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*Subsonic / supersonic / transonic steady-states for Euler-Poisson equations with sonic boundary*

In this talk, we present a series of our recent studies on Euler-Poisson equations with sonic boundary for semiconductor models. Our research recognizes that the location of doping profile is the crucial mechanism for the system possessing physical solutions or not, and the size of relaxation time plays the important role for the existence of shock/smooth transonic steady-states. We will show the criteria for the existence/non-existence of all physical solutions, as well as their regularities.