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A Numerical Investigation of Richtmyer-Meshkov Induced Vorticity in the Multi-Phase Interstellar Medium GANDHARI WATTAL, SEBASTIAN HEINZ, RICCARDO BONAZZA, JASON OAKLEY, UW-Madison, WISCONSIN SHOCK TUBE LABORATORY COLLABORATION — The interstellar medium (ISM) is inherently a multi-phase fluid, with density contrast of many orders of magnitude. Interstellar turbulence is one of the critical, poorly understood phenomena that regulate processes ranging from star formation to the formation of galactic structure. Baroclinic vorticity generated by the propagation of shocks through the multi-phase ISM is one of the potential drivers of turbulence and an important process in the distribution of momentum and energy into the ISM. We present hydrodynamic and magneto-hydrodynamic models of shock-bubble interactions that investigate the efficiency of vorticity generation in the ISM. The simulations are designed to complement laboratory experiments performed at the Wisconsin Shock Tube, with the goal to (a) calibrate the numerical method, and (b) to extend the investigation to regimes relevant for astrophysics but so far not reproducible in the lab (large magnetization, high Mach numbers).

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