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New View of Aurora from Space using the e-POP Fast Auroral Imager

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The Fast Auroral Imager (FAI) on the CASSIOPE Enhanced Outflow Probe (e-POP) consists of two CCD cameras, which measure the atomic oxygen emission at 630 nm and prompt auroral emissions in the 650 to 1100 nm range, respectively, using a fast lens system and high quantum-efficiency CCDs to achieve high sensitivity, and a common 26 degree field-of-view to provide nighttime images of about 650 km diameter from apogee (1500 km). The FAI is capable of operating in four viewing modes: nadir viewing, for imaging over a large latitude range; Earth-target viewing, for pointing at an emission target of fixed altitude, latitude and longitude; limb viewing, for measurement of altitude profiles; and inertial pointing, for imaging of an inertial target such as a star field. The near infrared camera provides one image of 0.1 sec exposure per second, and we restrict our examples to this camera. The four viewing modes make possible the observations of a variety of auroral and airglow phenomena, such as rapidly varying and small-scale structures in the auroral oval. The examples shown here illustrate some obvious features in the auroral phenomena that lead to new perspectives in the context of high-resolution studies of ionospheric processes.

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