Duan, Renjun; Huang, Feimin; Wang, Yong; Yang, Tong
Global well-posedness of the Boltzmann equation with large amplitude initial data. (English) Zbl 1367.35097

Summary: The global well-posedness of the Boltzmann equation with initial data of large amplitude has remained a long-standing open problem. In this paper, by developing a new $L^\infty_x L^1_v \cap L^\infty_x \cap L^1_v$ approach, we prove the global existence and uniqueness of mild solutions to the Boltzmann equation in the whole space or torus for a class of initial data with bounded velocity-weighted $L^\infty$ norm under some smallness condition on the $L^1_x L^\infty_v$ norm as well as defect mass, energy and entropy so that the initial data allow large amplitude oscillations. Both the hard and soft potentials with angular cut-off are considered, and the large time behavior of solutions in the $L^\infty_x \cap L^1_v$ norm with explicit rates of convergence are also studied.

MSC:
35Q20 Boltzmann equations
35A01 Existence problems for PDEs: global existence, local existence, non-existence
35A02 Uniqueness problems for PDEs: global uniqueness, local uniqueness, non-uniqueness
35B40 Asymptotic behavior of solutions to PDEs
35B45 A priori estimates in context of PDEs

Keywords:
Boltzmann equation; global existence and uniqueness of mild solutions

Full Text: DOI arXiv

References:


This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.