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Ion heating due to Alfvén waves in a helicon plasma C.S. COMPTON, C. BILOUI, S. HOUSHMANDYAR, E.E. SCIME, West Virginia University — Recent models for ion heating in the fast solar wind region of the Sun predict that the heating is due to MHD turbulence driven by counter propagating, low- frequency Alfvén waves [Matthaeus et. al. 1999]. Experiments to test this theory will be conducted in the West Virginia University HELIX (Hot hELIcon eXperiment) device in argon and helium plasmas. It is argued that the counter-propagation is a result of the reflection of the waves off of a gradient in the Alfvén speed. The HELIX device has a speed gradient similar to that found in the solar corona, a short region of high Alfvén speed followed by an expansion region of lower Alfvén speed. Alfvén waves have been launched using an internal coil measuring 2 cm in length with 50 turns and received using a coil measuring 1 cm in length with 300 turns, both of radius 1.5 mm. The parallel wave number versus wave frequency of the waves and the ion response to the wave field (as determined by laser induced fluorescence in argon plasmas) will be presented. The ion response to the wave field will be compared to theoretical predictions for shear Alfvén waves. The effect of moving the location of the reflection region (by varying the strength of the magnetic field in the expansion region) on the parallel wave number of the Alfvén waves will also be reviewed.

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