

## カスプの動くオーロラに伴うイオン温度上昇の3次元イメージング

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### Three-dimensional imaging of elevated ion temperatures of a moving auroral form in the cusp

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The ions are frictionally heated as they flow through the slower-moving neutral gas. Since the ion flow is generally fast in the cusp, and its direction changes quickly, ion temperature enhancements are clearly seen in the cusp. Recent studies have suggested that the enhanced ion temperature occurs in the moving mesoscale region as well as in the persistent latitudinal cusp band. In this study we present three-dimensional images of the elevated ion temperatures associated with a moving auroral form in the cusp. Our approach for constructing three-dimensional images is based on coordinated observations of the EISCAT Svalbard Radar (ESR) at Longyearbyen (~75.3 MLAT), and an all-sky imager in the observatory located nearby. Elevation scans with the steerable antenna of the former, i.e., 32 m dish antenna of the ESR can produce two-dimensional (altitude - ground distance from the radar) profiles. By combining these two-dimensional profiles in a way that takes into account a horizontal spatial relationship between the radar's field-of-view and the extent of the moving aurora, we constructed three-dimensional images. This method has revealed that the elevated ion temperature region occurs at F-layer heights along the Earth's magnetic field as if it were a heated tube. We also applied a similar method to ESR electron density data, and obtained three-dimensional images showing an isolated region of enhanced F-layer electron densities. This high-density region and the heated tube overlap. We give a quantitative explanation for the extent to which this overlapping occurs.