

# CMEs and the structure of low corona above associated active regions according to observations at microwaves

N.N. Kardapolova<sup>1</sup>, S.V. Lesovoi<sup>1</sup>, T.P. Borisevich<sup>2</sup>, N.G. Peterova<sup>3</sup>  
and B.I. Ryabov<sup>4</sup>

<sup>1</sup>Institute of Solar-Terrestrial Physics, Irkutsk, Russia

<sup>2</sup> Central astronomical observatory at Pulkovo of RAS, St.-Petersburg, Russia

<sup>3</sup>St.-Petersburg branch of the Special Astrophysical Observatory, St.-Petersburg, Russia

<sup>4</sup>Ventspils International Radioastronomical Centre, Riga, Latvia

**Abstract.** The phenomena ( $\sim 15$  cases) observed with Siberian Solar Radio Telescope (SSRT) in 2003-2004 years are under investigations. These phenomena are identified with CMEs by LASCO and with the associated active regions (ARs). The structure of low corona above these ARs is studied using the observations with RATAN-600. The aim of this cooperative investigation is to follow this phenomenon at the earliest stage when it is developing in low corona.

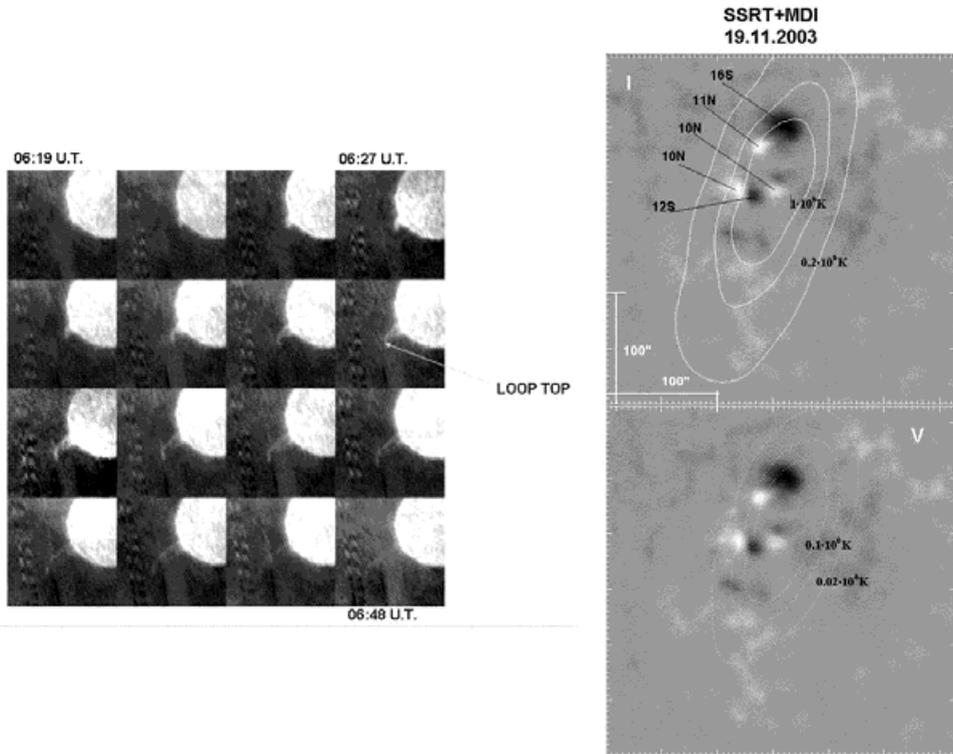
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## 1. CME observations

As an illustration the processing results of the two phenomena (08–09.11.2003) associated with the active region NOAA 0501 are given. At this period the AR was separated behind solar limb by a distance of  $\sim 25$  degrees (09.11). The ejection observed at 09.11 in  $\sim 6.5$  UT was the most intensive phenomenon. According to the SSRT-observations (See figure 1 at the left.) the source of radio emission had the form of a loop moved away to great distance ( $> R_o$ ) from solar limb. For the loop top, as the brightest detail, the estimations of the brightness temperature  $T_b$  and of the moving velocity were obtained.  $T_b$  reaches its maximum ( $\sim 8$  KK) within 8 min. after the initial moment of phenomenon. The subsequent  $T_b$  decreasing is accounted for by the increasing of the source sizes. The average moving velocity from solar disc came to 450 km/sec.

## 2. Structure of NOAA 0501 microwave source

The investigation of the corona structure above NOAA 0501 was performed after the AR rise from over the solar limb. This AR represented a remnant of the big in the first rotation sunspot group NOAA 0484. The rather complicated structure of the magnetic field at the photosphere level was preserved in the second rotation also. According to the RATAN-600 and SSRT-observations the region of radio emission looked like an unipolar source with the sizes  $\sim 50$  arc. sec (See figure 1 at the right.). The polarization sign throughout the wavelength range of (1.8 – 5.2) cm was consistent with a predominance of the extra emission mode and did not change with the changing of the AR heliographic coordinates. The 3D-structure of corona above the AR was most likely defined as an asymmetric loop one leg of which was fixed in two nearby sunspots S-polarity of magnetic field.



**Figure 1.** At the left: The evolution of the NOAA 0501 associated CME as observed 09.11.2003 with the radio heliograph BADARI (SSRT). At the right: The SSRT-maps of the radio emission source situated above the active region NOAA 0501 superimposed on the MDI-gramma. The sign and the maximum magnetic field at the photosphere level as well as the brightness temperature at the wavelength 5.2 cm are given.

### 3. Conclusion

Active region NOAA 0501 was in a stage of dissipation. So far the problem of AR magnetic field disintegration has an unambiguous solution. The investigation of CMEs can be useful in this efforts if the matter is ejected together with some magnetic field. The example of NOAA 0501 shows that such investigations calls for the high sensitivity, space and time resolution of observations. SSRT is one of instruments which can led such investigations.

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