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Plasma diagnostics using floating harmonics method and recent results in processing plasmas

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Recently, a floating harmonics method for processing plasma has been developed [1]. When a sinusoidal voltage is applied on a probe at a floating potential, the current flowing through the probe has many harmonics due to the nonlinearity of sheath. From the harmonic current components, plasma densities and electron temperatures can be found. There are many advantages of this method such as relative low voltages (a few V), good time resolution (∼msec), no perturbation (no net current), immune to rf interference, strong to contamination on probes. In this presentation, some improvement of this method and some measurements in various processing plasma reactors (SF6, CF4, N2, Ar, etc) as well as relevant physics will be given. Electron energy distribution function (EEDF) measurement based on the harmonic method and refinement technique for the EEDF will be given. A 2D wafer type probe array for 2D plasma density profile was developed and 2D plasma density profiles in an ICP at various conditions will be presented.

[1] MH Lee, SH Jang and CW Chung, J. Appl. Phys, **101**, 033305 (2007)