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AN ECLIPSING NEAR CONTACT SHORT PERIOD BINARY IN THE FIELD OF FS Aur

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Name of the object:
HH95-79

Equatorial coordinates:	**Equinox:**
R.A.= $05^{h}48^{m}03^{s}.85$ **DEC.**= $28^{\circ}30'47''.6$	J2000

Observatory and telescope:
RoboScope 0.41 meter, Whispering Pines 0.3 meter, UCA Observatory 0.28 meter, and Nubbin Ridge Observatory 0.35 meter

Detector:	[1]Liquid nitrogen cooled, thinned CCD, 512x512 pixels, each pixel 24 microns, [2]SBIG ST-6, [3,4]Apogee KX-1

Filter(s):	BVR

Date(s) of the observation(s):
(Roboscope) 185 nights between UTD 040202 and 991018, (Arkansas Observatories) 25 nights between UTD 031120 and 040201

Transformed to a standard system:	no
Standard stars (field) used:	

Type of variability:	Eclipsing

Remarks:

HH95-79 is a star near the cataclysmic variable (CV) FS Aur. A finding chart generated with Aladin software (Bonnarel et.al., 2000) is shown in Figure 1. HH95-79 was initially calibrated as a secondary standard star for the field of FS Aur (Henden and Honeycutt, 1995) as the CV is a part of the Indiana University RoboScope program (Honeycutt and Turner, 1992). The inhomogeneous ensemble photometry (Honeycutt, 1992) used on the RoboScope database, can yield the light curve for every star in the field of interest. The variability of HH95-79 was suggested by the 0.2 sigma uncertainty in its instrumental magnitude as seen in Figure 2. A period search of the RoboScope data using the method of Horne and Baliunas, (1986) revealed an eclipsing binary system with a period of 0.2508 days. We obtained differential time-series BVR photometry during 2003 of this field variable using an ensemble of observatories in Arkansas. Comparison stars used were HH95-62, HH95-63, and HH95-61 (Henden and Honeycutt, 1995). The time of minimum light was determined using the R-band data on UTD 031120 via the method of Kwee and van Woerden, (1956). B-band, V-band, and R-band differential light curves are shown in Figure 3 using the ephemeris

$$T_{\rm min} = 2452963.744(4) + 0.2508(1) \times E$$

Preliminary binary star models indicate that this system has a mass ratio of about 0.519, a primary temperature of about 4500 K, a secondary temperature of about 3585K, an inclination angle of about 83 degrees, and a filling factor of about 3% overfilling. Therefore, this appears to be a close binary system either in near contact or just barely in contact.

Acknowledgements:

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References:

Bonnarel, F., Fernique, P., Bienayme, O., Egret, D., Genova, F. Louys, M., Ochsenbein, F., Wenger, M., Bartlett, J.G., 2000, *A&AS*, **143**, 33

Henden, A. A., Honeycutt, R. K. 1995, *PASP*, **107**, 324.

Honeycutt, R. K. 1992, *PASP*, **104**, 435.

Honeycutt, R. K., Turner, G. W. 1992, *Robotic telescopes in the 1990's, ed. A. V. Filippenko, ASP Conference Series* **34**, 77.

Horne, J. H., Baliunas, S. L. 1986, *ApJ* **302**, 757.

Kwee, K. K. and van Woerden, H., 1956, *Bulletin of the Astronomical Institute of the Netherlands*, **12**, 327.

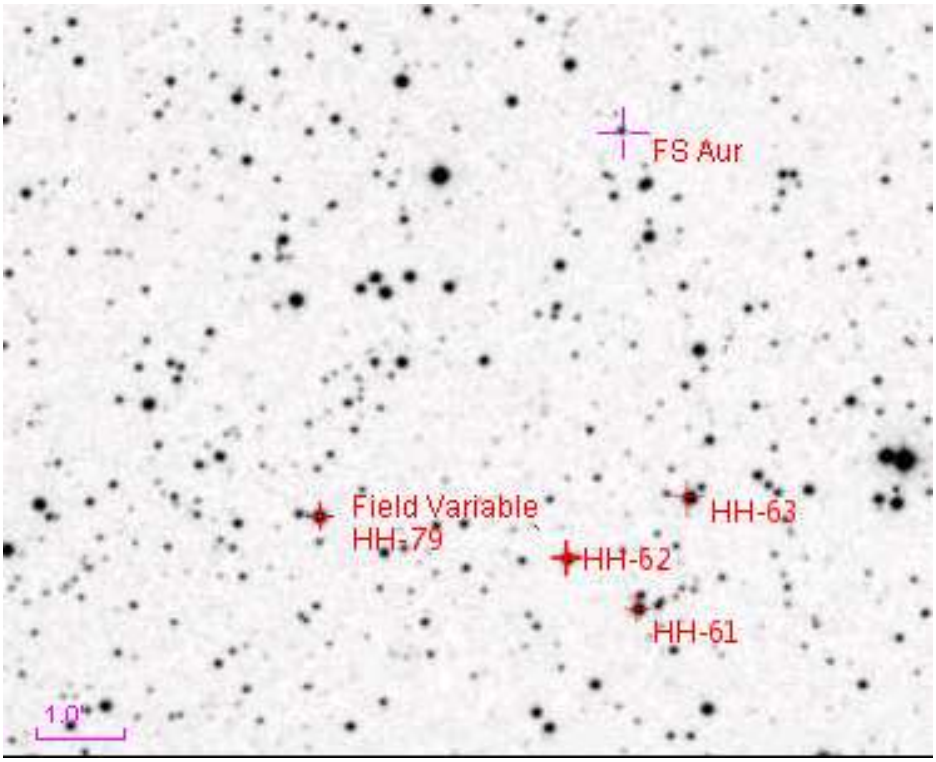

Figure 1. Finding chart.

