



Abstract:

Using 2.5D Particle-In-Cell (PIC) simulations, we investigate how magnetotail reconnection is affected by a cold, streaming, oxygen plasma population in the inflow region, attributed to ionospheric outflow. As the tailward streaming oxygen reaches the current layer, a motion of the reconnection site is induced. Due to the much longer cyclotron period of the oxygen ions, oxygen cannot couple as directly into the reconnection dynamics as protons. We find that the oxygen ions couples indirectly by means of impacting the electron dynamics. Therefore, a demagnetized species can, in fact, alter the dynamics of the reconnection site. We see further that the reconnection rate remains unchanged relative to a non-streaming run. Our results may prove useful for understanding the development and dynamics of magnetospheric substorms and storms.