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LIGHT CURVES FOR NOVA Mus 1998 AND NOVA Oph 1998

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In an earlier Bulletin (Liller & Jones 1999) we described and discussed light curves for Nova Sgr 1998 and Nova Sco 1998. Here we consider the light curves of the two other known galactic novae of that year, Nova Mus and Nova Oph. As before, Jones made visual observations while Liller used both photography and a CCD with a "minus-IR" filter, a combination that results in a broadband V system extending from about 420 nm to 720 nm and thus includes the Hα line.

Nova Oph was discovered by Takamizawa (1998) on T-Max 400 film on June 15.6, and Nova Mus was found by Liller (1998a) on Technical Pan film taken through an orange filter on Dec 29.3. The light curves, shown in Figures 1 and 2, are similar in that both show a relatively smooth, steady decline. Because of the very rapid fading of Nova Oph, poor weather in New Zealand and a brief hiatus of observations in Chile, we have augmented Fig. 1 with additional V magnitudes reported by Hanzl (1998).

As for N Mus, a casual report by Seronik (1999) establishes that N Mus was photographed by O'Meara "two nights before the nova was first spotted. The star itself appears somewhat brighter [than the discovery image]." From the print of O'Meara's color photograph, one would estimate a magnitude of 8.0 ± 0.2, shown in Fig. 1 as a triangle at JD 2451177.0. Using this observation, we estimate that for Nova Mus, $t_3 \approx 5.2$ days for the visual observations and ≈ 16.9 days from the broadband V measurements. This difference and the clear separation of the two light curves starting a few days after discovery can be understood from the differing response of the two detectors to Hα: the broadband V filter is near peak sensitivity at that wavelength, whereas the eye responds only weakly to Hα. Indeed a spectrum taken of Nova Mus the day after discovery showed "Hα to be exceptionally bright (≈ 7.3 times brighter than the neighboring continuum)". (Liller 1998b). Because the strength of Hα relative to the neighboring continuum increases steadily after the nova brightness has peaked, the visual observations would be expected to show a slower rate of decline. Perhaps puzzling is the coming together of the broadband V and the visual observations after about JD 2451210. The cause may be the presence of a faint star or stars at or near the position of the nova which biased the visual magnitude estimates, or it may just be that at this level of brightness, the visual magnitudes are systematically too bright.

For Nova Oph we estimate from Fig. 2 that $t_3 \approx 8.2$ days for Hanzl's V magnitudes and ≈ 11.7 days for the visual observations. Again, this difference can be understood from the differing response to Hα: the standard V filter is designed block the light from this

