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Coupling of axial plasma jets to compressional Alfven waves[1]
STEPHEN VINCENA, WALTER GEKELMAN, UCLA Department of Physics and Astronomy — The coupling of mass, energy, and momentum from a localized, dense, and rapidly expanding plasma into a large-scale magnetized background plasma is central to understanding many physical processes; these include galactic jets, coronal mass ejections, tokamak pellet fueling, high-altitude nuclear detonations, chemical releases in the ionosphere, and supernovae. The large-scale magnetized plasmas are capable of supporting Alfvén waves, which mediate the flow of currents and associated changes of magnetic topology on the largest size scales of the external system. We present initial results from a laboratory experiment wherein a fast-moving, laser-produced plasma (LPP) is allowed to propagate along the magnetic field lines of a pre-existing plasma column (17m long by 60 cm diameter). The LPP is generated using a 1J, 8ns Nd:YAG laser fired at a graphite target. The laser is pulsed along with the background plasma at 1Hz. This work focuses on the coupling of the LPP to compressional Alfvén waves in the background plasma. The experiments are conducted at UCLA's Basic Plasma Science Facility in the Large Plasma Device.

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