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**Supercritical Alfven Ionization Velocities observed on MCX** R. LUNSFORD, R.F. ELLIS, A. CASE, R. CLARY, A. HASSAM, C. TEODORESCU, University of Maryland, College Park — It has been theorized that Alfven's Critical Ionization Velocity (CIV) stands as a limit curtailing the speed at which a centrifugally confined plasma can rotate. While this limit in speed has been observed in the early experimental runs of MCX (Maryland Centrifugal eXperiment), by modification of the input parameters we have been able to access a high rotation discharge mode (HR mode) whose azimuthal velocity exceeds the CIV by greater than a factor of two. Previous analysis (C. Teodorescu, et al, unpublished) has shown that the observed average rotation velocities bifurcate about the CIV predicted for MCX geometry. In all cases the ordinary mode (O-mode) speeds are below the CIV boundary, and the HR-mode speeds are above. The O-mode CIV limitations are thought to be due to plasma and neutral boundary interactions at the insulating surfaces. This suggests that the ability to reach the supercritical state would be aided by a marked plasma detachment from the insulators. Thus, the presence of supercritical speeds supports the possibility of enhanced centrifugal confinement.

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