Kinetic equations and turbulence

The conductivity operator for a plasma is a pseudodifferential operator: linearized Vlasov-Maxwell and limiting absorption principle

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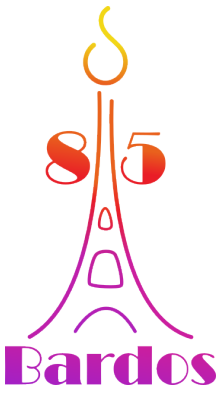
We consider, in the neighborhood of a stationary solution of Vlasov-Maxwell equations (that is a constant magnetic field B_0, a null electric field, and an homogeneous Maxwellian) the linearized Vlasov-Maxwell system for $f(t,x,v), E(t,x), B(t,x)$, where the current density is

$$\vec{j}(t,x) = en_0(x) \int [f_i(t,x,v) - f_e(t,x,v)]vdv.$$

The equations on f_e, f_i are inhomogeneous linear Vlasov equations. Unique solution in $(\mathcal{S}'(\mathbb{R}^7))^2$ of this problem is derived through a limiting absorption principle (adding viscosity $\nu f_{i,e}$ to the Vlasov equation), and deducing the classical Euler equations and the equation $\partial_t \vec{j} := \sigma(\vec{E})$. The conductivity operator is then obtained, and one shows that it is represented as a Fourier multiplier and we compute it.



In honor of Claude Bardos's 85th birthday