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Alfvén Wave Behavior in Partially Ionized Plasmas and a Strong Density Gradient in the Hot hELicon eXperiment (HELIX) STEPHANIE SEARS, JERRY CARR JR., ROBERT VANDERVORT, GREG LUSK, West Virginia University, RICHARD MAGEE, Tri Alpha Energy, Inc., EARL SCIME, West Virginia University — Damping of Alfvén waves is one of the most likely mechanisms for ion heating in the solar corona. Ion-neutral collisions have significant but poorly-understood effects on energy transfer and Alfvén wave propagation in partially ionized plasmas, such as those found in the solar chromosphere. The neutral density in HELIX varies strongly with radius, giving access to a wide range of Alfvén dynamics across the plasma column. The ratio of ion-cyclotron collision frequency in the solar atmosphere varies from 10-6 to 10, while in HELIX the ratio varies from about 0.02 to 0.5. With the use of a new internal wave-launching antenna close to the high-density core and a small-scale magnetic sense coil probe, the behavior of radially confined Alfvén waves is measured and characterized in helium. These propagation measurements, along with LIF observations of the temperature and drift of a minor argon ion component in the majority helium plasma, are compared to observations in the corona.

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