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Evolution of nonlinear ion-acoustic pulses in cylindrical plasma T. E. SHERIDAN, Ohio Northern University — We simulate the propagation and evolution of large-amplitude, compressive, ion acoustic pulses in plasma for a cylindrical geometry. The code is a hybrid simulation with particle-in-cell ions and Boltzmann electrons. We initialize the simulation with an inward propagating (i.e., moving toward smaller radii r), planar Korteweg-deVries (KdV) soliton, and follow its evolution in time. We find supersonic pulses where the pulse amplitude is directly proportional to the speed increment above the ion acoustic speed in agreement with KdV theory. Due to the cylindrical geometry, the pulse amplitude increases proportionally to $r^{-1/2}$. However the pulse profile is not stationary and the pulse develops a significant tail for smaller r.

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