

Global Existence for the Vlasov-Poisson System with Steady Spatial Asymptotic Behavior

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A collisionless plasma is modeled by the Vlasov-Poisson system in three space dimensions. A fixed background of positive charge, which is independent of time and space, is assumed. The situation in which mobile negative ions balance the positive charge as $|x| \rightarrow \infty$ is considered. Hence, the total positive charge and the total negative charge are both infinite. Local existence in time of smooth solutions was established in 2003 by the author. Global existence in time of smooth solutions was shown by S. Pankavich in 2006, however this result applies in the case when the background density of positive charge is a decreasing function of $|v|$. This talk will discuss two new results that address the question of global existence when the background density is not necessarily a decreasing function of $|v|$.