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Velocity Limits and Discharge Performance in MCX ROBERT LUNSFORD, R.F. ELLIS, R. CLARY, A. HASSAM, C. TEODORESCU, University of Maryland, College Park — A primary goal of the Maryland Centrifugal eXperiment (MCX) is the attainment and maintenance of high rotation velocities. As earlier experiments reported a limitation on achievable speed we have performed extensive studies involving variations to the applied voltage, magnetic field, and radial discharge extent to ascertain the conditions under which such a limit might exist. MCX has discovered two modes of operation, where the higher rotation (HR) mode seems to have surpassed earlier limits. The MCX rotational plasma then undergoes a spontaneous transition by which the plasma is shifted into a subsequent lower voltage mode characterized both by a depressed rotational velocity as well as a reduced stored energy. We have observed an optical bursting coincident with this transition localized at the surface of the insulators bounding the discharge region suggesting that these events are due to the formation of an undesired secondary breakdown. Possible methods of eliminating these aforementioned transitions have been implemented and will be discussed.

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