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**Shock waves in dense hard disk media: molecular dynamic and continuum descriptions**[1] NICK SIRMAS, MARIAN TUDORACHE, MATEI I. RADULESCU, University of Ottawa — Mediums composed of a system of colliding hard disks (2D) or hard spheres (3D) serve as good approximations to the molecular structure of gases, liquids and granular media. In the present study, the propagation of piston driven shock waves in a two-dimensional hard-disk medium is studied at both the continuum and discrete particle level descriptions. For the continuum description, closed form analytical expressions for the shock Hugoniot and shock jump conditions were obtained using the approximate Helfand equation of state. The predictions were found in excellent agreement with calculations using the Event Driven Molecular Dynamic method involving 30,000 particles over the entire range of compressibility spanning the dilute ideal gas, liquid and solid phases. In all cases, the energy imparted by the piston motion to the thermalized medium behind the propagating shock is found to be quasi-independent of the medium packing fraction, with a correction vanishing with increasing shock Mach numbers.

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