The luminosity dynamics and precipitated particle flux characteristic during optical tomography experiment in February 1999

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Auroral tomography is an efficient method of investigation of ionosphere structure and ionospheric parameters dynamics. An auroral tomography experiment was carried out in the Kola Peninsula on 10 February 1999, when a diffuse stable arc was obtained. There was used a chain of 3 scanning photometers, registering the luminosity of 320.0 nm, 427.8 nm, 557.7 nm, 630.0 nm emissions. Devices were located almost along the geomagnetic meridian and were separated by distances of 93 km and 133 km along the north-south line. The volume emission rates and profiles of electron concentration were reconstructed by tomography method from measurements of 427.8 nm and 557.7 nm emissions, using a universal mathematical approach based on the theory of stochastic conversion. The distinguishing characteristics of two-dimensional distributions of 427.8 and 557.7 volume emission rate were explored. The particular feature of these distributions is a salient decrease tendency of altitude of volume emission rate maximum inside the auroral form in north-south direction. This consistent pattern is of steady nature and remains persistent during stable auroral structures. The analysis of characteristics of precipitated electron energy spectra, obtained using tomography reconstruction of 427.8 nm volume emission rate, shown that according increase of average electron was 2-4 keV. At the same time, the energy flux was characterized by a maximum in center and a digression to confines of auroral form, which correlated with emission intensity behaviour.