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Effect of Magnetic Fields on the Nonlinear Rayleigh-Taylor Instability[1] XIN BIAN, RICCARDO BETTI, HUSSEIN ALUIE, University of Rochester — The magneto-Rayleigh-Taylor instability (mRTI) plays an important role in inertial fusion schemes, including ICF and magLIF. It is also hypothesized that mRTI is pervasive in the interstellar medium, where it tends to concentrate the plasma into discrete clouds. We investigate numerically the effects of external magnetic fields on RTI during its nonlinear stages in 2D and 3D. We consider magnetic fields oriented in both parallel and perpendicular directions relative to the initial interface. Both magnetic orientations tend to suppress bubble development in 2D but can enhance it in 3D, where we find a non-monotonic dependence on field strength. For example, we observe that a perpendicular magnetic field stronger than a threshold enhances the RTI growth by enhancing the anisotropy of mixing and suppressing horizontal motions, especially at the smallest scales. Moreover, magnetic fields in either direction tend to accentuate the asymmetry between bubbles and spikes

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