The observation of active regions with RATAN-600 and the Beijing Astronomical Observatory spectrograph in the decimeter wave band shows an existence of a long-term non-thermal emission of active regions in continual (a halo) and flaring (flares and micro flares) components. The observation-compatible models have been devised specifying the nature of continuum as a radiation originating in the non-linear interaction of plasma waves at the upper-hybrid frequency. These are electrostatic waves arising at the frequency $\omega_{UH} = \sqrt{\omega_P^2 + \omega_B^2}$, where ω_P is the Langmuir frequency, and ω_B is a gyrofrequency. The energy of these waves with respect to the thermal energy of background plasma is not too large (about 10^{-8}). An efficiency of this process is rigidly bound to magnetic field intensity what allows us to determine its estimates with a sufficient precision. Maser effects related to anisotropic distribution of energetic electrons in a magnetic trap and to a positive derivative of distribution of energetic electrons over energy cause the plasma waves generation. A fulfilled numerical simulation allowed us to develop a diagnostic method of physical parameters of plasma in the place of non-thermal emission of active regions. Thus, from observations we created a self-consistent model of a decimeter halo source indicating directly to the existence of the long-term process of generation of non-thermal electrons in the active region according to both characteristics of continual emission and parameters of flare emission

The Figure represents the scans of solar disc at a wavelength of 31.4 cm in the circular polarization channel (left) and in intensity channels (right) carried out by a method of multi-azimuth observations during 2^h10^m. In the polarization channels the limit sensitivity of several thousandths of the solar flux unit was realized what is not achievable for the aperture synthesis antennas. Such observations allow us to study the flaring plasma at a level of micro- and nano-flares.

L.V. Yasnov , V.M., Bogod, Q . Fu, Y.Yan,
A study of nonthermal radio emission features using fine spectral BAO and high sensitivity RATAN observations of the solar active region, Solar Physics, 2003, **215**, 34-356.