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Design study for diverging supernova explosion experiment on NIF[1] MARKUS FLAIG, TOMASZ PLEWA, Florida State University, MICHAEL GROSSKOPF, PAUL KEITER, PAUL DRAKE, CAROLYN KURANZ, University of Michigan, HYE-SOOK PARK, BRUCE REMINGTON, Lawrence Livermore National Laboratory — We report on preliminary design simulations for the DivSNRT experiment, which is a spherically-diverging Rayleigh-Taylor experiment scaled to the core-collapse supernova conditions to be carried out at the National Ignition Facility (NIF). The simulations are done in cylindrical geometry, using the block-AMR multi-group radiative diffusion hydrodynamics code CRASH. We assess the sensitivity of the Rayleigh-Taylor instability growth on numerical discretization effects, variations in the laser drive energy and the manufacturing noise at the material interface. We find that for perturbations with well resolved wavelength, the CRASH code is able to account for the effects of the target manufacturing noise as long as its amplitude is larger than a single grid cell. We also explore different designs of the target mount in order to minimize its influence on the Rayleigh-Taylor instability evolution. These results will serve as the basis for more detailed, multi-interface target design optimization studies in the future.

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