

Observation of aurora polarimetry at OI 630 nm

Hiroyuki Monji^{1*}, Takeshi Sakanoi¹, Masato Kagitani¹, Ryan Swindle²

¹PPARC, Tohoku Univ., ²Institute of Astronomy, University of Hawaii

Auroral polarimetry potentially contributes to bring us new information on electron collision with atmospheric particles and local process in the ionosphere. Recent ground-based measurement data showed that auroral emission at OI 630 nm probably polarized with a degree of 1-4 % [Lilensten et al., 2008]., and the polarization is maximized in the magnetic perpendicular direction [Barthelemy et al., 2011]. However, past experiments were carried out with a photometer mainly in the polar cap region, and examples were limited and there are no observation of circular polarization like all-sky imager.

We carried out observation of aurora polarimetry at OI 630 nm at Poker Flat Research Range in Alaska from 6 to 19 January 2013 with a newly developed all-sky polarization imager and meridian scanning photometer. We developed all-sky imager what measures polarization component (stokes vector) consists of fish-eye lens, the liquid crystal variable retarder difference which controls polarization electrically, polarization beam splitter, and CCD camera by joint development with the Institute for Astronomy, University of Hawaii. The photometer consists of wave plate on rotating stage, polarization beam splitter and measures polarization components.

In this talk, we report our result of this auroral polarimetry measurement, and the design of the observational instrument in detail. We will analyze and compare with geomagnetic data and precipitation particles data observed by the satellite and explore the application of aurora polarization measurement.

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