Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Electron-grain boundary scattering and the resistivity of nanometric metallic structures R.C. MUNOZ, M. FLORES, G. KREMER, R. HENRIQUEZ, J.G. LISONI, L. MORAGA, S. OYARZUN, M.A. SUAREZ, Dept. of Physics, University of Chile — The resistivity of metallic structures depends on electron-grain boundary and electron-surface scattering. By tuning the grain size, we have been able to separate the contribution to the resistivity originating in electron-grain boundary scattering, from that arising in electron-surface scattering. The resistivity of gold films approximately 54 nm thick deposited onto mica substrates under high vacuum, was measured between 4 and 300 K. It exhibits a cross over, in samples where the average grain diameter d $>$ 38 nm and the resistivity is determined by electron-surface plus electron-phonon scattering, to a regime where it is determined by electron-grain boundary plus electron phonon scattering , in samples where d $<$ 38nm. l(300)=38 nm is the electron mean free path in the bulk at 300 K. The resistivity can described by Drude's model. It can be described as well by Mayadas's theory using the grain boundary reflectivity R *as the only adjustable parameter.* Funded by FONDECYT 1085026. **References.** R. Henriquez et al., Phys. Rev. **B82** (2010) 113409.

Raul C. Munoz

Date submitted: 20 Dec 2010 Electronic form version 1.4