

On the stability of a point charge in the Vlasov-Poisson system

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Abstract

A Dirac mass is a particularly simple yet relevant equilibrium of the Vlasov-Poisson equations. This talk addresses the question of its stability in the repulsive setting: we describe the precise asymptotic dynamics of solutions which start as small, smooth and suitably localized perturbations of a point charge. The analysis builds on the Hamiltonian/symplectic structure of the equations, and makes use of an exact integration of the linearized equation through angle-action coordinates. This allows to obtain optimal decay estimates and reveals a modified scattering dynamic.

This is joint work with Jiaqi Yang (ICERM) and Benoit Pausader (Brown University).