Abstract Submitted
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Nonlinear Excitation of Acoustic Modes by Large Amplitude Alfvén waves in the Large Plasma Device (LAPD)[1] S. DORFMAN, T. CARTER, P. PRIBYL, S.K.P. TRIPATHI, B. VAN COMPERNOLLE, S. VINCENA, UCLA, R. SYDORA, U Alberta — Alfvén waves, a fundamental mode of magnetized plasmas, are ubiquitous in lab and space. While the linear behavior of these waves has been extensively studied [1], non-linear effects are important in many real systems, including the solar wind and solar corona. In particular, a parametric decay process in which a large amplitude Alfvén wave decays into an ion acoustic wave and backward propagating Alfvén wave may play an important role in coronal heating and/or in establishing the spectrum of solar wind turbulence. Recent counter-propagating Alfvén wave experiments have recorded the first laboratory observation of the Alfvén-acoustic mode coupling at the heart of this parametric decay instability [2]. The resonance in the observed beat process has several features consistent with ponderomotive coupling to an ion acoustic mode, including the measured dispersion relation and spatial profile. Strong damping observed after the pump Alfvén waves are turned off is under investigation. New experiments and simulations also aim to identify decay instabilities from a single large-amplitude Alfvén wave.

[1] W. Gekelman, et. al., Phys. Plasmas 18, 055501 (2011).
[2] S. Dorfman and T. Carter, Phys. Rev. Lett. 110, 195001 (2013).

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