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HD 152569: A RECLASSIFIED δ SCUTI VARIABLE

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The F0 IVn star HD 152569 is listed as a bona fide γ Doradus variable by Kaye et al. (1999). The γ Doradus stars have spectral types near F0 and low-amplitude photometric variability with periods between about 0.5 and 3 days. The inclusion of HD 152569 in this list was based on photometric variability reported by Kaye (1998). Based on the 1997–8 data set presented here, he found a period of $0^{\rm d}.8116 \pm 0^{\rm d}.0002$, but noted severe aliasing difficulties.

We have acquired an additional season of data with the same 0.4-meter automatic photoelectric telescope (APT) used for the earlier observations. Additionally, we have obtained two nights of Strömgren data with the 0.9-meter telescope and six-channel photometer at the Sierra Nevada Observatory (OSN). We used the comparison star HD 151900 (F1 III-IV) and the check star HD 155646 (F6 III) for all observations. Differential magnitudes were corrected for extinction and transformed to their respective standard systems. The observations are summarized in Table 1.

Up to five observations were acquired with the APT each night, spaced at roughly two hour intervals, resulting in severe aliasing problems when analyzed alone. However, when combined with the OSN data containing 50–60 points per night, least squares analysis using the Vaniček method (1971; via a FORTRAN code provided by L. Mantegazza) revealed a primary periodicity of $0^{\rm d}.075401 \pm 0^{\rm d}.000001$ and an amplitude of 11.4 ± 0.7 mmag in the combined $V + y$ observations. The resulting least-squares spectrum is shown in Figure 1. The data are shown phased with the principle period from Fig. 1 in Figure 2.

Table 1: Observations of HD 152569.

Year	Date Range HJD − 2450000	Telescope	Filter	$N_{\rm obs}$
1997–8	486 – 643	0.4-m APT	V	185
			B	190
1998–9	847 – 998	0.4-m APT	V	157
			B	156
1999	1388 – 1389	0.9-m OSN	$ubvy-\beta$	111

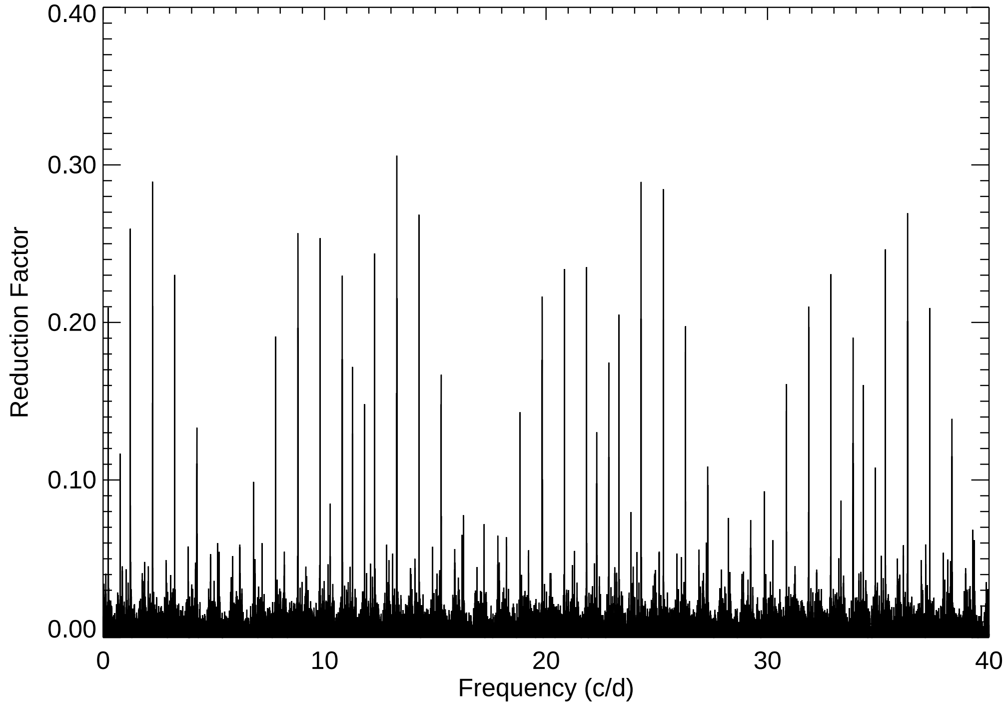

Figure 1. Least-squares spectrum of the $V+y$ data of HD 152569 showing the principle peak at $\nu = 13.26$ d^{-1} ($P = 0\overset{\mathrm{d}}{.}075$). Treating this frequency as a "known constituent", no signals remain above the 0.10 reduction factor level.

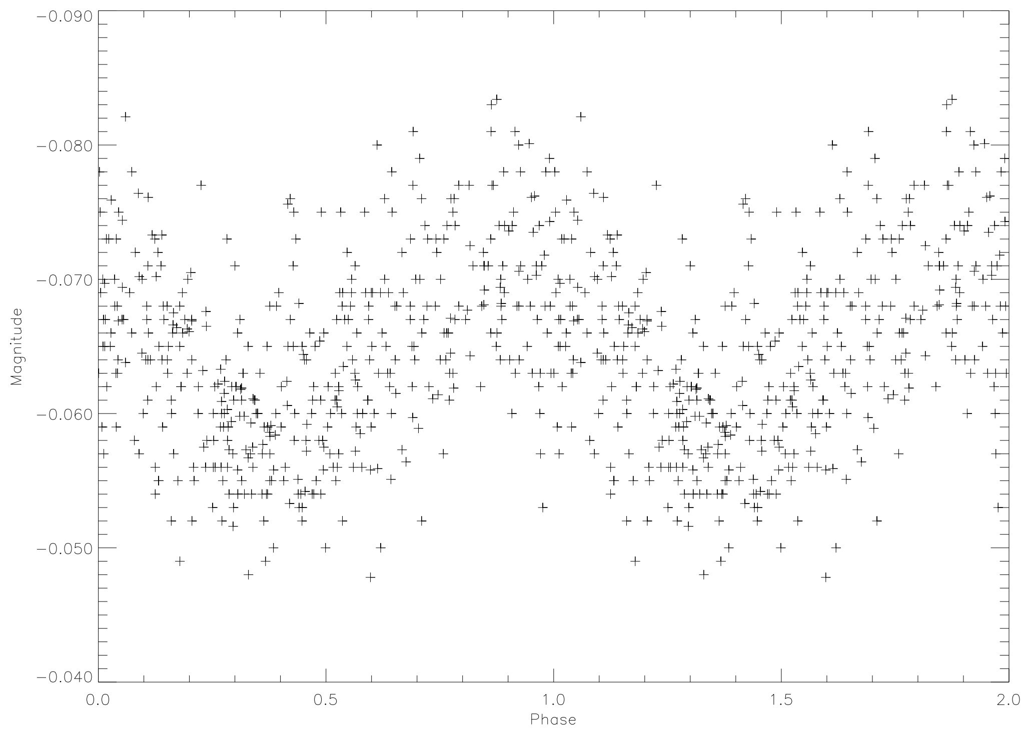

Figure 2. Phased light curve of the $V+y$ data of HD 152569.

The 0.81-day period reported earlier is an alias of the true 0.075-day period. Based on this revised period, we conclude that HD 152569 is *not* a γ Doradus variable but *is* a very low-amplitude δ Scuti star.

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