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On Hydrodynamic Instabilities in Cylindrical Geometry ERIK PROANO, BERTRAND ROLLIN, Embry-Riddle Aero. Univ. — Recent research has suggested that hydrodynamic instabilities induced mixing is one of the last major hurdles toward achieving optimum conditions for ignition in confined fusion approaches for energy production. We leave aside the complexities of multiple interacting physics that lead to a fusion target ignition to be able to focus on understanding the development of these hydrodynamic instabilities, namely Richtmyer-Meshkov and Rayleigh-Taylor, in the context of a converging geometry. The problem is reformulated into the cleaner case of a cylindrical shock wave imploding onto a pocket of Sulfur Hexafluoride immersed in air. This numerical experiment aims at characterizing qualitatively and quantitatively the relation between the instabilities initial conditions and their development until late time. Starting from carefully designed single- and multimode disturbances at the initial density interface, our simulations track the evolution of the mixing layer through successive occurrences of the Richtmyer-Meshkov and Rayleigh-Taylor instabilities. Evolution of the mixing zone width and growth rate are presented for selected initial conditions, along with a quantification of mixing. Also, the effect of the converging shock strength is discussed.

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