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Validation of SPHC and CRASH codes in modeling of linear and non-linear Richtmyer-Meshkov instabilities MILOS STANIC, JASON CASSIBRY, University of Alabama in Huntsville, ROBERT STELLINGWERF, Stellingwerf Consulting, CHUAN-CHIH CHOU, BRUCE FRYXELL, University of Michigan, SNEZHANA ABARZHI, University of Chicago — Richtmyer-Meshkov instability (RMI) plays an important role in variety of phenomena in nature and technology and is of special interest in the fields inertial confinement and magneto-inertial fusion. The instability develops when a shock refracts an interface between two fluids with different values of the acoustic impedance, and RMI dynamics is defined primarily by the flow Mach number and the Atwood number for the two fluids. This work was done under the Plasma Liner Experiment (PLX) program, with intentions of verifying whether SPHC and CRASH codes are capable of successful modeling of different modes of RMI that are expected to be seen during the plasma liner implosion. We used SPHC and CRASH codes to mutually evaluate the codes and compared results against the analytical RMI theory. The numerical and theoretical results are in good qualitative and quantitative agreement with one another. Results indicate that at large scales the nonlinear dynamics of RMI is a multi-scale process; at small scale the flow field is heterogeneous and is characterized by appearance of local microscopic structures; the coupling between the scales has a complicated character.

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