FLARES OF RADIO LINE EMISSION H_2O IN ORI A AND W49N

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ABSTRACT. The results of observations of H_2O maser sources Ori A and W49N at 1.35cm made the RATAN-600 radio telescope from June 1981 till December 1988 are presented. The light curves of these sources showed several outbursts. Duration of the strongest outbursts for the Ori A and W49N are approximately 1 and 1.5yr respectively. The maximum of the total luminosity (assuming isotropic emission) of these sources for the velocity range $\pm 8 km.s^{-1}$ is egual to $1\times10^{47} ph.s^{-1}$ and $2\times10^{49} ph.s^{-1}$ respectively. The time behaviour of the water maser source in W49N during more than 7yr is monitored for the first time.

1. INTRODUCTION

The flares of maser radio line emission H_2O in Ori A and W49N were discussed in few papers [1-6]. Here we shall discuss the results of our observations carried out from June 1981 till December 1988 in detail.

2. THE RESULTS OF OBSERVATIONS

In Fig.1a the time variations of the peak flux density and line width on half power level are shown for the feature in the Ori A having radial velocity $7.5 km.s^{-1}$. In Fig.1b the integral intensity variations for the velocity interval from -0.7 till $+15\ km.s^{-1}$ are shown. From these Figures one can conclude that:

1. The line flux density variability and its width are not correlate.
2. The integral intensity of Ori A and the peak flux density are changed practically in the same way. However, the integral intensity in the period from June 1985 till April 1986 is approximatly constant, while the peak flux density

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at that time is decreasing. This difference is due to by the appearing of strong component in the source spectrum with the radial velocity 6.9km.s^{-1}. The dependence of the flux density from line width for the feature 7.5km.s^{-1} is shown in Fig.1c. This dependence does not correspond neither the saturated maser amplification nor the unsaturated case. It should be noted also, that during the period of our observations the drift of the radial velocity 7.5km.s^{-1} was ±0.3km.s^{-1}.

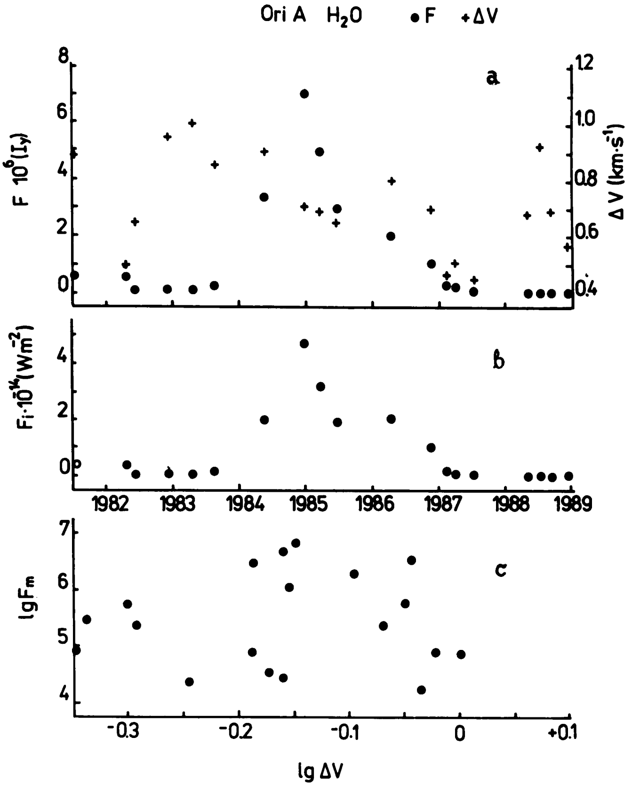

Figure 1. a) The time variation of the peak flux density (the left ordinate) and line width (the right ordinate) of the feature with radial velocity 7.5km.s^{-1}.

b) The integral intensity variation for the velocity interval −0.7 ÷ + 15km.s^{-1}.

c) The dependence of the flux density from line width for feature on 7.5km.s^{-1}.

The results of observation of W49N are presented in the

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fig.2a,b. Fig.2a is demonstrated the time variations of the peak flux density and line width of the feature on 10.3km.s^{-1} The drift of the radial velocity during our observations was ±0.6km.s^{-1}. The variability of the source integral intensity for the velocity interval from 3 till 23km.s^{-1} is shown in the Fig.2b.

The following characteristic properties we can pick out from observed dependences:

1. The light curve for the radial velocity 10.3km.s^{-1} consists of main maximum (March 1985) around which weaker maximums are observed.

2. The increasing and decreasing time of main maximum are approximately 2yr. If the flare duration is considered to be the time during which the intensity of radiation decreases twice, then it is egual to approximately 1.5yr. The light curve of the integral radiation has almost the same shape. However, it is reached its maximum in the end of June 1985.

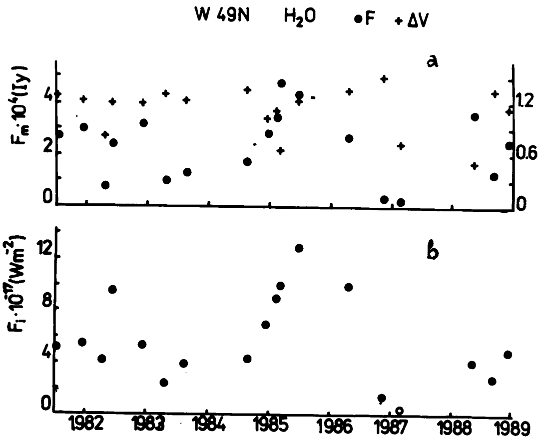

Figure 2. a) Same as in fig. 1a for the W49N on the radial velocity 10.3km.s^{-1}.
b) Same as in fig. 1b for the W49N for the velocity interval +3 ÷ +23km.s^{-1}.

3.CONCLUSIONS

VLBI observations of Ori A [3] and W49N [7] in the H_2O line show that in these objects there are a numberof maser sources clusters which are not resolved by a single radio telescope. Hence the results of our observations undergo of blending effects of the features. But the blending effect can introduce uncertainty when the properties of the concrete feature of the spectrum are discussing. Therfore study of the time variations of the source integral characteristic has certain importance, since it gives the notion about the source as a whole and about the contribution of components to the integral radiation.

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