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The Presence of Normal Modes Above a Capacitive Plasma Applicator WALTER GEKELMAN, UCLA Plasma Physics, MICHAEL BARNES, Intevac Corporation, STEVEN VINCENA, PATRICK PRIBYL, UCLA Plasma Physics — Normal modes of standing waves in the plasma potential have been observed over the entire surface of a dual-frequency capacitive applicator immersed in an inductively-generated rf glow discharge. An emissive probe used to measure the plasma potential is located 0.95 cm above the applicator and moved by a two-dimensional drive system. The heater current to the probe is switched off during the 100 μs measurement to eliminate uncertainties due to the heater voltage. Vp is mapped at 208 spatial locations and digitized at 1 GHz. An electrically floating probe is located 1.84 cm above the center of applicator to afford a means to generate correlation functions for the detection of waves in the low temperature plasma. The observed normal modes in potential can be expressed as summations of Bessel functions much as the vibrational modes in circular membranes and plates. The modes are most likely excited by the oscillations of the plasma-sheath interface including harmonic oscillations arising from the nonlinear mechanisms governing the sheath dynamics. As the frequency is increased, the order of the normal modes is postulated to increase as these modes are likely determined by the impedance terminating conditions on the chamber surfaces.

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