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Orientation, motion, and other properties of FTEs

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We present a new single-spacecraft technique for determining the orientation, motion, and intrinsic electric field of two-dimensional structures in s space plasma. The method is based on Faraday's law, applied to two-dimensional time-independent configurations. We illustrate the capabilities of the new method by applying it to Cluster observations of a few Flux Transfer Events (FTEs) and by comparing the results to those from several other methods. We also present results from optimal Grad-Shafranov reconstructions of the FTEs and discuss their properties, with special emphasis on certain supersonic flow effects, seen by one of the Cluster spacecraft, located near, but earthward of one of the FTEs. Comparison with MHD analysis indicates that these observations can be reasonably well accounted for.