



## **Microwave Precursors of Halo Type Coronal Mass Ejections**

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The spectral- temporary special features of radio-events in the centimeter and decimeter ranges of the radio waves are examined. The events precede the CMEs registration of the type Halo in the two-hour interval and are called precursors of CMEs. For this study data of the worldwide network of solar observatories in the radio-frequency band are used (on the ascending and descending phases of the 23rd solar cycle: 1998 and 2003 years).

Information about the phenomena and the characteristics of CMEs were undertaken from Internet [http://sdaw.jsfc.nasa.gov/cME\\_list](http://sdaw.jsfc.nasa.gov/cME_list). Examined set of the Halo type CMEs consists of "isolated" CMEs events, i.e., when the preceding CMEs event is recorded not less than for 8 hours, and following not less than 6 hours, prior to the event in question. Basic observed CMEs parameters are used for studying: angular width (W), the initial velocity of propagation (V), and also the phenomenological type of phenomenon. Such characteristics of the sporadic component of radio emission, as intensity (I) and the duration of sporadic component (T) at different frequencies cm and dm of the wavelength range are analyzed taking into account observed type of bursts.

Every CMEs event of the type Halo from 10 analyzed (4 events in 1998 and 6 events in 2003) has high speed. All CMEs events can be divided into 2 groups. The 1st one contains events preceded by wide-band precursors in 25-30 minutes prior to CMEs registration with different temporary behavior in cm and dm ranges. The precursors of

all events of this group possess high or average intensity, and the duration of sporadic component exceeds 26 minutes. The 2nd group of CMEs events of the type Halo precedes by narrow-band precursors with the weak intensity. The comparison of the conditions for appearance and course of CMEs events of the type Halo for these 2 groups is carried out.

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