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IDENTIFICATION OF V379 PEGASI

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A recent paper by Kato, et al. (2002) discussed the lack of variability of the star identified as V379 Peg (NSV26158, Peg 7). This field is part of an upcoming paper on cataclysmic variable sequences (Henden and Sumner 2003). Relatively deep $UBV(RI)_C$ photometry has been performed of this field using the USNO Flagstaff Station (NOFS) 1.0m telescope and SITe 1024×1024 CCD.

The star identified by Kato and others is quite red and has relatively large proper motion (−56mas/year RA; −32mas/year Dec; from USNO-B (Monet et al., 2003)). The original discovery papers list V379 Peg as a UV-excess object (FBS 2351+228), as well as having a blue spectrum (Lipovetskii and Stepanyan 1981). A later paper by Kopylov et al. (1988) shows an object with a late M-type spectrum with narrow hydrogen emission lines, so some confusion is obviously present.

Examining our photometry, we believe that V379 Peg has been misidentified. A better candidate is a blue object about 22″to the east of the red star that is the bluest object in a 20′×20′field. The coordinates and magnitudes of both objects are:

Star	RA(J2000)	Dec(J2000)	V mag	$B-V$	$U-B$	$V-R$	$R-I$
blue	$23^h53^m52^s.47$	$+23°09'20''.5$	18.47(2)	0.24(2)	−0.70(3)	0.46(3)	0.44(4)
red	$23^h53^m50^s.88$	$+23°09'18''.8$	15.14(1)	1.53(1)	1.08(2)	1.06(1)	1.41(1)

Photometry was performed on multiple nights using Landolt (1992) standard stars of wide color and airmass for calibration. Photometric errors in the last digit are shown in parenthesis. The UCAC2 reference catalog was used for astrometry, with absolute coordinate errors under 100mas. The coordinate epoch is 2001.312. The blue object's proper motion from USNO-B is zero within errors.

Both of these objects were also observed with the Astrocam near-IR camera (Aladdin 1024×1024 InSb detector) on the NOFS 1.55m telescope. The magnitudes, using 2MASS second incremental data release values for stars in the same field, are:

Star	J(nofs)	J(2mass)	K(nofs)	K(2mass)
blue	16.93(3)		15.84(4)	
red	11.36(1)	11.35(2)	10.54(1)	10.51(3)

Note that the NIR magnitudes for the red object agree with the 2MASS values, further indicating little or no variability. A finding chart with the blue and red objects marked is shown in Figure 1. A file containing the calibrated $UBV(RI)_C$ magnitudes of all stars within 10 arcmin of the variable is given in 5368-t3.txt on the IBVS-website.

Based on the broad-band colors, the red object is a close match to an M4V (Cox 2000) star. The blue object is puzzling. The red colors look like an unreddened K0III star, but the blue colors do not match this classification. They appear more like an O star reddened by $E(B-V) \sim 0.55$, but using this reddening makes the red colors match something closer to A/F. Note that the NIR colors further complicate the issue, since the "blue" object is quite red. We propose that the blue object is exhibiting a composite spectrum, with a blue and a red star involved. This is common for interacting binaries such as cataclysmic variables.

Unfiltered time-series photometry was performed on 021204 and 021220 UT for both stars, and also on 021215 UT (under poor conditions) for the red star. Figure 2 shows the data for the blue star. No obvious periodicity is visible, though the scatter is larger than Poisson statistics ($\pm$0.03mag) would suggest. Such flickering is common for cataclysmic variables. Figure 3 shows the data for the red star. Some small fluctuations are present, indicating at most some low amplitude variability.

In summary, we propose that the blue star is the star observed in the FBS survey and is mismarked on the Lipovetskii and Stepanyan (1981) finding chart. The spectrum taken by Kopylov et al. (1988) was of the red star and not of the UV-excess object. A modern spectrum would solidify the identification, but until such is available, we recommend observing the blue star for further outburst activity.

We acknowledge the help of U. Munari (U. Padova) in the interpretation of the broad-band colors. This paper makes use of the Two Micron All Sky Survey (2MASS), a joint project of the University of Massachusetts and the Infrared Processing and Analysis Center/California Institute of Technology, funded by the National Aeronautics and Space Administration and the National Science Foundation.

