Abstract Submitted
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Critical ionization velocity in plasma-neutral collisions on the Caltech spheromak experiment[1] A.L. MOSER, P.M. BELLAN, Caltech — Alfvén predicted [1] that when a neutral gas impacts a magnetized plasma it will be ionized and entrained if its velocity across magnetic field lines exceeds the critical ionization velocity, $v = \sqrt{2E/m}$, where E is the ionization energy of a neutral atom with mass m. In experiments using the coplanar spheromak gun at Caltech, a magnetized plasma jet collides with a target cloud of neutral gas at a relative velocity that can be adjusted above or below the critical ionization velocity of the neutral cloud. The jet and its associated magnetic field deform as the jet impacts the neutral cloud. At relative velocities exceeding the critical velocity, the plasma jet slows dramatically and spectroscopic measurements show ionization of the target gas. The ratio of ion to neutral lines increases as relative velocity increases. Future experiments will look for a lack of ionization (neutral spectral lines only) of the neutral target cloud when the relative velocity is below the critical ionization velocity. [1] H. Alfvén, Rev. Mod. Phys., **32**, 710, (1960)

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