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Designing cylindrical implosion experiments on NIF to study deceleration phase of Rayleigh-Taylor N. VAZIRANI, Va. Tech, LANL, J. L. KLINE, E. LOOMIS, J. P. SAUPPE, S. PALANIYAPPAN, K. FLIPPO, LANL, B. SRINIVASAN, Va. Tech, E. MALKA, NCRN, A. BOSE, U. of Mich., D. SHVARTS, NCRN, U. of Mich. — The Rayleigh-Taylor (RT) hydrodynamic instability occurs when a lower density fluid pushes on a higher density fluid. This occurs in inertial confinement fusion (ICF) implosions at each of the capsule interfaces during the initial acceleration and the deceleration as it stagnates. The RT instabilities mix capsule material into the fusion fuel degrading the Deuterium-Tritium reactivity and ultimately play a key role in limiting target performance. While significant effort has focused on understanding RT at the outer capsule surface, little work has gone into understanding the inner surface RT instability growth during the deceleration phase. Direct measurements of the RT instability are difficult to make at high convergence in a spherical implosion. Here we present the design of a cylindrical implosion system for the National Ignition Facility for studying deceleration phase RT. We will discuss the experimental design, the estimated instability growth, and our outstanding concerns.

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