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A Cutoff Probe for the Measurement of High Density Plasma

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A cutoff probe is the novel diagnostic method to get the absolute plasma density with simple system and less assumption. However, high density of ion flux from plasma on probe tip can make the error of plasma density measurement because the dielectric material of probe tip can be damaged by ion flux. We proposed a shielded cutoff probe using the ceramic tube for protection from ion flux. The ceramic tube on probe tip can intercept the ion flux from plasma. The transmitted spectrum using the shielded cutoff probe is good agreement with E/M wave simulation result (CST Microwave Studio) and previous circuit simulation of cutoff probe [1]. From the analysis of the measured transmitted spectrum base on the circuit modeling, the parallel resonance frequency is same as the unshielded cutoff probe case. The obtained results of electron density is presented and discussed in wide range of experimental conditions, together with comparison result with previous cutoff method.

Keywords: plasma, electron density, cutoff probe