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Electron neutral collision frequency measurements with the hairpin resonator probe[1] DAVID PETERSON, North Carolina State University, PHILIP KRAUS, THAI CHENG CHUA, Applied Materials Inc., STEVEN SHANNON, North Carolina State University — Electron neutral collision frequency is measured over pressures ranging from 0.1-2.0 Torr in Ar, He, Ar-He, and N_2 plasmas. Measurements are made with both grounded and fully floating hairpin resonator probes in a symmetric parallel plate capacitively coupled system driven at 27 MHz. The analysis treats the hairpin probe as open circuit two wire transmission line immersed in a dielectric medium. Results are compared to hybrid plasma equipment module (HPEM) simulations, showing good agreement with simulated collision frequency. Appropriate sheath models are shown to be a factor in determining measured quantities. Additionally, models that either include or neglect the RF sheath are compared for grounded and floating probes, respectively. The possibility of inferring both mean electron energy and dissociation fractions in N_2 from measured collision frequency is also briefly discussed.

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