



Observational evidence of the absence of the linear wave polarization in AKR

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The terrestrial auroral kilometric radiation (AKR) is generated near the local gyrofrequency of electrons in the Earth's auroral magnetosphere and believed to be purely circularly polarized radio emission. Although, up-to-date determinations of the wave modes of AKR have been based merely on measurements of the circular component of the wave polarization, leaving the linear polarization parameters unknown. Contrary to the ground based radio astronomical observations the wave plane of AKR is not a priori known, since the space polarimeter cannot be pointed to the AKR source. However, having determined the polarization parameters in each of the three perpendicular planes one is able to locate the polarization ellipse in the 3D space and determine its eccentricity. Data provided by the Polrad-Interball-2 triaxial polarimeter, which was able to measure the wave polarization parameters in the three nearly perpendicular antenna planes are used to determine the Stokes polarization parameters in the wave plane. We have statistically demonstrated that the AKR polarization is mostly circular and the small deviations from circularity can be explained by the errors of measurements. We then conclude that the linear component of the AKR wave polarization is absent.