

High-speed EMCCD imaging of auroral microstructures

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We have been conducting high-speed (~100 Hz) imaging observations of auroral microstructures since January 2010 at Poler Flat Research Range (PFRR), Alaska. In this presentation we report development of a new optical instrument system to be installed at PFRR in October 2010. Using a Hamamatsu EMCCD camera, we are planning to conduct 180 Hz and 250 Hz imaging of the breakup aurora for the first time to search unexpectedly fast auroral phenomena, and to understand the electron acceleration mechanisms associated with dispersive Alfvén waves in possible collaborations with Tohoku University and University of Alaska, Fairbanks. We use a telephoto lens of 300mm/F2.8 to resolve the finest scale of aurora with attaching a BG3 filter to see only the prompt emissions from molecular nitrogen. In the presentation, we show some preliminary results from the observations in October 2010.