

On the Landau damping

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March 21 - 23,2009

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Abstract

Landau damping [5] may be the single most famous mystery of classical plasma physics, and is of tremendous importance in galactic dynamics [1]. For the past sixty years it has been treated in the linear setting at various degrees of rigor [3, 6]; but its nonlinear version has remained elusive, since the only available results [2, 4] prove the existence of *some* damped solutions, without telling anything about their genericity.

In the present work we aim to close this gap by treating the nonlinear version of Landau damping, under assumptions which cover both attractive and repulsive interactions. For this we shall be led to develop a whole theory, complete with its own functional spaces and functional inequalities, we shall get new insights in the physics of the problem, and identify new mathematical phenomena.

References

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