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Exploring the role of Alfvén waves in heating the solar corona[1]
SAYAK BOSE, Columbia University, W. GEKELMAN, University of California at Los Angeles, M. HAHN, Columbia University, S. VINCENA, University of California at Los Angeles, D.W. SAVIN, Columbia University — The solar corona, the outer atmosphere of the Sun, is ~ 200 times hotter than the underlying visible surface of the Sun. Recent coronal observations find Alfvén wave damping at unexpectedly low heights in the corona, suggesting that Alfvén waves may contribute to the heating of the corona to temperatures of $\sim 10^6$ K. Dissipation of wave energy may occur due to gradients in the Alfvén speed along the coronal magnetic field lines. These gradients may cause wave reflection, which subsequently generates turbulence. Furthermore, the presence of gradients in the Alfvén speed across the magnetic field line may lead to phase mixing, which can promote additional nonlinear damping mechanisms. We are studying various wave dissipation processes under conditions similar to the solar corona, using the Large Plasma Device (LAPD) at the University of California, at Los Angeles. Here we will present the results of our initial experiments exploring the effectiveness of gradients in the Alfvén speed along the magnetic field in reflecting Alfvén waves and reducing the amplitude of Alfvén waves transmitted across a gradient

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