



Large-scale Observations of the Magnetopause by Cluster

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The magnetopause and its adjacent boundary layers are a key science target for many satellite missions. They have been sampled, at the same time, either locally by a maximum of 4 to 5 closely spaced spacecraft (from the Cluster constellation and the Double Star TC-1 satellite) or on larger scales by missions such as Geotail, Cluster and THEMIS. Unfortunately, none of the spacecraft configurations has so far permitted the 'evolution' of perturbations along their main direction of propagation to be tracked. The study of the evolution of magnetic field and plasma perturbations, such as Kelvin-Helmholtz (KH) waves or Flux Transfer Events (FTEs), together with the (associated or not) generation of Kinetic Alfvén Waves (KAWs) and the turbulence developing at the flank magnetopause boundary layer, is important for our understanding of the mechanisms that mediate solar wind plasma entry into the magnetosphere, i.e. magnetic reconnection and diffusive processes. The Cluster Guest Investigator (GI) proposal implemented in November 2012 targeted inter-spacecraft separations of ~ 1 RE necessary to relate disturbances and deduce their evolution. It resulted in separations of up to 36,000 km across the constellation at the magnetopause and was the largest separation ever for the Cluster mission. In this invited talk, I will present the first results from the Cluster GI observations of magnetopause boundary layer.