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HD 81882: A NEW δ Sct VARIABLE

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During an observational program on the δ Sct-type pulsating star DL UMa, HD 83271 ($V = 7\overset{\mathrm{m}}{.}5$, F2) was used as the main comparison star and HD 83490 ($V = 8\overset{\mathrm{m}}{.}1$, A2) and HD 81882 ($8\overset{\mathrm{m}}{.}2$, F0) as check stars. These three comparison stars have not been reported as variable before in any catalogue, however our observations showed that while HD 83271 and HD 83490 kept a constant brightness, HD 81882 presents a δ Sct-type photometric variability with a luminosity amplitude of about $0\overset{\mathrm{m}}{.}02$ and a main period of about 1.4 hours ($P = 0.06$ days). Figure 1 shows the light curve in the Strömgren b filter corresponding to the night of January 29th, 2000 during about 7 hours of observation. The vertical scale shows magnitude differences HD 81882 – HD 83271 and HD 83490 – HD 83271 versus the Heliocentric Julian Day. Multiperiodicity is also evident from the light curve shown in the figure.

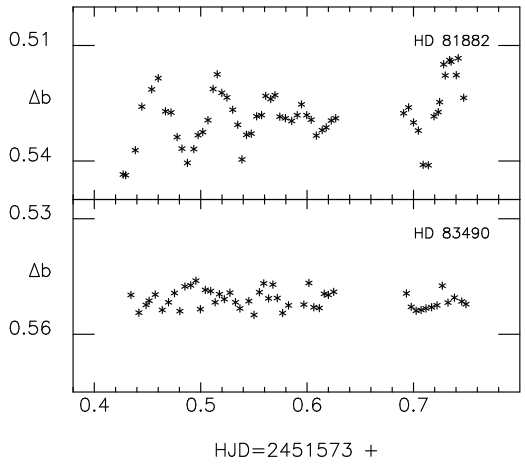

Figure 1. Differential light curves of HD 81882 and HD 83490 relative to HD 83271 in the b filter versus Heliocentric Julian Day

The observations were collected during January, 2000 using the 90-cm telescope at the Observatory of Sierra Nevada, Spain. These observations are simultaneous *uvby* data in the Strömgren photometric system using the six-channel *uvbyβ* spectrograph photometer for simultaneous measurements in *uvby* or in the narrow and wide Hβ channels, respectively (Rodríguez et al. 1997).

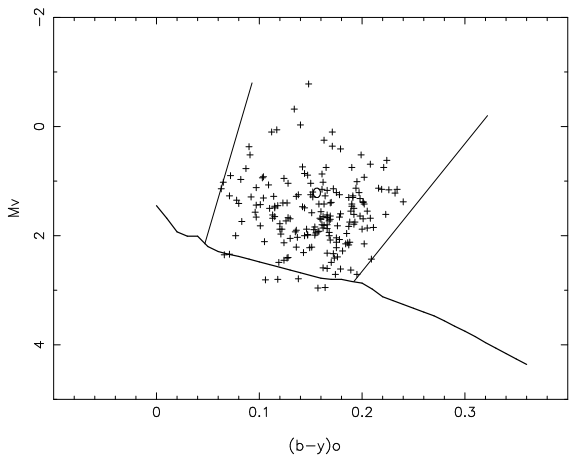

Figure 2. Position of the δ Sct stars in the H–R diagram. HD 81882 is shown with the symbol O

In order to derive the physical parameters of this new variable, the photometric Strömgren indices listed in Hauck & Mermilliod (1998) were used. This catalogue lists the following values: $V = 8\overset{\mathrm{m}}{.}153$, $b-y = 0\overset{\mathrm{m}}{.}156$, $m_1 = 0\overset{\mathrm{m}}{.}187$, $c_1 = 0\overset{\mathrm{m}}{.}977$ and $\beta = 2\overset{\mathrm{m}}{.}751$. Intrinsic indices were derived using the reference lines of Philip & Egret (1980) with the appropriate corrections for gravity and metallicity (Crawford 1975a,b; Philip et al. 1976). Thus, colour excess of $E(b-y) = 0\overset{\mathrm{m}}{.}000$ was found. Then, deviations from the ZAMS's values of $\delta m_1 = -0\overset{\mathrm{m}}{.}002$ and $\delta c_1 = 0\overset{\mathrm{m}}{.}195$ are obtained. This means that this variable is a normal δ Sct star with nearly solar abundances. In fact, a value of [Me/H] = 0.06 is obtained using the Smalley's (1993) calibration for metal abundances. In addition, using the relations by Crawford (1975b) for luminosity, Code et al. (1976) for bolometric correction and the grids by Smalley & Kupka (1997) with [Me/H] = 0.0 for temperature and gravity, we obtain the following values for $M_{\mathrm{bol}} = 1\overset{\mathrm{m}}{.}30$, $T_{\mathrm{e}} = 7370$ K and $\log g = 3.83$. These results place HD 81882 in the middle part of the instability strip corresponding to the δ Sct region as can be seen in Figure 2. This figure shows the sample of δ Sct stars and the observational edges of the instability strip in the δ Sct region from Rodríguez et al. (1994).

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References:

Code, A.D., Davis, J., Bless, R.C., Brown, R.H., 1976, *ApJ*, **203**, 417
Crawford, D.L., 1975a, *Dudley Obs. Report*, No. 9, 17
Crawford, D.L., 1975b, *AJ*, **80**, 955
Hauck, B., Mermilliod, M., 1998, *A&AS*, **129**, 431
Philip, A.G.D., Egret, D., 1980, *A&AS*, **40**, 199
Philip, A.G.D., Miller, T.M., Relyea, L.J., 1976, *Dudley Obs. Report*, No. 12
Rodríguez, E., López de Coca, P., Rolland, A., Garrido, R., Costa, V., 1994, *A&AS*, **106**, 21
Rodríguez, E., González-Bedolla, S.F., Rolland, A., Costa, V., López de Coca, P., 1997, *A&A*, **324**, 959
Smalley, B., 1993, *A&A*, **274**, 391
Smalley, B., Kupka, F., 1997, *A&A*, **328**, 349