Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Geometric Studies of Shunt and Lead Orientation in EEC Devices[1] F.M. WERNER, S.A. SOLIN, Washington University in St. Louis — Electric field sensors are ubiquitous in modern technology, from field effect transistors (FETs) in circuit boards to point-of-care testing (POCT) devices used in detecting the presence of specific protein markers in blood. The transport properties of these devices are limited by two general categories: intrinsic material properties and extrinsic geometric effects. Devices with a maximum electric field resolution of 3.05V/cm were previously reported [1-2]. The metal semiconductor hybrid (MSH) devices are constructed by forming a Schottky interface between a mesa of nGaAs and Ti, while four ohmic leads surround the perimeter of the mesa and are used for four point resistance measurements. These devices exhibit extraordinary electroconductance (EEC) and make it possible to correlate measured four point resistance to changes in the local electric field. While maximizing the EEC response by optimizing the intrinsic material properties has been theoretically investigated [2], we present a phenomenological study of the impact of lead orientation and shunt geometry in the sensing capabilities of these devices. Ref [1] Yun Wang, et al, Appl. Phys. Lett. 92, 262106 (2008). [2] A.K.M. Newaz, et al, Phys Rev B. 79, 195308 (2009).

[1]S.A.S. is a co-founder of and has a financial interest in PixelEXX, a start-up company whose mission is to market imaging arrays.

Stuart Solin
Washington Univ

Date submitted: 14 Nov 2013 Electronic form version 1.4