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The Structure of Weak Shock Waves in Water ROY BATY, Los Alamos National Laboratory, DON TUCKER, University of Utah, CARL HAGELBERG, Los Alamos National Laboratory — This talk presents solutions of the Navier-Stokes equations that model weak shock waves in water. One-dimensional jump functions are computed to describe the viscous microstructure of hydrodynamic shocks, which are approximately isentropic. The Tate and Grueneisen equations of state are applied separately with the conservation laws to derive the flow microstructure for shock compressions and pressures up to 1.3 and 20.0 kbars, respectively. The Navier-Stokes equations are integrated along characteristic lines to compute the shock wave thickness. On characteristic lines, the shock wave jump functions reduce to integral equations. The Tate and Grueneisen equations of state yield similar, strictly monotonically increasing, shock wave microstructures. Moreover, the non-dimensional shock wave thicknesses predicted by these equations of state as a function of compression are very similar.

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