

## Van Allen Probes 衛星搭載 RBSPICE 粒子検出器による磁気嵐中の高エネルギー水素および酸素イオンの複数点観測

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## Multi-point observations of energetic protons and oxygen ions during magnetic storms by the Van Allen Probes RBSPICE instrument

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We examine short time-scale (shorter than 30 min) enhancements of energetic (greater than 50 keV) ions in the inner magnetosphere ( $L$  less than 6) during magnetic storms. This study focuses on the storm main phase on June 1 and 7, 2014 during which two Van Allen Probes spacecraft dwelled with a small separation ( $dL$  less than 1,  $dMLT$  less than 0.5 h). Analyzing ion data with high energy, angular resolution and mass information provided by the RBSPICE instrument, we study temporal, spectral, and pitch angle evolution of proton and oxygen ions to identify the spatial scale of plasma population injected from the plasma sheet and occurrence/lack of non-adiabatic acceleration in the inner magnetosphere.

RBSPICE detects ions with the energy range of  $\sim 50$  to  $\sim 1000$  keV, with high energy resolution. In the region at the radial distance greater than 3 RE, where RBSPICE has been in nominal operation, the magnetic field strength ranges from  $\sim 100$  to  $\sim 1000$  nT. Thus, the first adiabatic invariant ( $\mu$ ) of ions monitored by RBSPICE is below  $\sim 2$  keV/nT near the inner most point of the nominal operation and reaches  $\sim 20$  keV/nT around the Van Allen Probes apogee.

In this study, we analyze temporal and spatial variations of ion phase space density for different  $\mu$  values, pitch angles/second invariants, and species. We also compare the results with storm events on August 4 and August 27, 2013, when the Van Allen Probes experience larger satellite-to-satellite separation:  $\sim 2$  RE in the radial direction and  $\sim 2$  hours in the MLT direction.