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Investigation of Models of Instability Growth in Convergent Geometry[1] WILLIAM GAMMEL, University of Arizona, JOSHUA SAUPPE, Los Alamos National Laboratory — The Rayleigh- Taylor (RT) instability occurs along the interface between two fluids, when a layer of lighter fluid is pushing upon a denser one, in the presence of a gravitational field or external potential. In convergent geometry, such as spherical or cylindrical configurations, RT growth is modified by Bell-Plesset (BP) effects. We investigate various linear and nonlinear models for RT and BP growth in convergent geometry, including those that allow for compressibility of the fluids. In particular, we focus on the explicit characterization of BP effects in the underdriven or 'accelerationless' limit where the contribution from RT growth is small. The models are applied to recent cylindrical implosion experiments that directly measure hydrodynamic instability growth in convergent geometries. Extensions of the models are considered, and we apply bifurcation analysis in this setting to study the evolution of our system under parameter variation.

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