

Abstract Submitted
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The Effect of Surface Heterogeneities in Exploding Metallic Foils WILLIAM NEAL, Atomic Weapons Establishment, NATHANIEL SANCHEZ, BRIAN JENSEN, JOHN GIBSON, MIKE MARTINEZ, JONATHON ROMERO, CHARLES OWENS, DENIS JARAMILLO, Los Alamos National Laboratory, ADAM IVERSON, CARL CARLSON, National Security Technologies, ALEX DERRY, Advanced Photon source, Argonne National Laboratory, PAULO RIGG, Dynamic Compression Sector, Washington State University — During the electrical explosion of bridge-wires and bridge-foils, the metal bridge undergoes rapid resistive-heating. The metal is rapidly expanded through solid, liquid, vapour and plasma phases. This study uses ALEGRA MHD, a Sandia National Laboratory magneto-hydrocode, to predict the formation of these metallic phases during the explosion process and determine the effects of surface heterogeneities on the spatial distribution of these phases. The simulations are compared against x-ray phase contrast radiographs of electrically exploded bridge-foils. From comparison of these data, it is evident that the meso-structure of the metallic foil dominates the explosion process and is something that should be controlled during the manufacturing processes for detonator designs.

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