Magneto-Rayleigh-Taylor, Sausage And Kink Mode In Cylindrical Liners¹ Y.Y. LAU, PENG ZHANG, MATTHEW WEIS, RONALD GILGENBACH, Univ of Michigan - Ann Arbor, MARK HESS, KYLE PETERSON, Sandia National Laboratories — This paper analyzes the coupling of magneto-Rayleigh-Taylor (MRT), sausage (azimuthal mode number m=0) and kink mode (m=1) in an imploding cylindrical liner, using ideal MHD. A uniform axial magnetic field of arbitrary value is included in each region: liner, its interior, and its exterior. The dispersion relation, the feedthrough factor, and the temporal evolution of perturbations were solved exactly, for arbitrary values of g (= gravity), k (= axial wavenumber), m, aspect ratio, and equilibrium quantities in each region. For small k, a positive g (inward radial acceleration in the lab frame) tends to stabilize the sausage mode, but destabilize the kink mode. For large k, a positive g destabilizes both the kink and sausage mode. This analysis might shed lights into some puzzling features in Harris’ classic paper [1], and in the recent cylindrical liner experiments [2] on MRT.

¹M. R. Weis was supported by the Sandia National Laboratories