Coupling of axial plasma jets to compressional Alfven waves\note{1}
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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 Alfven waves, which mediate the flow of currents and associ-
ated 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 Alfven waves in the background plasma. The experiments are
conducted at UCLA’s Basic Plasma Science Facility in the Large Plasma Device.

\note{1} This work is funded through a cooperative agreement between the DOE and NSF