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Simulations of collisionless counter-propagating plasma flows in support of two-wire implosion experiments[1] JAMES CAPLINGER, VLADIMIR SOTNIKOV, ANDREW HAMILTON, Air Force Research Laboratory, WPAFB, OH, PLASMA PHYSICS SENSORS LABORATORY TEAM — One of the simplest configurations leading to colliding plasma flows is created by driving strong currents through a pair of parallel wires. The azimuthal magnetic fields generated around each wire, and the Ohmic current dissipation and heating occurring upon wire evaporation, launches powerful radial outflows of magnetized plasmas. Upon colliding they form a flow pattern suggestive of magnetic field reconnection, and the development of various plasma instabilities. In the current effort, we analyzed collision of two high-temperature precursor light ion plasma flows via PIC (Particle-In-Cell) simulations using LSP. The aim is to demonstrate the appearance of an electric field parallel to the direction of a plasma flow. This field appears in colliding plasma flows due to the charge separation and is associated with the Buneman instability. It is responsible for the creation of ExB drift of electrons. Next, an interaction between drifting electrons and unmagnetized ions, moving parallel to them, lead to excitation of a modified Buneman instability in the frequency range close to the Lower-Hybrid frequency. Simulation results will allow us to identify the characteristics of nonlinear density fluctuations that appear in the process of such an interaction.

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