
Finding parallel electric fields in the Earth's magnetotail using a two-spacecraft Liouville mapping method

Jack White^{*†}, Yuri Khotyaintsev¹, Cecilia Norgren¹, Daniel Graham¹, and Louis Richard¹

¹Swedish Institute of Space Physics – Sweden

Abstract

We investigate the use of a novel two-spacecraft Liouville mapping method using data from the Magnetospheric Multiscale mission to determine local accelerating parallel potentials in the Earth's magnetotail. The method detects the presence of local accelerating parallel potentials by mapping between electron velocity distribution functions from two field-aligned spacecraft upstream and downstream of acceleration regions. We demonstrate the effectiveness of the method by applying it to a known event to verify the occurrence of a double layer in the magnetotail flanks. Using the method, we also find evidence of electron acceleration towards the X-line along reconnection separatrices and electron deceleration and trapping in the outflow, resulting from the need to maintain quasineutrality in the ion diffusion region.

*Speaker

†Corresponding author: jackw@irfu.se