currents are averaged over all realisations of the interface characterised by its root-mean-square departure from flatness and the extent of its lateral correlation, and the results are used to set up simple boundary conditions for the Boltzmann transport equation. These are in the form of angle-dependent transmission and reflection coefficients, generalising Fuch's reflectivity parameter, but given as explicit functions of observable properties of the interface. These results are further applied to the calculation of the electrical conductivity of thin films and foils, and of double-layer metallic films.