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Plasma Sheath Around Long Conductors with Elliptic Cross-sections[1] LUCA CHIABÓ, GONZALO SÁNCHEZ-ARRIAGA, Universidad Carlos III de Madrid — The plasma sheath around an emissive surface immersed in a plasma is a topic of interest for a wide range of applications like emissive probes, electrodynamic tethers, and dusty plasma. This work presents a Vlasov-Poisson solver to study the plasma structure around a long body with an elliptic cross-section. Since angular momentum is not conserved by particle trajectories, the code allows to extend the orbital motion theory to non-integrable configurations. Some subtle physical and numerical features are highlighted, including the filamentation of the distribution function and its fractal structure in velocity space. A parametric analysis varying the probe eccentricity and the emission level is presented. Relevant features and macroscopic magnitudes, like density and potential profiles, and collected and emitted current are shown. Orbital-motion-limited and space-charge-limited regime transitions are both investigated. The stationary nature of the model and its implications in the development of reliable stationary Vlasov-Poisson solvers are discussed.

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Luca Chiab
Universidad Carlos III de Madrid

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