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Numerical modeling of laser-driven experiments of colliding jets: Turbulent amplification of seed magnetic fields[1] PETROS TZEFERACOS, MILAD FATENEJAD, NORBERT FLOCKE, CARLO GRAZIANI, University of Chicago, GIANLUCA GREGORI, University of Oxford, DONALD LAMB, University of Chicago, DONGWOOK LEE, University of California-Santa Cruz, JENA MEINECKE, University of Oxford, ANTHONY SCOPATZ, University of Wisconsin-Madison, KLAUS WEIDE, University of Chicago — In this study we present high-resolution numerical simulations of laboratory experiments that study the turbulent amplification of magnetic fields generated by laser-driven colliding jets. The radiative magneto-hydrodynamic (MHD) simulations discussed here were performed with the FLASH code and have assisted in the analysis of the experimental results obtained from the Vulcan laser facility. In these experiments, a pair of thin Carbon foils is placed in an Argon-filled chamber and is illuminated to create counter-propagating jets. The jets carry magnetic fields generated by the Biermann battery mechanism and collide to form a highly turbulent region. The interaction is probed using a wealth of diagnostics, including induction coils that are capable of providing the field strength and directionality at a specific point in space. The latter have revealed a significant increase in the field's strength due to turbulent amplification. Our FLASH simulations have allowed us to reproduce the experimental findings and to disentangle the complex processes and dynamics involved in the colliding flows.

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