Scanning Tunneling Potentiometry for Nanoscale Transport
Studies

MICHAEL ROZLER, M.R. BEASLEY, Stanford University — We have
developed a scanning tunneling potentiometry (STP) system for study of electrical
transport on nanometer length scales. A novel biasing scheme is used to achieve
electrochemical potential resolution at the theoretical limits of this measurement -
the thermal noise of the tunnel junction. We apply this technique to several ma-
terials in order to explore the capabilities of the instrument. These include thin
films of Au, the “bad metal” SrRuO$_3$ and amorphous indium oxide. Homogeneity
of transport in these systems is discussed. Work supported initially by the AFOSR
and currently by the NSF.

Michael Rozler
Stanford University

Date submitted: 06 Dec 2005