

Sheared Flow Generation in Imploding Vlasov-Fluid Plasmas

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Abstract

Sheared flow generation is investigated in one dimensional hybrid simulations (kinetic ions/fluid electrons) of imploding plasmas. Examples in both Cartesian and cylindrical (z pinch, θ pinch, screw pinch) geometries are described. It is shown that sheared flow is generated consistent with off-diagonal terms in the collisionless pressure tensor for all cases. These terms result from large Larmor radius ions interacting with the moving plasma-vacuum boundary. The effects of changing the rate of implosion and initial ion orbits through adjustment of the initial ion inertial length δ_{si} were investigated. It was found that the amount of flow generated is maximum when the rate of implosion was maximum and for a specific range of δ_{si} in each case.