viscosity of a UFG is negligible, its shear viscosity is not [22], 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 Þrst-order correction to the hydrodynamic system is the addition of a von WeizsackerÐ type [24], dispersive correction term to the right-hand side of (2) of the form $\frac{\hbar^2}{4m} \cdot ( \quad \log \quad )$, where is a dimensionless parameter with accepted value 0.25 [13]. Note that studies in the weakly interacting regime have led to alternative dispersive models [15]

couples to the shock speed by invoking the jump conditions to give the ordinary differential equation

$$s(t) = \frac{u}{-\quad m}\bigg|_{z=s(t)}. \qquad \text{(A23)}$$

The initial condition must be prescribed just after the interaction time so that a shock is created, say $t = t_i +$ , where $0 <$ $1$. Then, inserting the Taylor series expansion, $s(1/5) = 0$ $s(1/5 + \ ) - s(1/5 + \ )$, into (A22) and (A23) gives the approximate initial data,

$$s(1/5 + \ ) \quad {}^{17/7}\frac{5^{17/7}}{35^{5/7} - 1}, \quad 0 < \quad 1, \qquad \text{(A24)}$$

which we use as the initial condition to numerically solve the system (A22) and (A23). For the simulations presented, we took $= 5 \times 10^{-5}$ and found it to be sufficiently small to accurately resolve the shock dynamics.


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