

EXTREMELY SLOW NOVA V 1548 AQL

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ABSTRACT. The results of VRI CCD photometrical observations of extremely slow nova V1548 Aql (Nova Aql 2001) in Crimean Astrophysical Observatory during 2001 - 2003 years are presented.

During the outburst decline in 2001 there were quasi-periodic brightness variations with period about 57 days (or 28 days). There were also color changes during decline. Brightness variations of V 1548 Aql during long periods, behaviour in color diagrams are presented.

The behaviour of slow Nova Aquilae 2001=V 1548 Aql is like the behaviour of some slow novae, i.e. V 723 Cas, HR Del, DO Aql.

Key words: Stars: binary: cataclysmic; stars: individual: V 1548 Aql.

1. Introduction

Nova Aquilae 2001 (V 1548 Aql) was discovered by Mike Collins on May, 11 2001 as a variable star TAV J1907+117 (VSNET-Alert, 2001a). Before it was a star with $R = 18^m$. However, photographic observations show that it was $12^m.1$ at April, 25. This star had a long pre-maximum halt (Kato, et.al 2001). In its maximum, V 1548 Aql was $10^m.9$ (ph).

We observed V 1548 Aql during 2001 - 2003 years. Observations took place in Crimean Astrophysical Observatory and in the Southern Laboratory of the Sternberg Institute, using telescopes K-380 and Zeiss - 600

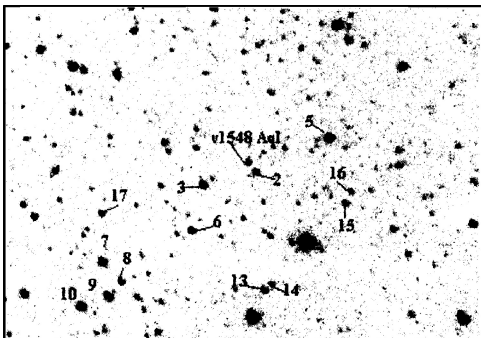


Figure 1: The finding chart of V 1548 Aql.

in V, R, I spectral bands (close to the Johnson and Morgan system). As a detector, we used CCD SBIG ST-7.

The accuracy of observations is different for different nights. Sizes of signs on Figs. relatively correspond to the accuracy of observations.

The finding chart is shown in Fig.1, the brightness of comparison stars are in (VSNET-Alert, 2001b).

2. Light Curve

We began to observe V 1548 Aql at late June, 2001. V.P.Goranskij supported us with observational data from late March and early June 2001.

Fig.2 a) shows the light curve of V 1548 Aql during 2001 - 2003 years. We can see that the brightness faded to 15 magnitude in R and to 16 magnitude in V bands during this period. The light curves of V 1548 Aql for 2001 and 2002 years are shown on Figs. 2 b), 2 c).

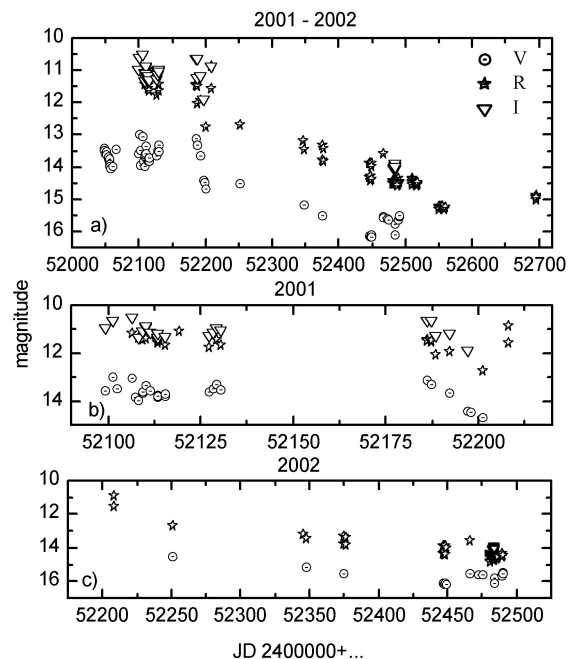


Figure 2: The light curve of V 1548 Aql, a) - during 2001 - 2003 years, b) - during 2001 and c) - during 2002.

