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Earlystage Electrical Breakdown involving Tunneling HAROLD HJALMARSON, CHRIS MOORE, PETER SCHULTZ, EZRA BUSSMAN, DAVID SCRYMGEOUR, MATT HOPKINS, Sandia National Labs — The early stage of electrical breakdown from a surface is assumed to involve field emission. In real-world applications, the electrical field is often assumed to be increased by geometrical effects. In addition to these enhancement effects, contamination by adsorbates can lead to reductions in the effective work functions. To develop a physics-based understanding beyond the use of these empirical effects, the field emission currents at early times are being computed and measured. The calculations involve a solution of the Boltzmann equation, and the measurements involve a scanning tunneling microscope. Early results from this collaborative theoretical-experimental project will be described in this presentation. The presentation will focus on results for an ideal system with an absence of geometrical effects. Sandia National Laboratories is a multi-mission laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energys National Nuclear Security Administration under contract DE-AC04-94AL85000.

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