



國立中央大學太空科學與工程研究所  
*Graduate Institute of Space Science and Engineering,  
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## 專題演講

# Analytical Theory of Current Sheet Structure in Magnetic Reconnection

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Time : 109 年 1 月 7 日 星期二 11:00-12:00

Place : 健雄館(科四館) S4-811 教室

摘要/Abstract :

Magnetic reconnection physics has been extensively studied by laboratory plasma merging experiments, observations of space plasmas and particle-in-cell simulations. However, analytical understanding of current sheet structure and particle heating/acceleration is still not available. Here, we present analytical profile solutions of the current, merging magnetic field, charge separation, and electrostatic potential and electric field in the current sheet during quasi-steady phase of anti-parallel driven magnetic reconnection. The current sheet structure is determined if the values of magnetic field and plasma density in the upstream and the electron acceleration factor in the current are known. The theory provides analytical understanding of the electron and ion dynamics and heating/acceleration processes. In particular, the increase of ion temperature as ions flow from upstream to downstream is due to the electrostatic potential drop and is proportional to the square of the upstream merging magnetic field, which is consistent with the laboratory experimental results.

※歡迎聽講※

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