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A Kinetic Simulation of Ponderomotive Interactions between Reflecting Alfvén Waves and Particles KENDRA BERGSTEDT, JONATHAN JARA-ALMONTE, HANTAO JI, Princeton Plasma Physics Laboratory — Alfvén waves propagating through inhomogeneous media generate ponderomotive forces which can accelerate charged particles. This process is important throughout space and astrophysical plasma physics, contributing to pressure balance in molecular clouds and the acceleration of heavy ion species out of Earths ionosphere. In particular, the ponderomotive force can cause an abundance (or depletion) of heavy ions with first ionization potential (FIP) below 10 eV in a star's corona compared to its photosphere, which is known as the FIP (or inverse FIP) effect. We present kinetic simulations of an Alfvén wave propagating from a collisionless regime and reflecting at a higher-density cutoff. The energization of minority ion species is compared to observations of the FIP and inverse FIP effect. Propagation-angle-dependent interactions are investigated. The simulations are performed with varying collisionalities and results are compared to MHD simulations to determine the importance of kinetic effects.

Kendra Bergstedt
Princeton Plasma Physics Laboratory

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