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Measurement of Electron Density and Electron-neutral Collision Frequency Using Cutoff Probe Based on the Plasma Reactance Measurement

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We proposed a new measurement method of cutoff probe using the reactance spectrum of the plasma in cutoff probe system instead of transmission spectrum. The high accurate reactance spectrum of the plasma which is expected in previous circuit simulation of cutoff probe [1] was measured by using the automatic port extension method of the network analyzer. The measured reactance spectrum is good agreement with E/M wave simulation result (CST Microwave Studio). From the analysis of the measured reactance spectrum based on the circuit modeling, not only the electron density but also electron-neutral collision frequency can be simply obtained. The obtained results of electron density and e-n collision frequency were presented and discussed in wide range of experimental conditions, together with comparison result with previous methods (a previous cutoff probe using transmission spectrum and a single langmuir probe).

참고문헌

1. D.W. Kim et al., Appl. Phys. Lett. 99, 131502 (2011)

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