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Electrical conductivity and equation of state data from Ohmically exploded tamped planar foils E.L. RUDEN, D.J. AMDAHL, R.H. COOKSEY, T.P. FLEMING, Air Force Research Laboratory, Directed Energy Directorate, F.T. ANALLA, D.J. BROWN, M.R. KOSTORA, Science Applications International Corporation, J.F. CAMACHO, NumerEx, LLC — Design details and preliminary results are presented for an effort to produce homogeneous Warm Dense Matter (WDM) in a regime characteristic of single-shot pulsed power devices, and diagnose dynamic surface conditions to infer intrinsic bulk properties. The WDM is produced by Ohmically exploding a metal foil placed between transparent tampers using a 36 μF, 40 kV capacitor bank. Electrical conductivity, pressure, density, specific energy, and temperature time histories are inferred from a combination of pyrometer, polarimeter, and photonic doppler velocimeter measurements of the foil surface, and a B-dot probe array around the foil. 3-D MHD simulations of the overall dynamics and diagnostic response, which include the results of quantum many body simulations of tamper properties, facilitate interpretation. The ultimate goal is to validate theoretical ab initio models of matter encountered in single-shot pulsed power devices.

Edward Ruden
Air Force Research Laboratory

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