

A multi-satellite formation flight mission for aurora observation

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In 2000s, Fast and Reimei satellite revealed fine-scale plasma particle and wave structures which are considered to be playing a significant role in magnetosphere - ionosphere coupling. They carry plasma instruments with time resolution of tens of ms which is much higher than previous. In particular, Reimei conducted plasma particle measurements together with auroral imagings in which ionospheric footprints were captured. It provides us a hint for fine-scale spatial plasma structures in the auroral region although it is a single-satellite platform. However, it is still difficult to investigate a dynamics of plasma processes by using the simultaneous observations without wave measurements, like Reimei. It would be necessary to make a simultaneous observation of plasma particles and auroral emissions together with waves, which is never made so far. We are planning a multi-satellite formation flight mission for auroral observation. Main purpose of the mission is to reveal (1) time- and spatial-structures of auroral particle acceleration caused by Alfvén waves and field-aligned electric field, (2) energy transfer between plasma waves and ions in supra-thermal energy range, and (3) fine-scale plasma structures which trigger global-scale changes and vice versa. We will discuss possible mission configurations.

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