Abstract Submitted
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A study of RMF-plasma coupling on varying seed plasma parameters[1] GABRIEL GONZALEZ JUSINO, University of Puerto Rico, Rio Piedras Campus, ERIC PALMERDUCA, Princeton University, DR. SAMUEL COHEN, Princeton Plasma Physics Laboratory, PFRC TEAM — We describe the effects of seed-plasma parameters on the repeatability of rotating magnetic field (RMF) plasma formation in the PFRC-2. The initial plasma is a steady-state, tenuous (1x109 - 1x1011 electrons/cm3) hydrogen plasma, formed by an RF capacitively-coupled external antenna in the source chamber of the device. Previous measurements have shown this relatively low power (2-500 W) plasma may contain a small population of energetic electrons (up to 35 keV), in addition to bulk electrons with temperatures near 5 eV. This 'seed plasma' flows along the main axial magnetic field into the region between the RMF antennas in the main chamber. A high power (up to 50 kW), pulsed (up to 300 ms duration), odd-parity RMF at frequencies between 2 and 14 MHz is then applied to the seed plasma. A higher density (up to 5x1012 electrons/cm3) plasma is formed as a result. Our experiments have studied the effects of varying the seed plasma's parameters on the formation of the RMF plasma. The RMF plasma's breakdown time and the efficiency of power coupling are measured as functions of the initial hydrogen pressure, the main axial magnetic field strength, the RMF antenna power, and the seed plasma RF power. Plasma formation mechanisms are considered.

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