NUMERICAL SIMULATIONS FOR THE OFF-AXIS ELECTRIC POTENTIAL CREATED BY A BIASED DISK ELECTRODE IMMERSED IN A COLD DIFFUSION PLASMA*

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Determining the electric potential configuration of a biased electrode immersed in plasma in any point away from its symmetry axis is of great importance for the physics of plasmas. Our purpose is to explain how the electrode’s potential independently (only in the presence of the unperturbed plasma) can influence the experimentally measured potential profiles of some complex structures that may emerge in front of it. Using our results, one can now improve the models that describe the physical processes involved in a variety of mechanisms that stay at the base of plasma structures formation and dynamics (plasma sheaths and double layers formation, complex plasma patterns emergence, etc.). In our work, using elliptic integrals, we computed and numerically simulated (using Python programming language) the electric potential’s value at any point around a positively biased disk electrode immersed in a cold diffusion plasma.

1. S. Chiriac, D. G. Dimitriu, M. Sanduloviciu – Type I Intermittency related to the spatiotemporal dynamics of double layers and ion-acoustic instabilities in plasma, Physics of Plasmas 14 072309, 2007;

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