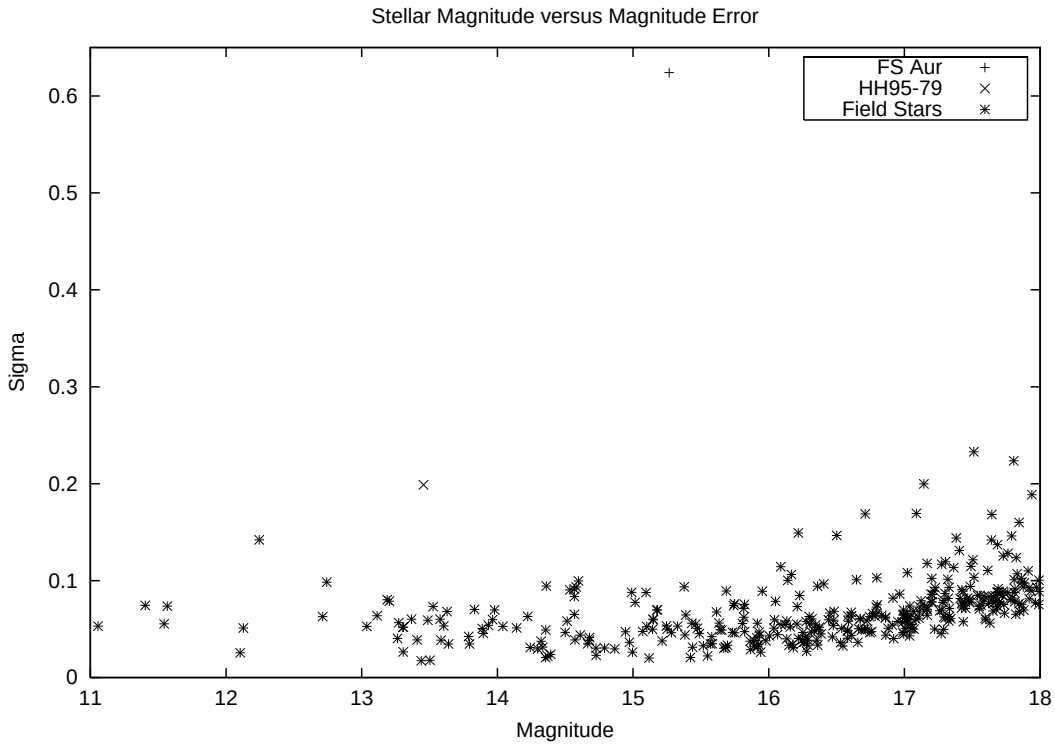

Figure 2. The inhomogeneous ensemble photometry SIGMA shows FS Aur with a sigma around 0.6 and HH95-79 with a sigma of about 0.2.

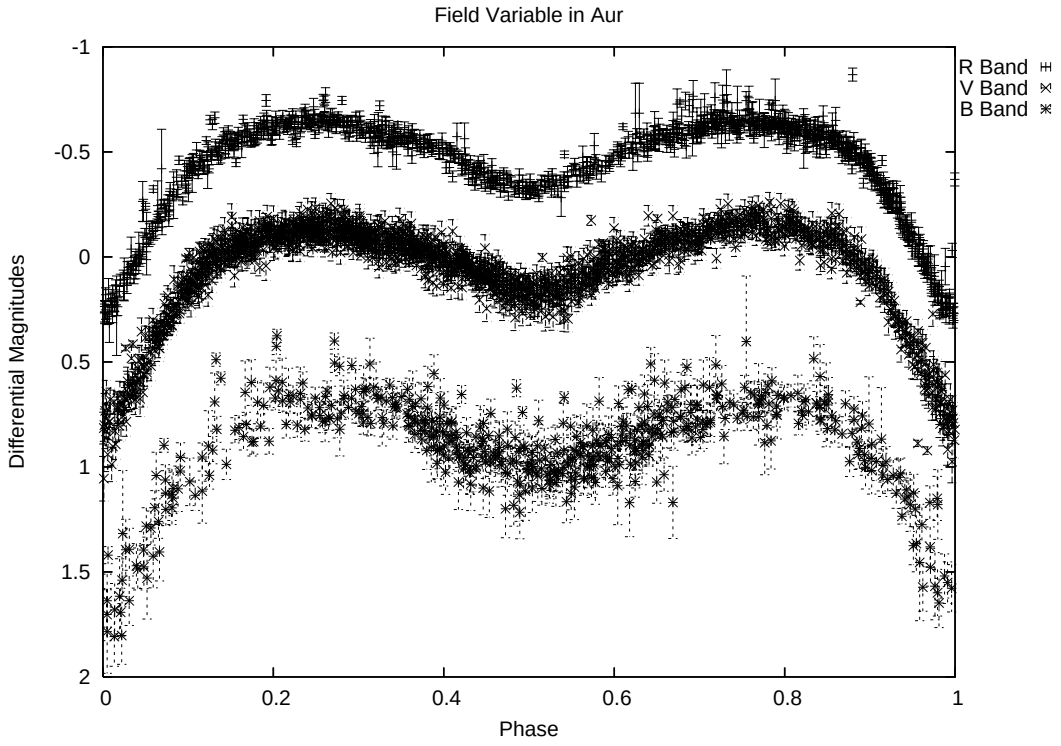

Figure 3. BVR differential photometry of HH95-79