MAGNETIC AND ELECTRIC FIELD MEASUREMENT OF A LASER PRODUCED PLASMA EXPANDING THROUGH A MAGNETIZED BACKGROUND PLASMA

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In the recent experiment, the Raptor kJ class 1053 nm Nd:Glass laser in the Phoenix laser facility at University of California, Los Angeles (UCLA) was used to accelerate debris ions from a carbon or polyethylene target to super-Alfvénic speed, which flow through a tenuous, uniform, and quiescent ambient magnetized plasma in the Large Plasma Device (LAPD). This device can generate peak plasma density n_i in order of $10^{13}cm^{-3}$ and the background magnetic field varying from 200G to 2000G, a very unique and space-alike plasma environment. The interaction of the debris-ambient plasma with the magnetic field creates a diamagnetic cavity, which acts as a piston launching magnetized collisionless shocks in a laboratory setting. The magnetic and electric field structure has been measured and the field development, especially at the cavity edge, is studied. The experimental results are compared to two-dimensional hybrid simulations.