Numerical analysis of ion wind flow using space charge for optimal design

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In this study, the numerical modeling of the ion wind has been modified and newly defined to calculate the velocity of the ion wind flow by combining three basic models such as electrostatics, electrodynamics and fluid dynamics. The model has included presence of initial space charges to calculate transfer energy between space charges and air gas molecules using a developed space charge correlation. The simulation has been performed for a geometry of a pin to parallel plate electrode. Finally, the results of the simulation have been compared with the experimental data for the ion wind velocity to confirm the accuracy of the modified numerical modeling and to obtain the optimal design of the ion wind generator.

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