High Speed Imaging of Auroral Filaments

One frame of a thin auroral arc in the magnetic zenith from a sequence of 300 frames which cover 1 second of data. The field of view is 6.4 degrees in each direction. The bright thin arc is thus about 400 m wide. Below that is a slice through the image about 1/3 up from the bottom. The blue, green, and red line are from every 8th image, showing the motion of the bright thin arc. The thin arc is moving rapidly toward the right, covering about its width every 8 frames (about 27 msec). The fainter aurora in its wake is not just due to afterglow from metastable states (green line), but shows significant internal motion and brightness variation. More likely, this aurora results from velocity dispersion of the auroral electrons. The high speed imager not only shows this motion clearly, but because of the short exposure time also shows an unusual amount of detail in the aurora itself. (H. C. Stenbaek-Nielsen, Geophysical Institute, University of Alaska).