木星夜側磁気圏におけるリコネクションのその場観測

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In-situ observations of magnetic reconnection in the Jovian nightsidemagnetosphere

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Magnetic reconnection is commonly seen in various planetary magnetospheres. However, morphologies and roles of reconnection in magnetospheric dynamics are not necessarily the same. In a classical view, the Earth's magnetosphere is driven by the solar wind through reconnection, whilst the Jovian magnetosphere has been believed to be centrifugally-driven because of the planetary fast rotation and its internal plasma source. Due to the poor data, however, detailed study of Jovian reconnection has been difficult before the first orbiting spacecraft GALILEO. In-situ observations by GALILEO, equipped with particle detectors and electric/magnetic field sensors, indeed enabled us to refine the above classical view. We show that the plasma structure of Jovian reconnection is similar to the Earth's case despite the existence of heavy ions, whilst the global distribution of transient reconnection events is yet unique to the fast-rotating magnetosphere. Observations also suggest that the solar wind may significantly participate in prominent reconnection events, which was not anticipated in the classical view.