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An Efficient Vlasov-Poisson Solver and Deep Parametric Analysis of Cylindrical Emissive Probes[1] SADAF SHAHSAVANI, GONZALO SNCHEZ-ARRIAGA, XIN CHEN, Univ Carlos III De Madrid — The Orbital Motion Theory (OMT) for cylindrical emissive probes immersed in collisionless plasmas, which uses conservation laws to write the Vlasov-Poisson system as a single integro-differential equation, has been developed recently and solved numerically for specific parameter values. This work presents an improvement in the code that reduces the computational cost by a factor of approximately 80, thus opening the opportunity to carry out deep parametric analysis. By varying the probe radius-to-Debye length ratio and the emission level (controlled by the probe temperature), a database of current-voltage characteristics has been computed. The transition boundaries in parameter space from Orbital-Motion-Limited (OML) to non-OML regimes and from space-charge-limited (SCL) to non-SCL regimes have been found. The analysis shows that, depending on the emission level, the probe can float at positive and negative biases, with the floating potential not saturated at high emission levels.

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