COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 3144

Konkoly Observatory
Budapest
8 February 1988

HU ISSN 0374-0676

STRÖMGREN PHOTOMETRY OF UU Her : 1987 RESULTS

UU Her is an F supergiant that seems to be the prototype of a class of evolved stars. All of them share peculiar photometric variability, spectral type and position very high above the galactic plane. Basic photometric features are the long periods, small amplitudes, and remarkable mode switching of two or more periods. In particular UU Her is known to switch between periods of $\sim$ 45 and 72 days (Fernie 1986), in addition, Sasselov (1983) found the star to have a period of 80 days in 1978-1979.

Within a program aimed to study the photometric and spectroscopic behaviour of these stars, we performed u,v,b,y photometry of UU Her, from June to November 1987 at the 91 cm Cassegrain telescope of the Catania Astrophysical Observatory with a photon-counting photoelectric photometer.

The same set of standard Strömgren filters but different photomultipliers (EMI 6256/s and EMI 9658/Ra) were used throughout the observing period. Even if the EMI 9658/Ra has a sensitivity extended to the red, no difference due to the red leak has been found in the instrumental photometric system.

Two main comparison stars BD +38^{o} 2798 (V = $8\overset{m}{.}866$, B-V = $0\overset{m}{.}417$; Sasselov et al. 1987) and HR 6123 (V = $5\overset{m}{.}535$, b-y = $0\overset{m}{.}112$; Fernie 1986) have been used to carry out differential photometry. In addition ten u,v,b,y standars stars have been nightly observed to deduce b-y,m1,c1 indices. BD +38^{o}2798 is named TZ Her as variable, but in the last General Catalogue of Variable Stars (Kholopov, 1985) is reported as non variable. No evidence of variability is seen from our observations displayed in Figure 1, where BD +38^{o} 2798 is plotted against HR 6123, in agreement with the photometry of Fernie (1986).The external error of our differential photometry estimated from the nightly averages of the differential observations between the two comparison stars, weighted by the dispersion around the mean of each night, turns out to be about 0.004 mag. Magnitude differences of UU Her with respect to HR 6123 in the y filter are shown in Figure 2 and a summary of the photometric results is given in Table I.

The y filter light curve plotted in Figure 2 is characterized by two minima of different depth, so that UU Her in 1987 appears to show an RV Tau-like behaviour. The interval between the two minima is about 45 $\pm$ 2 days

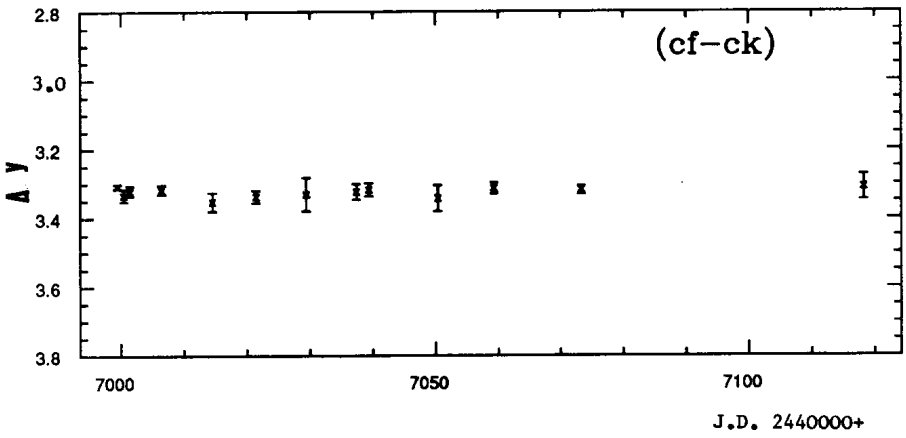

Figure 1

Differential magnitudes of our comparison stars.
(BD +38°2798 - HR 6123)
Error bar is the standard deviation of each night

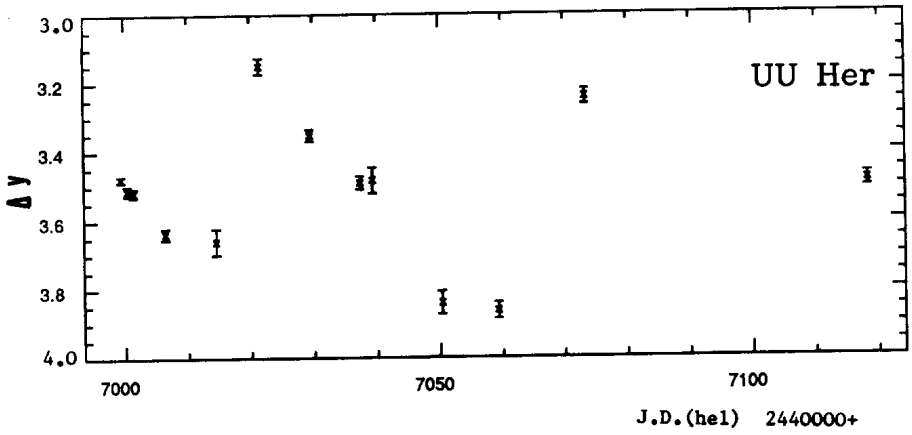

Figure 2
Light curve of UU Her against HR 6123

Table I
UU Her Strömgren Photometry in 1987

Julian Day 2440000.0+	Δy	b-y	c1	m1
6999.425	3.478	0.429	0.788	0.129
7000.427	3.512	0.449	0.919	0.142
7001.412	3.517	0.417	0.919	0.141
7006.428	3.637	0.419	0.862	0.153
7014.481	3.660	0.310	0.863	0.247
7021.411	3.149	0.215	1.123	0.173
7029.396	3.353	0.414	1.003	0.078
7037.372	3.491	0.471	0.965	0.147
7039.363	3.484	0.446	0.982	0.190
7050.354	3.840	0.500	0.886	0.198
7059.320	3.863	0.459	0.824	0.124
7073.301	3.243	0.361	1.074	0.114
7118.275	3.489	0.346	0.899	0.241

and the difference in the depth in the y filter is about 0.2 mag. This light curve is in very good agreement with the one observed in 1961 (Fernie 1986). In 1984 and 1985 UU Her showed a fairly constant sinusoidal light curve with 71.3 day period (Sasselov et al., 1987), so that we have seen a new switch in the pulsation mode of this enigmatic star.

G. UMANA[1], S. CATALANO[1], E. MARILLI[2], C. TRIGILIO[1]

1 Institute of Astronomy, University of Catania

2 Catania Astrophysical Observatory
Citta' Universitaria
Viale A. Doria 6
95125 Catania, Italy

References:

Fernie J.D. 1986, Ap.J. 306,642.

Kholopov P.N., 1985 General Catalogue of Variable Stars, Moscow, Nauka.

Sasselov D. 1983, IBVS, No. 2387,

Sasselov D.,Zsoldos E., Fernie J.D. and Arellano Ferro A., 1987, PASP 99,967.