

## Linear and Non Linear Stability for the kinetic plasma sheath on a bounded interval

*mardi 8 octobre 2024 09:00 (45 minutes)*

Plasma sheaths are inhomogeneous equilibrium that form when a plasma is in contact with an absorbing wall. We prove linear and non linear stability of a kinetic sheath equilibrium for a Vlasov-Poisson type system in a bounded interval. Notably, in the linear setting, we obtain exponential decay of the fluctuation provided the rate of injection of particles at equilibrium is smaller than the rate of absorption at the wall. In the non linear setting, we prove a similar result for small enough equilibrium and small localized perturbation of the equilibrium.

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