Abstract Submitted
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Higher Dimensional Theory of Contact Resistance and Experimental Validation W. TANG, M. GOMEZ, D. FRENCH, J. ZIER, P. ZHANG, Y.Y. LAU, R. GILGENBACH, University of Michigan - Ann Arbor, UNIVERSITY OF MICHIGAN - ANN ARBOR TEAM — Electrical contact is an important issue to Z-pinches, pulsed power systems, field emitters, and wafer evaluation, etc. Because of the surface roughness on a microscopic scale, true contact between two pieces of metal occurs only on the asperities of the two contacting surfaces, resulting in contact resistance [1]. We recently developed a higher dimensional theory of contact resistance for an asperity of transverse dimension (a) and finite axial length (h) connecting two metal blocks [2]. For asperity of rectangular, cylindrical or funnel shape, the contact resistance is found to be of the form R[1+p(h/a)] where R is the corresponding h=0 "a-spot" theory limit of Holm and Timsit [1], p has a simple form which is geometry-dependent. This scaling law is verified against electrostatic code results [2]. It is also recently validated in a series of controlled experiments [3]. This work is supported by Sandia, AFOSR, AFRL, L-3, and Northrop-Grumman.

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