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Comparison between Cutoff Probe and Langmuir Probe: Focused on Measurement Technique Error

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Precise measurement of plasma parameters including density and temperature is the most essential part for understanding plasma characteristics. To pursue more accurate measurement, it is very important to understand the intrinsic error of the measurement method. In this paper, we performed the plasma measurement with different method; langmuire probe and cutoff probe. Both measurement technology are known to be exactly correlate with etch other. We conducted the four set of same experiments process by different persons to observe the intrinsic error based on measurement tools. As a result, the cutoff probe is relatively reliable then the Langmuir probe. This difference is analyzed to be intrinsic since it comes from the inevitable error such as manufacturing of probe tip. From this study, we sure that it is good decision to choose cutoff probe as repeatable measurement independent with intrinsic human factor.

Keywords: cutoff probe, plasma measurement, intrinsic error

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Characteristics of the Low Pressure Plasma

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Plasma hardly grows in low pressure because of lack of collision. Especially, in extremely low pressure like 1 mTorr, the experiment scale is far larger than mean free path therefore plasma is hardly generated in such low pressure. But low pressure plasma has useful properties like low damage or fine sputtering process because it has typically low electron density. In here, thermal electron is used to make breakdown in low pressure easily and cylindrical geometry is used to help discharge easily. And we changed magnetic field strength to control electron density or temperature. In low pressure, density and temperature behavior is very interesting so its characteristics are examined here.

Keywords: low pressure, plasma, electron confine