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Plasma diagnostic method by charging capacitor in a floating Langmuir probe

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An electrical plasma diagnostic method based on using charged capacitor voltage is developed for measurement of plasma parameters. When two square voltages having different amplitudes smaller than electron temperature are applied to a probe tip, the current flows from the plasma. The voltages of a capacitor connected to the probe vary due to this current. Plasma parameters are derived from the ratio of capacitor voltage variations. To obtain relations with plasma parameters and capacitor voltage, a circuit model containing nonlinear sheath and the capacitor is proposed. The plasma density and electron temperature were measured in the inductively coupled plasma. The results are in good agreement with those obtained from electron energy distribution function (EEDF)