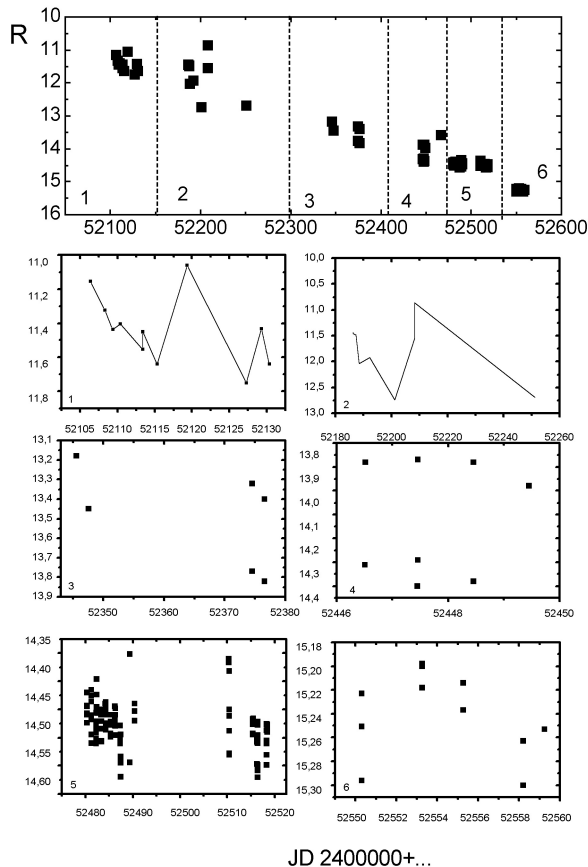


Figure 3: Fragments of the light curve. The most dense observations are connected with line.

In 2001- 2002, the quasi-periodical brightness variations in all spectral bands superposed on the slow decline were observed (Primak et. al, 2002).

The brightness of the V 1548 Aql faded slowly. It is difficult to determine t_3 (the time, during which the star fades by 3 magnitudes) because of the brightness variations. In the R band, the Nova faded faster, than in the V band. But if we use the mean light curve for R and V bands or its lower or upper envelope, we will obtain $t_3 > 400$ days. So, the Nova V 1548 Aql is an extremely slow Nova.

2. Long - term Variability

Fig.3 shows fragments of the light curve. We can see, that during its decline, Nova shows brightness variations. At the beginning, the amplitude of brightness variations was $\sim 1^m$, but later it decreased to $0^m.5$. During 400 days the amplitude decreased by 2-5 times.

To study the typical time of variations, we have computed the periodogram using the method by Stellingwerf (1978) for V-band data, using the package ISDA (Pelt, 1992). At this periodogram, one can see, that the period is ~ 57 days. The phase curve folded with this period, shows a two-humped shape. So we suggest that the two times shorter period could be more real. It is ~ 28 days (Primak et. al, 2002).

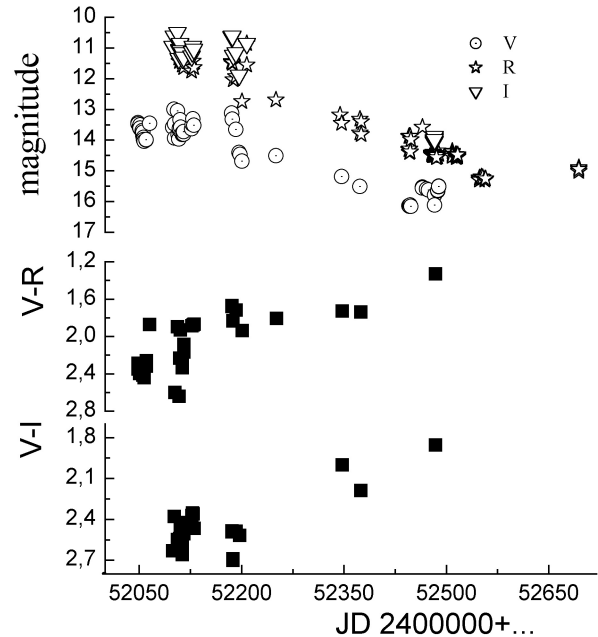


Figure 4: Light curves and changes of color indexes with time.

3. Color Changes

Fig. 4 shows the light curves for 3 bands and changes of color indexes with time. During the outburst ($V = 13^m$) up to $V = 14^m$, the fading of nova was accompanied by its reddening. Since $R = 14^m$, it became bluer with fading.

In more detail, the color changes are shown in Fig.5. The arrows point out the directions of color changes with time. Variations in the V-R color are more noticeable than in V-I (Primak et. al, 2002).

4. Conclusions

Nova V 2548 Aql is the extremely slow nova with $t_3 > 400$ days. The behaviour of this star is like the behaviour of some slow novae, i.e. V 723 Cas, HR Del, DO Aql. During its decline, the star performed quasi-periodical brightness variations with quasi-period of ~ 57 days or ~ 28 days. There were also color variations with brightness variations.

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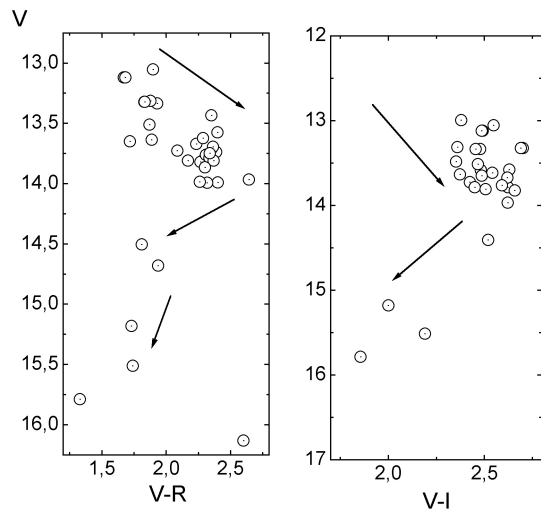


Figure 5: Color changes depending on brightness changes of the star.

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