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FLASH Hydrodynamic Simulations of Experiments to Explore the Generation of Cosmological Magnetic Fields[1] ANTHONY SCOPATZ, MILAD FATENEJAD, NORBERT FLOCKE, The University of Chicago, GIANLUCA GREGORI, The University of Oxford, DON LAMB, DONGWOOK LEE, The University of Chicago, JENA MEINEKE, The University of Oxford, PETROS TZEFERACOS, KLAUS WEIDE, The University of Chicago — Magnetic fields are ubiquitous throughout the universe. However, the origin and strength of these fields are not fully understood. A promising mechanism for the origin of seed fields is the asymmetric shocks that occur in hierarchical structure formation when smaller halos merge to form galaxies and galaxies merge to form clusters of galaxies. The seed fields are generated by the Biermann battery mechanism. The COSMOLAB team are conducting experiments to investigate the generation of magnetic fields by asymmetric shocks. These experiments involve laser illumination of a foil target, driving a shock into a gas-filled chamber, and a variety of plasma and magnetic field diagnostics. Hydrodynamic-only simulations are useful because the shock-generated magnetic fields are not dynamically important. In this paper, we describe hydrodynamic simulations of the experiment conducted using the FLASH code. The scientific objective of these simulations is to explore the sensitivity of the properties of the jet-like shock to target composition, thickness, and lateral extent.

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