

Possible remote sensing of Kelvin-Helmholtz instability at the magnetospheric boundary from ground-based optical measurement

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On 28 June 2005, the all-sky imager (ASI) at South Pole Station (SPA, MLAT=-74.3 deg, MLT=UT-3.5h) observed a series of the auroral bright spots in the dawn sector during geomagnetically quiet period. For the ASI images, we first found three auroral bright spots appearing along -74 deg MLAT in the 07-08 MLT sector. The auroral spots were longitudinally separated and moved poleward/tailward with enlarging each bright area. As moving tailward, the three auroral spots were merged into two spots, and eventually into a single auroral spot. A series of the auroral bright spots are projected to the dawn flank in the equatorial plane. The spatial and temporal evolution of the auroral bright spots reminds us of the association with Kelvin-Helmholtz (KH) vortices growing at the equatorial magnetospheric boundary. During this event, the Cluster spacecraft was located in the dawn side equatorial magnetotail at $L \sim 18 R_e$, close to the auroral bright spot region mapped to the equatorial plane. In this study, we will discuss a possibility for generation of the auroral bright spots through the KH instability on the basis of a conjunction study of the ASI at SPA with the Cluster spacecraft.