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NOVA SCORPII 2011 = PNV J16551100-3838120

Data through June 6, 2011

Introduction

On June 1, AAVSO sent out Special Notice 240 advising that a possible nova had been discovered by John Seach (Chatsworth Island, NSW, Australia) at RA 16 55 11 Dec -38 38 12 J2000, later named in Alert Notice 442 as NOVA SCORPII 2011 = PNV J16551100-3838120 [note that my own initial designation for the object was sn240]. That evening (June 1) and on a number of subsequent nights, I was able to observe the object for up to 3.5 hours from my observatories in Maryland, even though it only reached 11deg above the southern horizon. Observations included time series using a C11 f6.3 and ST7e camera with J-C Red filter started on June 2, and spectroscopy using a Newtonian 3.5 with DSS7 spectrometer and ST402 camera.

Time Series Results

Time series photometry was conducted in Red because of the low altitude of the object, as well as early results showing that there appears to be extensive reddening of the object spectrum. Exposures were 60 sec, and approximately 150 were made each night. Differential photometry was performed, and the resulting data analyzed using Peranso. The Peranso period analysis results were graphed using Excel.

Fig 1 shows the raw data as plotted in Peranso. The brightness of the object is approximate 10mag (V), while these results were taken using a red filter. It appears that the object dropped about 0.5 mag after the first observation, but now has a very reduced rate of change.

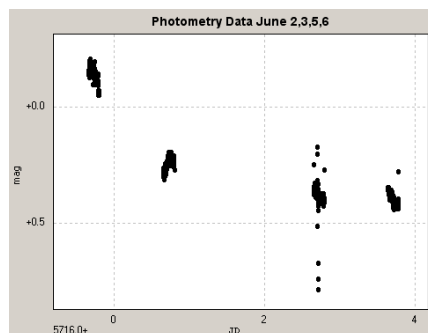


Fig 2 shows the intensity of the object compared to a comparison star in the same field. These are clear filter data images taken by the spectrometer as part of its pointing functions.

