
JOURNAL CLUB

A Study of Flickering Auroras Using a High-Speed Photometer

by

Kazuyo Sakanoi

Applied Research and Standards Division, CRL, Japan

ABSTRACT

In order to investigate the generation mechanisms of flickering auroras a high-speed imaging photometer system was operated at Syowa station (-66.2 MLAT) in Antarctica in 1998. About 35 events were identified as flickering auroras using ICCD video data. Out of 35 events we selected 3 typical flickering events and analyzed those events in detail. These provided important evidence on the evolution of flickering auroras. In particular, neighboring flickering spots (or columns) often appear in pairs and their luminosities change synchronously as if bright and dark spots (or columns) interchange. An isolated flickering spot (or column) is also observed. In both cases flickering spots (or columns) remain in almost the same area in the sky during their lifetime and their shapes are smeared every half flickering period. Considering this result, we have proposed the following model. In the auroral acceleration region two electromagnetic ion cyclotron wave packets interact in the field-aligned resonance cone and produce standing waves with field-aligned electric field. This field-aligned electric field modulates precipitating electron fluxes which produce flickering auroras. Model calculation showed that the spatial and temporal structures of these interfering waves exhibit characteristics similar to the observed spatial structure and evolution of flickering spots or columns.

Friday, September 27
Elvey Bldg. Globe Room
3:45 pm