

Now and Future of Kronian Research

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Cassini brings us many interesting phenomena of the Kronian magnetosphere till now. For example Cassini observed the disturbed convection and unstable magnetopause then it became apparent that they were the vortex configuration caused by the Kelvin Helmholtz instability as the MHD simulation of Kronian magnetosphere represented. In addition Cassini performed the simultaneous observation with the Hubble Space Telescope (HST) in the way to the Saturn and in the upstream of Saturn. These observations are very important to understand the interaction of magnetosphere with the solar wind from the aurora activity. For the simulation of magnetosphere the solar wind is important input parameter and the aurora activity is the proxy of calculation results of magnetosphere thus these observations are used to be compared with the simulation results.

In the future we will be able to execute the statistical research of whole Cassini data to see the long period phenomena, effect of solar cycle, etc. After that we should start to consider the after Cassini success. In that time, numerical simulation of Kronian magnetosphere will play more important role than now to execute the high resolution simulation including the non MHD phenomena. On the other hand, the numerical simulation itself will be difficult situation in next 5 years. Now the computer architecture is changing and the configuration of computer memory will become different from now. This indicates that the numerical simulation code will be developed taking into account this situation. If not, the present simulation codes cannot run on the next supercomputer system.