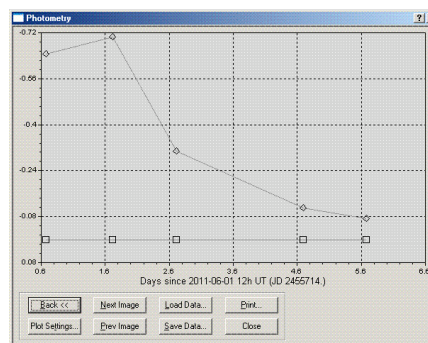
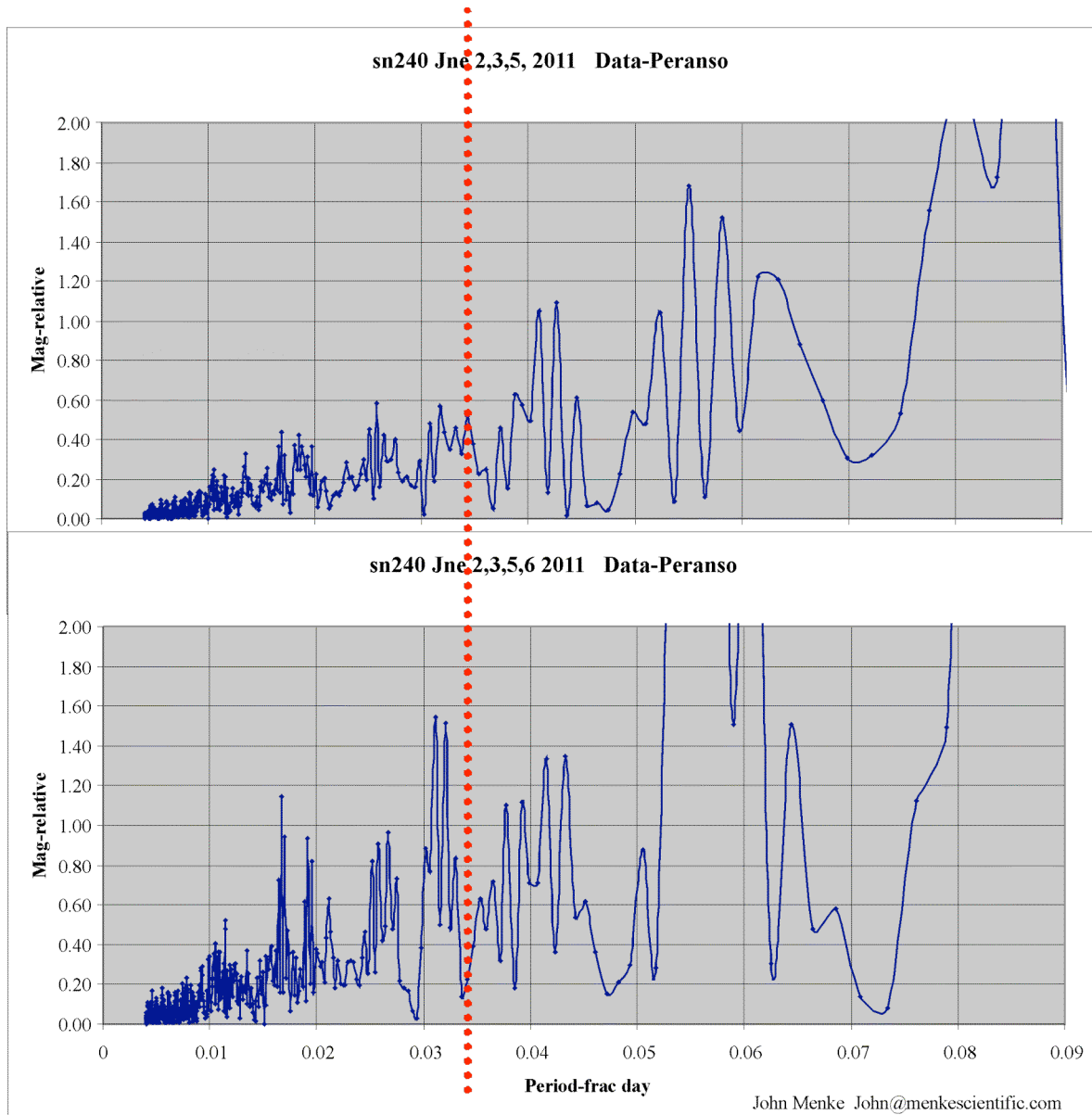


Fig 3 shows the results of performing the period analysis on the photometry data. The upper graph is the data of June 2,3,5, while the lower graph is June 2,3,5,6. The result shows apparent periodicities that

are persistent and coherent over the observation period. The periodicities are obvious to the eye when examining the light curve of the object, and have amplitudes of approximately .04mag P-P.



Spectral Results

Spectra were taken using the DSS7 100u slit giving an instrument resolution of approximately 50Å. Because the object is low on the horizon, the larger image size at the slit and the movements during exposure have caused the image largely to fill the slit. The slit is oriented E-W, so differential refraction errors affecting the overall slope of the spectrum are substantial. However, the extensive reddening of the spectrum both from

the low elevation and the apparent interstellar reduces the adverse effects. In any case, the consequence is that the quality of the spectrum is very much reduced in the blue.

Spectral images were each 120sec, and approximately 12-20 images were combined before reading. Wavelength calibration was done with a fluorescent light, and by calibrating on the Ha line. Instrumental calibration was done using a class B9 reference star about 30a-min from the target, calibrated against a B8 spectrum from the Vspec software library.

Fig 2 shows the spectral results. To show the progression of the nova, each spectrum has been adjusted to the same intensity at 5500A. Excessive noise in the data in the blue is obvious. There appear to be regular changes in the slope in the red; however, due to the differential refraction and low altitude, it is difficult to say this is real.

The Ha at 6565 is dominant, but its increase as of June 6 appears to be lessening. Hb at 4861 appears to be continuing to increase at about 30% per day. The emission peak at 7828 appears to have stabilized. The structure at 7150 and 7500 is likely due to imperfect Telluric line removal in the reference star calibration process.

