

Recent data on zebra pattern in the broad frequency range 25-7000 MHz

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The observations of the fine structure of solar radio emission in the active period in October- November 2003 are represented, utilizing spectral data of IZMIRAN in the meter range and NAOC (Beijing) in dm and cm ranges and all available ground-based and satellite data (WIND/WAVE, TRACE, RHESSI). A special attention is turned to the simultaneous appearance on the spectrum of pulsations, zebra structure and fibers. Some new unusual properties of the fine structure are discussed in light of the known models of the formation of stripes in emission and absorption. In particular, the new superfine structure of zebra stripes as millisecond spikes is discussed more in detail. The radio fine structure is a manifestation of radio wave generation mechanisms. Fine structures can be observed as in strong events as in weak ones, and more frequently in weak events. Zebra pattern, fiber bursts, fast pulsations and spikes are observed as in impulsive phase as in decay phase of events, but more frequently - in decay phase. A type of fine structure depends mainly on conditions in the radio source: the particle acceleration (in pulsating regime or continuously); the magnetic structure: magnetic trap, open force lines or in a relation with shock front and CME. Within the frameworks of common model with whistlers it is possible to explain many fine details of the dynamics of stripes in emission and absorption which is defined by the fast particle distribution function, quasi-linear effects (the scattering of fast particles on whistlers) and new fast particle injections. We try also to explain simultaneous radiation of 30-40 stripes (with a narrow frequency separation) within the frameworks of the new model of zebra pattern of LaBelle et al., 2003.