



UNIVERSITÀ
DEGLI STUDI
DI BRESCIA



DIPARTIMENTO DI INGEGNERIA CIVILE
ARCHITETTURA, TERRITORIO, AMBIENTE
E DI MATEMATICA

Large time behavior of global solutions to one-dimensional Navier-Stokes-Poisson equations with large initial data

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Martedì 12 dicembre 2023 alle ore 11:00
Aula Seminari della Sezione di Matematica del DICATAM

Abstract: We are concerned with the global well-posedness to one-dimensional compressible Navier-Stokes-Poisson equations with large initial data. Our consideration contains two folds: 1. For the isentropic case, we show that the rarefaction waves are time-asymptotically nonlinear stable; 2. For the non-isentropic case, the large time behavior of global solutions is obtained with constant transport coefficients. Our analysis is based on the nonlinear energy method by taking into account the effect of the self-consistent electric field on the viscous compressible fluid, and the crucial step is to derive the desired positive upper and lower bounds of the density and temperature which are uniform in time and space.



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