Abstract Submitted
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Characterization of Flow and Ohm's Law in the Rotating Wall Machine[1] DAVID HANNUM, M. BROOKHART, C.B. FOREST, R. KENDRICK, G. MENGIN, C. PAZ-SOLDAN, UW-Madison — The rotating wall machine is a linear screw-pinch built to study the role of different electromagnetic boundary conditions on the Resistive Wall Mode (RWM). Its plasma is created by an array of electrostatic washer guns which can be biased to discharge up to 1 kA of current each. Individual flux ropes from the guns shear, merge, and expand into a 20 cm diameter, $\sim$ 1 m long plasma column. Langmuir (singletip) and tri-axial B-dot probes move throughout the column to measure radial and axial profiles of key plasma parameters. As the plasma current increases, more H_2 fuel is ionized, raising n_e to 5×10^{20} m^{-3} while T_e stays at a constant 3 eV. The electron density expands to the wall while the current density (J_z) stays pinched to the central axis. $\mathbf{E} \times \mathbf{B}$ and diamagnetic drifts create radially and axially sheared plasma rotation. Plasma resistivity follows the Spitzer model in the core while exceeding it at the edge. These measurements improve the model used to predict the RWM growth rate.

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