

## Small Knudsen rate of convergence to rarefaction wave for the Landau equation

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**Abstract:** I will talk about the hydrodynamic limit to rarefaction waves of the compressible Euler system for the Landau equation with Coulomb potentials as the Knudsen number  $\epsilon > 0$  is vanishing. Precisely, whenever  $\epsilon > 0$  is small, for the Cauchy problem on the Landau equation with suitable initial data involving a scaling parameter  $a \in [\frac{2}{3}, 1]$ , we construct the unique global-in-time uniform-in- $\epsilon$  solution around a local Maxwellian whose fluid quantities are the rarefaction wave of the corresponding Euler system. In the meantime, we establish the convergence of solutions to the Riemann rarefaction wave uniformly away from  $t = 0$  at a rate  $\epsilon^{\frac{3}{5} - \frac{2}{5}a} |\ln \epsilon|$  as  $\epsilon \rightarrow 0$ . The proof is based on the refined energy approach under the scaling transformation  $(t, x) \rightarrow (\epsilon^{-a}t, \epsilon^{-a}x)$ .