Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Analysis of current harmonics and application on the floating harmonics method with multiple voltage waveforms in a plasma YOUNG-DO KIM, YU-SIN KIM, HYO-CHANG LEE, CHIN-WOOK CHUNG, Hanyang Univ. Seoul, South Korea — In this paper, it was shown that measured probe currents have specific harmonics depending on the types of the input voltage waveforms due to nonlinearity of the sheath in plasma. In this experiment the voltage waveforms of sinusoidal, saw-tooth, square, and triangular types were applied, and the currents were analyzed using the Fourier transform of various periodic functions. The results were discussed including circuit model analysis. It was revealed that the harmonics of the probe current waveforms and the stray currents had different characteristics against each applied voltage waveform. It was also found that the floating harmonic method by using the triangular waveform has a valuable potential to measure plasma parameters such as plasma density and electron temperature. The plasma parameters obtained from our method were good agreements with the results from single Langmuir probe and sinusoidal floating harmonic methods.

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Date submitted: 11 Jun 2010 Electronic form version 1.4