V. V. Zaĭtsev, E. Ya. Zlotnik, and V. E. Shaposhnikov. *Cyclotron mechanism of decameter radio emission of Jupiter.* In spite of investigations of the decameter (DCM) radio emission of Jupiter performed over many years, the nature of the different components of the emission is still not completely understood. At the same time, as a result of close passage of space probes, a great deal is now known both about the details of DCM and the physical parameters of the Jupiter atmosphere (magnetic field and the electron density, temperature, and high-energy particle distributions). In particular, direct measurements of the magnetic field confirm the hypothesis from the 1950s that the frequency of DCM corresponds to the electron gyrofrequency in the ionosphere and the lower magnetosphere of Jupiter.

The main preconditions of the theory of DCM bursts are high intensity, limited frequency bands, short time scales, and the sporadic character of the radiation—all this indicates that the emission mechanism must be coherent. Cutoff of the spectrum at 40 MHz (which apparently corresponds to the maximum gyrofrequency and maximum magnetic field at Jupiter's surface) and the absence of traces of higher order harmonics indicate that the radiation is generated by nonrelativistic particles and is most likely linked with the instabilities in the ionospheric and magnetospheric plasma at frequencies close to the local electron gyrofrequency. In this connection, instabilities of plasma and electromagnetic waves, owing to the existence of groups of nonequilibrium electrons in the ionosphere and magnetosphere, are discussed in the literature.

A mechanism for generation of DCM *s*-bursts has been proposed in Refs. 1–3. This narrow-band, sharply directed radiation has a high brightness tempergure, and is polarized with the sign of the extraordinary wave and is often observed in the form of quasiperiodic sequences of millisecond bursts. The dynamic spectra always contain a negative frequency drift, and fine structure in the form of frequency splitting is sometimes recorded. The appearance of *s*-bursts is clearly correlated with the phase of the moon I_0 and the longitude of the central meridian.

The principal points of the scheme for generation of *s*-bursts proposed in Refs. 1–3 are as follows: 1) nonequilibrium electron distribution over the transverse (relative to the magnetic field) velocities; 2) the kinetic instability, caused by these electrons, of plasma waves in the magnetized plasma at a frequency close to the frequency of the upper hybrid resonance; and 3) conversion of plasma waves into extraordinary waves with a refractive index $n_e \ll 1$ on weak fluxes of electrons along the magnetic field. Invoking extraordinary waves with $n_e \ll 1$ makes it possible to explain the fact that the frequency drift is always negative (owing to the effect of group delay) and the fact that the emission is highly direction. The choice of plasma waves is linked with the interpretation of the spontaneous frequency spectrum: the increment with an oscillating frequency dependence, explaining the observed frequency splitting in *s*-bursts (the so-called band-like emissions), is realized only for plasma waves with sufficiently large refractive index and is impossible for electromagnetic waves with $n_{0,e} \lesssim 1$. Induced scattering of plasma waves into electromagnetic waves leads to the appearance of quasiperiodic sequences of *s*-bursts.

[1]V. V. Zaĭtsev, E. Ya. Zlotnik, and V. E. Shaposhinkov, Pis'ma Astron. Zh. **11**, 208 (1985) [Sov. Astron. Lett. **11**, 85 (1985)].
[2]V. V. Zaĭtsev, E. Ya. Zlotnik, and V. E. Shaposhnikov, Astron. Astrophys. **169**, 345 (1986).
[3]V. V. Zaitsev, E. Ya. Zlotnik, and V. E. Shaposhnikov, Proceedings of Contributed Papers of the International Conference on Plasma Physics, Kiev (1987), Vol. 4, p. 298.

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