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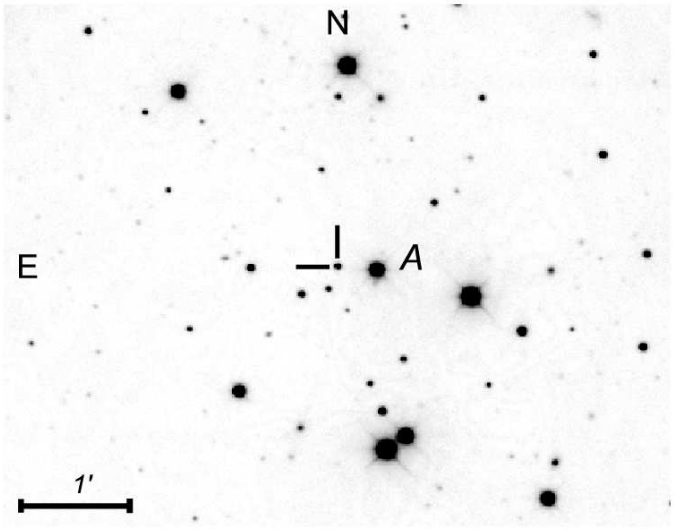

Figure 1. V-band chart of V379 Peg. Chart size is $5' \times 6'$. Star "A" is the red star from Kato et al. 2002

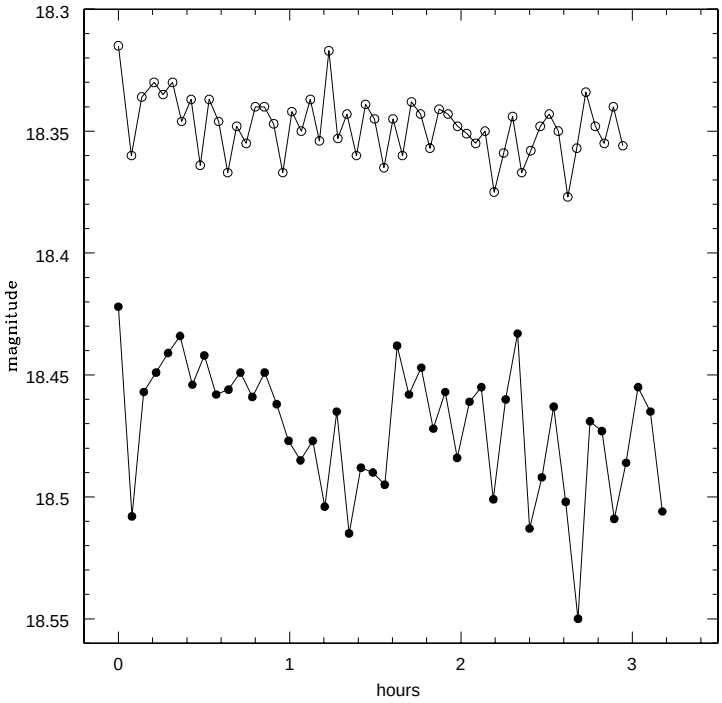

Figure 2. Unfiltered light curve for the blue candidate. Open circle data is for 021204; filled circle data is for 021220. Horizontal axis is hours since the beginning of each time series. The two nights have been offset by 0.1mag for clarity.

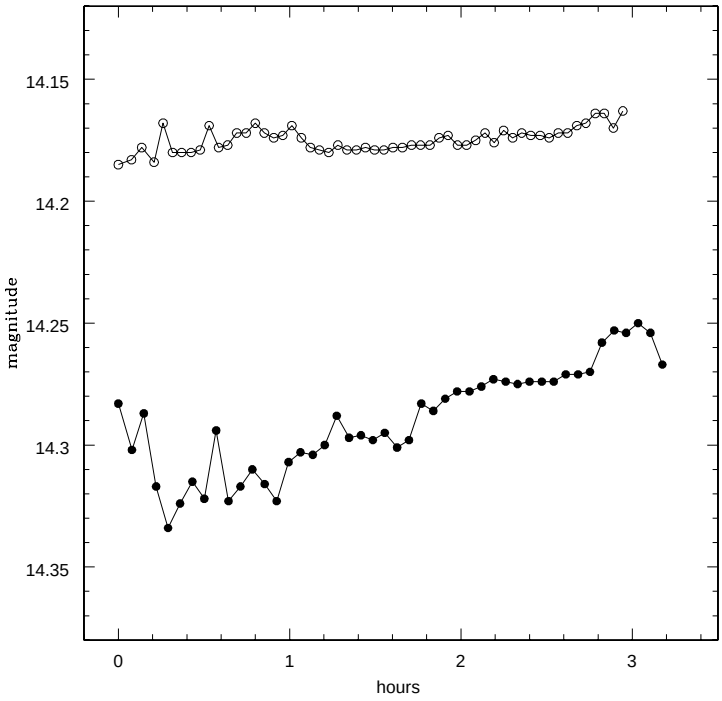

Figure 3. Unfiltered light curve for the red candidate. Open circle data is for 021204; filled circle data is for 021220. Horizontal axis is hours since the beginning of each time series. The two nights have been offset by 0.1mag for clarity.