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Turbulence-driven Magnetic Reconnection in quasi-parallel shocked magnetosheath

Quanming Lu[1], Huanyu Wang[1], and Xueyi Wang[2]
[1]School of Earth and Space Sciences, University of Science and Technology of China, Hefei 230026, China
e-mail (speaker):qmlu@ustc.edu.cn
[2]Physics Department, Auburn University, Auburn, Alabama, USA

Satellite observations with high-resolution measurements have demonstrated the existence of intermittent current sheets and occurrence of magnetic reconnection in a quasi-parallel magnetosheath behind the terrestrial bow shock. By performing a three-dimensional (3-D) global hybrid simulation, we investigated the characteristics of the quasi-parallel magnetosheath of the bow shock, which is formed due to the interaction of the solar wind with the earth's magnetosphere. Current sheets with widths of several ion inertial lengths are found to be produced in the magnetosheath after the upstream large amplitude electromagnetic waves penetrate through the shock and are then compressed in the downstream. Magnetic reconnection consequently occurs in these current sheets, where high-speed ion flow jets are identified in the outflow region. Simultaneously, flux ropes with the extension (along the y direction) of about several earth's radii are also observed. Our simulation shed new insight on the mechanism for the occurrence of magnetic reconnection in the quasi-parallel shocked magnetosheath.