Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Bulk and Thin Film Contact Resistance with Dissimilar Materials[1] Y.Y. LAU, P. ZHANG, U of Michigan, Ann Arbor, W. TANG, Air Force Research Laboratory, M.R. GOMEZ, Sandia National Laboratories, D.M. FRENCH, Air Force Research Laboratory, J.C. ZIER, Naval Research Laboratory, R.M. GILGENBACH, U of Michigan, Ann Arbor — Contact resistance is important to integrated circuits, thin film devices, carbon nanotube based cathodes, MEMS relays and interconnectors, wire-array z-pinches, metal-insulator-vacuum junctions, and high power microwave sources, etc. This paper summarizes the recent modeling efforts at U of M, addressing the effect of dissimilar materials and of finite dimensions on the contact resistance of both bulk contacts and thin film contacts. Accurate analytical scaling laws are constructed for the contact resistance of both bulk [1] and thin film [2] contacts over a large range of resistivity ratios and aspect ratios in Cartesian and cylindrical geometries. They were validated against known limiting cases; and spot-checks with numerical simulations and experiments.

[1] Lau et al., *J. Appl. Phys.***105**, 124902 (2009); Gomez et al., *Appl. Phys. Lett.* **95**, 072103 (2009); Zhang et al., *J. Appl. Phys.* **108**, 044914 (2010).
[2] Zhang et al., *Appl. Phys. Lett.* **97**, 204103 (2010); *J. Appl. Phys.* **109**, 124910 (2011); Proc. of the 57th IEEE Holm Conf. on Electrical Contacts (2011).

[1]Supported by AFOSR, AFRL, L-3, and Northrop-Grumman.

Peng Zhang
U of Michigan, Ann Arbor

Date submitted: 22 Jul 2011 Electronic form version 1.4