

Identifying magnetic reconnection events using the FOTE method

*Huishan Fu¹, Jinbin Cao¹, Andris Vaivads², Yuri Khotyaintsev², Mats Andre², Malcolm Dunlop¹

1.Beihang University, 2.Swedish Institute of Space Physics

A magnetic reconnection event detected by Cluster is analyzed using three methods: Single-spacecraft Inference based on Flow-reversal Sequence (SIFS), Multi-spacecraft Inference based on Timing a Structure (MITS), and the First-Order Taylor Expansion (FOTE). Using the SIFS method, we find that the reconnection structure is an X-line; while using the MITS and FOTE methods, we find it is a magnetic island (O-line). We compare the efficiency and accuracy of these three methods, and find that the most efficient and accurate approach to identify a reconnection event is FOTE. In both the guide- and non-guide-field reconnection regimes, the FOTE method is equally applicable. This study for the first time demonstrates the capability of FOTE in identifying magnetic reconnection events; it would be useful to the forth-coming MMS mission.

Keywords: Magnetic reconnection , MMS mission, FOTE , Magnetic null , X-line , O-line

