

Abstract Submitted  
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**Existence of solutions to the Guderley implosion problem in arbitrary media** ZACHARY BOYD, SCOTT RAMSEY, ROY BATY, Los Alamos National Laboratory — It is known classically that in an ideal gas, there exist self-similar, spherical, converging shock solutions, but much less is understood about the existence of such solutions in compressible flow of real materials. On the other hand, it has recently been pointed out that there exist self-similar solutions for the Euler equations regardless of the equation of state closure model, which suggests the possibility that the Guderley problem might be solvable in general. In this work, we rigorously determine what properties are required of an equation of state in order for an exact, self-similar Guderley flow to be realized, including a generic solution procedure in the cases where existence holds. Among other contexts, this result is of great practical interest for the verification of codes intended to treat shock propagation in a wide variety of real materials.

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