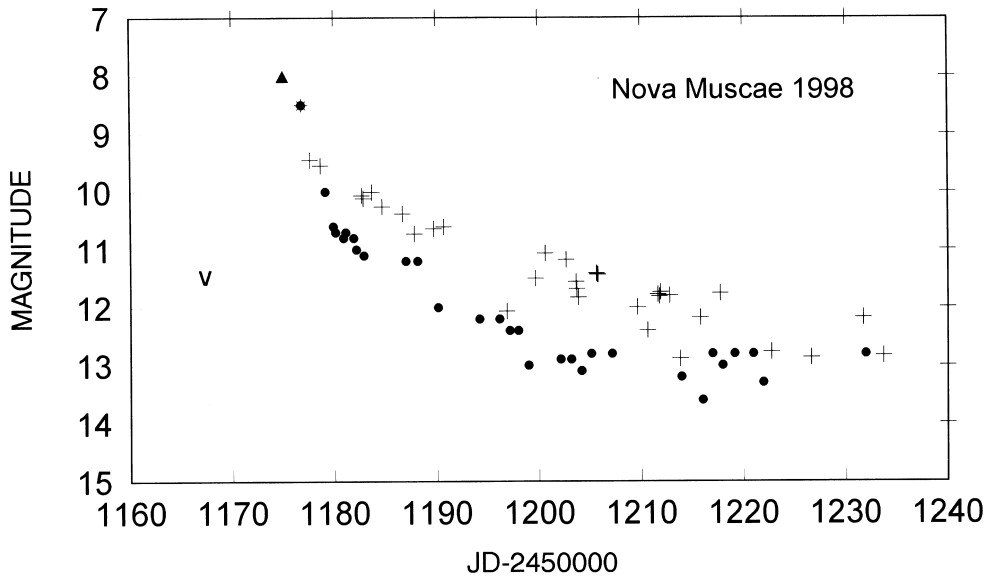

Figure 1. Light curves of Nova Mus 1998 showing Jones' visual estimates as filled circles and Liller's broadband V magnitudes as plus signs. The triangle shows the approximate values derived from O'Meara's pre-discovery color photograph. Two photographic magnitudes by Liller are indicated by a filled circle with rays – from the discovery photograph – and by a "v" denoting a fainter-than pre-discovery observation.

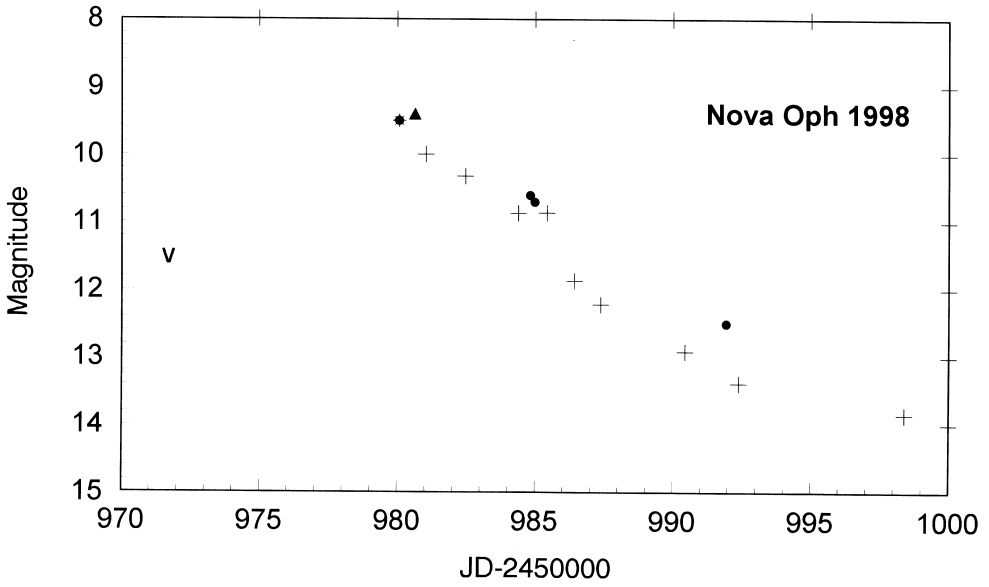

Figure 2. Light curves of Nova Oph 1998 showing Jones' visual estimates as filled circles and Hanzl's CCD-V magnitudes as plus signs. Takamizawa's photographic discovery is indicated with a filled circle with rays, and two unpublished photographic magnitudes by Liller show as a triangle and as a "v" denoting a fainter-than pre-discovery observation.

strong emission, whereas the eye retains some sensitivity at that wavelength. Filippenko et al. (1998) reported that CCD spectra of Nova Oph showed "strong emission lines of H", and their note implies that Hα was the strongest line recorded.

As usual, uncertainty in the values of t_3 arises from the imperfectly known time and magnitude when peak brightness was reached. We note that for N Oph, 8.4 days elapsed between the discovery date and the preceding patrol of the area, while for N Mus, the interval between when O'Meara's photograph was taken and the preceding negative observation of the area was 7.3 days.

Finally, we reiterate the conclusion reached in our earlier report (Liller & Jones 1999), namely that although classically, the value of t_3 should be evaluated using blue-sensitive photographic emulsions, the values derived from visual observations should agree quite well with the "classical" values, and they are certainly superior in this regard to standard V observations.

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