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Multidimensional Hybrid Simulations of Super-Alfvénic Laser Ablation Experiments in the Large Plasma Device S.E. CLARK, University of California at Los Angeles, Department of Physics and Astronomy, Los Angeles, CA 90095, D. WINSKE, Los Alamos National Laboratory, Los Alamos, NM 87545, D.B. SCHAEFFER, E.T. EVERSON, A.S. BONDARENKO, C.G. CONSTANTIN, C. NIEMANN, University of California at Los Angeles, Department of Physics and Astronomy, Los Angeles, CA 90095 — Two dimensional hybrid simulations are performed to determine the best plasma and laboratory parameters for the next generation of laser ablation experiments in the Large Plasma Device (LAPD). After installation of a new plasma source in the LAPD, the ambient plasma density is expected to reach $n_i \sim 10^{13}$ cm^{-3} with a diameter > 20 cm embedded within the main cathode discharge of $n_i \sim 10^{12}$ cm^{-3}, which has a diameter of ~ 80 cm. The electron temperature is expected to be $T_e > 5$ eV and the ion temperature will be $T_i \sim 1$ eV. The background magnetic field will be selected to have a strength between 275 G and 800 G. The debris plasma is assumed to be C^{+4}, which is ejected conically and relatively monoenergetically from the target at a super-Alfvénic speed $V_d > 100$ km/s into an ambient plasma of H^{+1} or He^{+1}, where collisions with neutrals is neglected. Simulations with uniform background density will be compared to those with a non-uniform radial density profile and the effect of the density gradient on debris-ambient coupling will be examined. These simulation results will be used to help determine the parameter space in which to operate the next experiment.

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