

Possible Microlensing Event in the direction of M31

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Abstract. The Cousin *R* and *I* band photometric observations of $\sim 13' \times 13'$ field in the direction of M31 galaxy have been carried out during 1999-2001 to search for microlensing events using pixel technique. Here we report a microlensing-like event, of which preliminary analysis indicates that it is a long duration ($t_{1/2} \sim 66$ days) event.

1. Introduction and Observations

M31 has been a promising target to search for microlensing events. Consequently a number of groups have started observations towards this galaxy, however, analysing the observations in the large background of unresolved stars is a cumbersome process. To deal with the problem, AGAPE (Baillon et al. 1993) collaboration proposed ‘pixel technique’ to monitor pixels of the CCD rather than the stars themselves. To search for microlensing events, we have also started CCD observations in the direction of M31 at the State Observatory, Naini Tal in 1999 using 2K×2K CCD at the f/13 Cassegrain focus of 104-cm Sampurnanand Telescope. The target field ($13' \times 13'$), observed in Cousins *R* and *I* bands, is centered at $\alpha_{2000} = 00^h43^m38^s$ and $\delta_{2000} = +41^\circ09'.1$, at a distance of about 15 arcmin in the South-East direction from the center of M31. An overview of the observations and data reduction are given in Joshi et al. (2001, 2003) and the details of ‘pixel technique’ is described by Ansari et al. (1997).

2. Preliminary results

We found few possible microlensing events in our data after three observing seasons. The pixel light curve of a possible microlensing event ($\alpha_{2000} = 00 : 43 : 33.3$, $\delta_{2000} = +41 : 06 : 43.8$) is shown in Fig. 1. A 7 parameter theoretical Paczyński fit (1986), yielding same time period ($t_{1/2}$) and maximum magnification ($A_{\max}$) in both *R* and *I* filters, is also plotted with the light curve. The event is peaked at $t_{\max} \sim 1910$ Days (JD ~ 2451534.5) where the $A_{\max}$ is ~ 1.22 . The $t_{1/2}$ of the light curve is estimated about 66 Days. At the noise level of typically 300 ADUs against amplification of ~ 2000 ADUs at peak flux, the single lens parameters are not well determined,

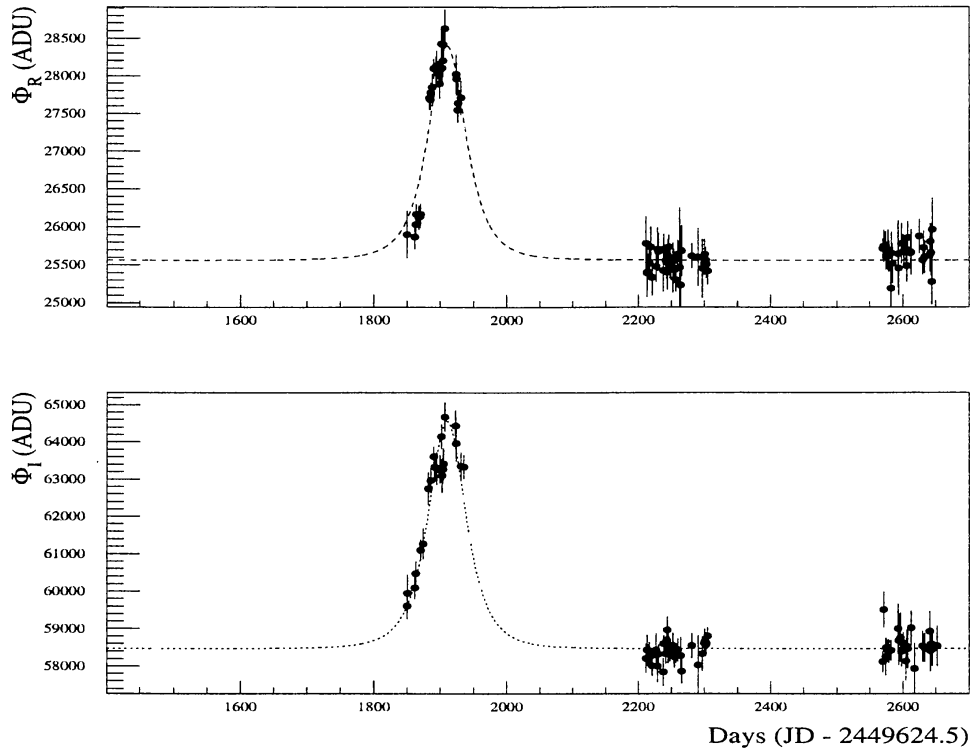


Figure 1. The pixel light curves of a microlensing candidate in both *R* and *I* filter detected in our study. The continuous line represent the 7-parameter Paczyński fit.

however, we are trying to improve the noise level and refined analysis of the candidate event is in progress.

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