

# News

## *Simultaneous intensive photometry and high resolution spectroscopy of FG Vir*

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53 hours of photometric observations and 7 hours of consecutive high resolution spectroscopic observations of the  $\delta$  Scuti star HD 106384 = FG Vir have been obtained. From photometry we were able to detect 7 pulsation modes, 4 of which were also seen in the time series describing the variations of line profiles. From spectroscopy we also derived  $v \sin i = 21$  km/s and estimated  $i \sim 30^\circ$ . The ensuing discussion of the combined results of the analyses of photometric and spectroscopic data suggests that the dominant 12.72 c/d term is probably the first radial overtone mode, two other terms (9.66 and 19.86 c/d) are nonradial non-axisymmetric modes, while a fourth term (24.22 c/d) is an axisymmetric mode (possibly radial). Problems connected to mode typing and possible effects due to rotational splitting are also discussed in a paper which will appear in *Astronomy and Astrophysics*.

## *HD 224638 and HD 224945: two new unusual variables among early F-type stars*

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The two main sequence early F-type stars HD 224638 and HD 224945 show unusual types of light variations. We obtained about 1000 data points for each star on 20 nights over a period of 35 d (corresponding to 118 hours of monitoring). The frequency analysis by several different techniques shows that both light curves contain two close periodic terms of about 0.8 c/d. The two terms of HD 224638 have a double wave shape, while those of HD 224945 have a triple wave shape. However, these terms are unable to fully account for the light variations. A similar behaviour could also be explained by single pseudoperiodic variations with a time scale of about 0.8 c/d. High resolution spectrograms give evidence of line profile variations in HD 224638.

HD 224638 and HD 224945 apparently share a common behaviour with a group of other field and cluster stars showing similar *uvby* colour indices, similar light curves and spectroscopic pattern. The most widely studied stars are HD 164615 (Abt, H.A., Bollinger, G., Burke, E.W. Jr., 1983, *ApJ* **272**, 196), 9 Aur (Krisciunas K., Aspin C., Geballe T.R., Akazawa H., Claver C.F., Guinan E.F., Landis H.J., Luedeke K.D., Ohkura N., Ohshima O., Skillman D.R., 1993, *MNRAS* **263**, 781) and  $\gamma$  Dor (Cousins A.W.J., 1966, *Roy. Obs. Bull.* **122**). A discussion of the characteristics of all these stars together with those of the few similar objects found in the literature show that they constitute a very homogeneous class whose nature is however still unclear. They are located on the cold border of the instability strip. The most promising mechanisms which can explain this phenomenon are either spot activity or nonradial *g*-mode pulsations. Both these possibilities have many consequences in the context of stellar structure and evolution.