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Plasma Evolution Studies Using High-speed Imaging at the Maryland Centrifugal Experiment[1] C.A. ROMERO-TALAMAS, W.C. YOUNG, R.R. REID, G. TAYLOR, R.C. ELTON, R.F. ELLIS, A.B. HASSAM, University of Maryland, College Park — A high-speed imaging camera has been installed at the Maryland Centrifugal Experiment (MCX) [R.F. Ellis, et al., Phys. Plasmas 12, 055704 (2005)], in order to capture a single image per plasma discharge with practical shutter speeds as fast as 200 ns. The camera captures visible light emitted by plasma-neutral interactions, and reveals the shape of plasma-confining magnetic flux surfaces. Changes in brightness profiles at different camera shutter speeds suggest plasma escapes the confining flux surfaces in bursts. Preliminary correlations with magnetic field, density, and discharge voltage measurements suggest that burst timescales are between a few to tens of microseconds. These bursts are conjectured to initiate at the mirror midplane, and then propagate axially towards the insulator ends. Imaging through various ports, stereoscopy techniques, spectroscopy, and correlations with other diagnostics are being used to test this hypothesis.

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