

Stationary Solutions for Euler-Poisson Equations

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In this talk, we will present some recent work with Yinbin Deng and Tai-Ping Liu on the Euler-Poisson equations governing the evolution of the gaseous stars. By assume that the density function has compact support, we givesome existence and non-existence theorems to the stationary solutions and describe the behavior of the solutions near the vacuum interface, i.e., the surface seperating the gas and vacuum. The boundary behavior thus obtained agrees with the physical boundary condition proposed and studied in [?] for local existence of solutions to both Euler equations with damping and the Euler-Poisson equations for gaseous stars. Some interesting existence, non-existence, uniqueness and unstability of the stationary solutions with vacuum are discussed under the different assumptions on the adiabatic exponent γ and the entropy $S(x)$.