

## **The magnetic topology and currents in Force-Free and Non-Force-Free Flux transfer events: Similarities and Contrasts**

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Flux transfer events (FTE) are formed as a result of magnetic reconnection. Utilizing the four MMS spacecraft, which forms a near-regular and closely-separated tetrahedron, we have been able to accurately determine the axial direction of the flux transfer events and quantitatively study the current content and force balance inside the flux rope. Through directly comparing the plasma and magnetic forces of the flux rope, we find that some flux ropes are indeed force-free structures, while in the others, there are non-negligible plasma forces, resulting in a non-force-free structure. However, the current strength inside these two kinds of FTEs can be very similar. The magnetic field topology in the cross-sectional plane is inconsistent with either a circular or an elliptical flux rope model.