

Abstract Submitted
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Universal disorder in the microwave conductance spectra of doped silicon nanowire arrays CLARK HIGHSTRETE¹, MARK LEE, Sandia National Laboratories, AARON VALLETT, SARAH EICHFELD, JOAN REDWING, THERESA MAYER, Penn State University — Microwave conductance spectra of doped silicon nanowire (SiNW) arrays were measured from 0.1 to 50 GHz at temperatures between 4 K and 293 K. SiNWs were synthesized by VLS growth, assembled into arrays on co-planar waveguides and measured using microwave vector network analysis. The complex conductance of the arrays was found to increase with frequency at all temperatures as f^s , with $0.25 < s < 0.4$, and to agree with the expected Kramers-Kronig relations. This AC conductance is consistent with behavior found universally in disordered systems. The likely cause is disorder from Si/SiO_x interface states dominating the conduction due to the high surface-to-volume ratio of the nanowires. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. Penn State authors acknowledge partial support from NSF DMR-0213623 and NSF NIRT ECCS-0609282.

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