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Copper Conductivity Model Development and Validation Using Flyer Plate Experiments on the Z-machine L. RIFORD, Univ of Wisconsin, Madison, R.W. LEMKE, K. COCHRANE, Sandia National Laboratories — Magnetically accelerated flyer plate experiments done on Sandia's Z-machine provide insight into a multitude of materials problems at high energies and densities including conductivity model development and validation. In an experiment with ten Cu flyer plates of thicknesses 500-1000 μm, VISAR measurements exhibit a characteristic jump in the velocity correlated with magnetic field burn-through and the expansion of melted material at the free surface. The experiment is modeled using Sandia's shock and multiphysics MHD code ALEGRA. Simulated free surface velocities are within 1% of the measured data early in time, but divergence occurs at the feature, where the simulation indicates a slower burn through time. The cause was found to be in the Cu conductivity model's compressed regime. The model was improved by lowering the conductivity in the region 12.5-16 g/cc and 350-16000 K with a novel parameter based optimization method using the velocity feature as a figure of merit.

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