Abstract Submitted
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**Measurement of Ohms Law and Transport with Two Interacting Flux Ropes.**[1] WALTER GEKELMAN, TIM DEHAAS, STEVE VINCENA, University fo California, Los Angeles, BILL DAUGHTON, Los Alamos Scientific Labratory — Two flux ropes, which are kink unstable, and repeatedly collide, were generated in a laboratory magnetoplasma. All the electric field terms in Ohms law: $-\nabla\phi - \frac{\partial \vec{A}}{\partial t}, \frac{1}{ne}\vec{J}\times\vec{B}, \text{-}\frac{1}{ne}\nabla P, \vec{u}\times\vec{B}$ were measured at 48,000 spatial locations and thousands of time steps. All quantities oscillate at the flux rope collision frequency. The resistivity was derived from these quantities and could locally be 30 times the classical value. The resistivity, which was evaluated by integrating the electric field and current along 3D magnetic field is not largest at the quasi-seperatrix layer (QSL) where reconnection occurs. The relative size and spatial distribution of the Ohms law terms will be presented. The reconnection rate, $\Xi = \int \vec{E}\cdot d\vec{l}$was largest near the QSL and could be positive or negative. Regions of negative resistivity exists (the volume integrated resistivity is positive) indicating dynamo action or the possibility of a non-local Ohms law. Volumetric temperature and density measurements are used to estimate electron heat transport and particle diffusion across the magnetic field.

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