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Ion Flows Associated with Two Flux Ropes in a Background Plasma[1] TIMOTHY DEHAAS, WALTER GEKELMAN, BART VAN COMPERNOLLE, UCLA — Magnetic flux ropes are ubiquitous as they are located on and near the sun, presumably other stars, and near the earth and other planets. They consist of helical field lines which vary in pitch due to the electric current flowing along a background magnetic field. Multiple braided flux ropes have been observed in the solar corona, and their unraveling is theorized to be the signature of magnetic reconnection. Two flux ropes (L=10 m, A=7 cm^2, J=10 amp/cm^2) were created in the Large Plasma Device (LAPD) at UCLA (Bo=330 G, $n_o = 10^{12}$ cm^{-3}, T^e =4eV, Ar). These kink unstable ropes violently twist and oscillate about a central axis. A quasi-separatrix layer (QSL) forms as the ropes collide and the magnetic field lines reconnect. Through the use of a six-faced Mach probe, volumetric data was taken to determine the three-dimensional plasma flow. Volumetric magnetic fields were obtained through use of a three-axis magnetic probe. The three-dimensional data is conditionally averaged to construct the average flux rope dynamic. In this experiment, the ropes are shown to twist, interact, then merge; while the plasma flows are shown to spiral around the two flux ropes in a singular O-point. As they collide and a QSL is formed and an induced electric field is generated, slowing parallel ion flows.

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