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**Global existence for ion dynamics in the Euler-Poisson equation**

ABSTRACT:

The 2 fluids (compressible) Euler-Poisson system governs the dynamics of a plasma under certain conditions and admits two “asymptotic limits”: the electron dynamics (short time) obtained by neglecting the movement of the ions in the plasma and the ion dynamics (long time) obtained by assuming that the electron are always in the Boltzmann equilibrium and looking at the behavior of the ions. Here we present a joint work with Y. Guo where we investigate the second limit and prove that small smooth perturbations of a uniform background exist globally (and in particular do not create shocks). The main difficulty comes from the closeness of the linearized operator to the classical wave operator and the absence of null form in the nonlinearity. We overcome it by using a normal form transformation and estimates for bilinear operators with singular symbols.