

viscosity of a UFG is negligible, its shear viscosity is $\eta \ll \mu$ suggesting that dissipation could be a viable regularization mechanism for the singular hydrodynamics.

In contrast, a dispersive regularization of the hydrodynamic equations, proposed in [23], uses an extended Thomas-Fermi functional approach. The first-order correction to the hydrodynamic system is the addition of a von Weizsacker type [24], dispersive correction term to the right-hand side of (2) of the form $\frac{\hbar^2}{4m} \nabla^2 \rho \cdot (\log \rho)$, where α is a dimensionless parameter with accepted value 0.25 [13]. Note that studies in the weakly interacting regime have led to alternative dispersive models [5].

couples to the shock speed by invoking the jump conditions to (A23) gives the approximate initial data, give the ordinary differential equation

$$s(t) = \frac{u}{S} \Big|_{z=s(t)} \quad (A23) \quad s(1/5 + \epsilon) = \frac{5^{17/7}}{35^{5/7} S}, \quad 0 < \epsilon < 1, \quad (A24)$$

The initial condition must be prescribed just after the interaction time so that a shock is created, say $t_0 + \epsilon$, where $0 < \epsilon < 1$. Then, inserting the Taylor series expansion, $s(1/5) = 0$, $s(1/5 + \epsilon) = \dot{s}(1/5 + \epsilon) \epsilon$, into (A22) and (A23), which we use as the initial condition to numerically solve the system (A22) and (A23). For the simulations presented, we took $\epsilon = 5 \times 10^{-5}$ and found it to be sufficiently small to accurately resolve the shock dynamics.

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