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HD 209775: A NEW δ SCUTI VARIABLE

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In the course of making photometric observations of planetary transits in HD 209458 (Henry et al. 1999; 2000), we found one of our comparison stars, HD 209775, to be a new small-amplitude variable. Very little has been published about HD 209775; Olsen (1980) estimated a spectral type of Am/p based on his Strömgren *uvby* photometry and the assumption that his Strömgren indices were not contaminated by duplicity. Fehrenbach & Burnage (1982) found the radial velocity to be constant to 2.6 km s^{-1} in six measurements. The *HIPPARCOS* catalogue classifies the star as photometrically constant and gives $V = 7.56$, $B - V = 0.33$, and $\pi = 10.17$ mas (Perryman et al. 1997). Combined with the effective temperature calibration of Flower (1996), the *HIPPARCOS* results imply an absolute magnitude of 2.50 and a spectral type of F0 V.

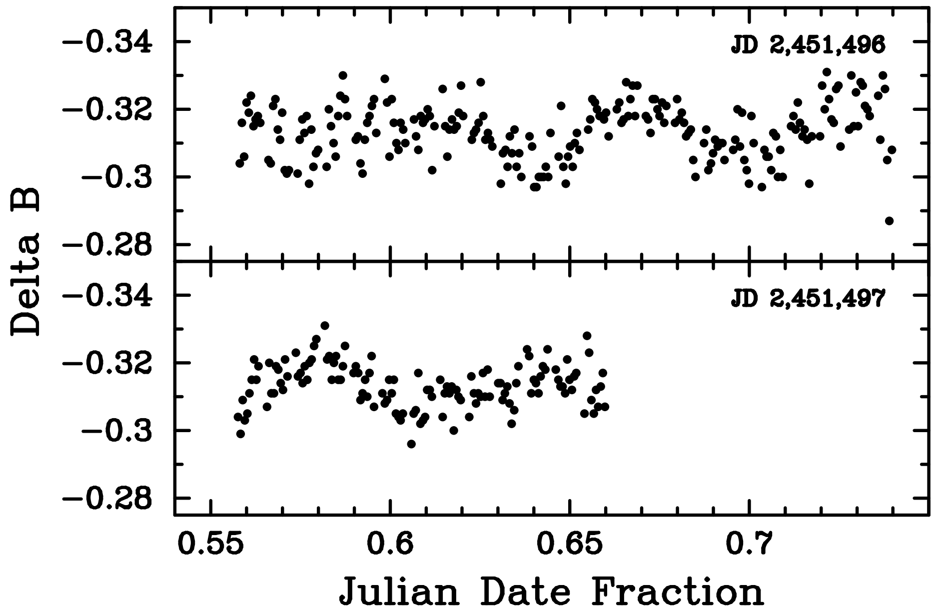

Figure 1. Johnson B photometry over two nights acquired with a 0.40 m APT showing HD 209775 to be a new low-amplitude, short-period variable star.

Figure 1 plots our Johnson B photometry acquired with the T3 0.40 m automatic photoelectric telescope (APT) located at Fairborn Observatory in southern Arizona. We used HD 209458 ($V = 7.65$, $B - V = 0.594$, G0 V) as a comparison star to compute the differential magnitudes since it has been shown to be constant to 0.0017 mag or better except during transits (Henry et al. 2000). The observations were corrected for differential extinction and transformed to the standard Johnson system. Details on the operation of the APT and the reduction and precision of the data can be found in Henry (1995).

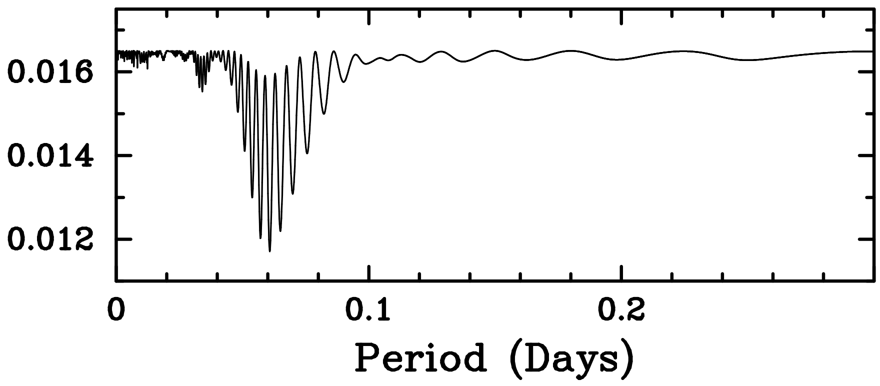

Figure 2. Periodogram analysis of the B data gives a period of 0.0608 ± 0.0002 d and a full amplitude of 0.012 ± 0.001 mag.

The results of periodogram analysis of the B observations from Figure 1 are shown in Figure 2. We find a period of 0.0608 ± 0.0002 d. A least-squares sine fit to the B data at this period gives a full amplitude of 0.012 ± 0.001 mag. From the V observations, we find a period of 0.0607 ± 0.0002 d and an amplitude of 0.007 ± 0.001 mag. The star lies in the region of the HR diagram where the δ Scuti and the γ Doradus variables overlap (Handler 1999). Its short period places it in the δ Scuti class.

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