Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01377, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01377
EGU General Assembly 2008

Non-MHD scale physics at the magnetopause. Cluster observations.

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Many important science questions related to the magnetic reconnetction require detailed studies of observations on temporal and spatial scales that are comparable or smaller than characteristic ion scales. Such questions are reconnection onset, reconnection site dynamics, ion and electron energization, anomalous resistivity, Kelvin_Helmoltz instability, etc. Also for such an important large scale question as magnetosphere/ionosphere coupling it appears that non-MHD effects are very important. We summarize recent studies, utilizing Cluster spacecraft observations at the magnetopause, addressing all those problems. Where possible we illustrate the major differences that characterize assymetric reconnection, such as is common at the magnetopause, from the symmetric reconnection, such as is common in the magnetotail. Most of the observations we compare with relevant numeric simulations to help in the understanding of basic underlying physical processes.