

## 磁気圏尾部境界領域において発達する渦の成長過程に関する観測的研究

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### Observational study on growth process of vortices that develops at magnetotail boundary region

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The plasma mixing and transportation are recognized as one of important processes in astrophysics as well as in space plasma physics. It is well known that the Kelvin-Helmholtz instability develops by being the velocity shear flows between the flow of the magnetosphere and the flow of the magnetosheath region, and it is believed that the plasma mixing has been initiated in this boundary region. However, how plasma is transported while passing such a mixing process is not yet clarified. We researched the invasion of the vortex motion toward the magnetosphere from both macro and micro viewpoints by using the in situ observation of the GEOTAIL satellite. In order to examine the structure of vortex, we pay attention to the velocity angle hodogram of equatorial vortex motion. From macro viewpoints, whether the vortex was on the magnetosphere side or on the magnetosheath side is judged by using the clue that the density and the pressure of plasma are different in each wave patterns of the velocity angle hodogram. Moreover, the x-components dependency of the structure of the boundary region is statistically searched by analysing multiple magnetopause crossing events with different x-components. From micro viewpoints, we presumed the traveling directions of each vortex by using the change of wave patterns. Finally, we discuss how much plasma can be transported even to the midnight region by the growing vortex