Langmuir probe in magnetized plasma: determination of the electron diffusion parameter and of the electron energy distribution function

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Abstract-

This work is devoted to a new method used to determine the electron diffusion parameter and the electron energy distribution function (EEDF) in magnetized plasma, by means of a Langmuir single probe. This method is only based on calculations performed on experimental data, no model is used and results do not depend on the accuracy of the different hypothesis, the probe orientation within the plasma, the magnetic field intensity, the diffusion coefficient, the mean free path or the potential profile through the sheath. We test the method and show its efficiency with experiments performed in hydrogen magnetized microwave plasma, using magnetic field intensity up to 0.12 T. The results are compared with those obtained using classical methods based on models and hypothesis reported in the literature.

Index Terms- diffusion parameter, electron energy distribution function, Langmuir probe, magnetized plasma

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