We investigate the nonlinear stability of wave patterns for bipolar Vlasov-Poisson-Boltzmann (VPB) system. To this end, we first set up a new micro-macro decomposition around the local Maxwellian related to the bipolar VPB system and give a unified framework to study the nonlinear stability of the basic wave patterns to the system. Then, as the applications of this new decomposition, the time-asymptotic stability of the viscous shock waves, rarefaction wave, viscous contact wave and its superposition with rarefaction waves, are proved for the 1D bipolar Vlasov-Poisson-Boltzmann system. Note that there is no zero macroscopic mass conditions on the initial perturbations for the stability of superposition of two viscous shock waves in the first and third characteristic fields by introducing suitable shifts and some diffusion waves. All these results imply that the basic wave patterns are still nonlinearly stable for the Boltzmann equation coupled with additional electric forces in the transportation of charged particles under the binary collisions, mutual interactions, and the effect of the electrostatic potential forces.

[Light refreshments will be served outside the venue at 4:00-4:30 pm. Please come and join us.]

~ALL ARE WELCOME~