Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Electrical Breakdown in Solids HAROLD HJALMARSON, FRED ZUTAVERN, Sandia National Laboratories, KENNETH KAMBOUR, Leidos, CHRIS MOORE, ALAN MAR, Sandia National Laboratories — During electron breakdown of a solid subjected to a large electric field, impact ionization causes growth of an electron-hole plasma. This growth process is opposed by Auger recombination of the electron-hole pairs. In our work, such breakdown is investigated by obtaining steady-state solutions to the Boltzmann equation. In these calculations, the carriers are heated by the electric field and cooled by phonon emission. Our results imply that breakdown may lead to high carrier-density current filaments. Conductive filaments have been observed in optically-triggered, high-power photoconductive semiconductor switch (PCSS) devices being developed at Sandia Labs. The relationship between the steady-state computed solutions to the observed filaments will be discussed in the presentation. This work was supported by the Laboratory Directed Research and Development program at Sandia National Laboratories. Sandia National Laboratories is a multi-program 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.

Harold Hjalmarson
Sandia National Laboratories

Date submitted: 06 Nov 2015 Electronic form version 1.4