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Producing Beam Instabilities Relevant to Parallel Shock Formation in a Magnetized Laboratory Plasma P. V. HEUER, M. S. WEIDL, R. S. DORST, D. B. SCHAEFFER, C. G. CONSTANTIN, S. VINCENA, S. TRIPATHI, W. GEKELMAN, Univ of California - Los Angeles, D. WINSKE, Los Alamos National Laboratory, C. NIEMANN, Univ of California - Los Angeles — Simulations have identified several electromagnetic beam instabilities that play an essential role in the formation of Alfvénic parallel shocks, but have never been studied in that context in the laboratory. We present measurements of one such instability (the Right-Hand Resonant Instability, or RHI) from a series of recent experiments at the University of California, Los Angeles. Instabilities are observed between a field-parallel super-Alfvénic ($M_A = 5$) ‘beam’ of laser-produced plasma expanding over $80 \delta_i$, and the large, magnetized ambient plasma of the Large Plasma Device (LAPD), and are diagnosed with an array of 3-axis magnetic flux ‘bdot’probes and Langmuir probes. Measurements are compared to hybrid simulations of both the experiment and of fully formed parallel shocks.

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