

Frequency Oscillations in the Delta Scuti Star V534 Tauri: Preliminary Results of the STEPHI IX Campaign

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1. Introduction

The δ Scuti stars are pulsating variables located in the lower part of the Cepheid instability strip with spectral types from A2 to F0 on the main sequence, and from A3 to F5 at luminosity class III. These variables show short periods (< 0.3 day) and luminosity amplitudes ranging from a few thousandths of a magnitude to several tenths. Over the last few years, significant progress has been made in the detection of pulsating modes in the framework of the multi-site campaigns, e.g. STACC (Frandsen et al. 1996), DSN (Breger et al. 1998), STEPHI (Michel et al. 2000). For the 1998 STEPHI IX photometry campaign, the δ Scuti star V534 Tau of the Pleiades cluster (see Table 1) was monitored during a three week, three continent run. Preliminary results are reported here.

Table 1. Observational properties of the target stars in STEPHI IX

Star	HD	Sp.	m_v	$B - V$	$U - B$	$V \sin i$ (km s^{-1})	β
V534 Tau	23567	A9V	8.30	+0.36	+0.12	90	2.788
Comparison 1	23628	A4V	7.68	+0.22	+0.10	187	2.884
Comparison 2	23627	B8	8.73	+0.18	-0.05		2.804

2. Observations, Data Reduction and Modes Detected

As was done in the other STEPHI campaigns, we observed from three observatories approximately equally-spaced in longitude: San Pedro Mártir Observatory in Baja California, Mexico; Xing Long Station in Beijing, China; and Teide Observatory in Tenerife, Spain. The observational procedure and the data reduction were the same as in the previous campaigns (see Alvarez et al. 1998).

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The amplitude spectrum of the time series of the target star was obtained by using the ISWF technique following the same procedure as that used in the STEPPI VII campaign (Hernández et al. 1998). The frequencies have been detected by using the prewhitening process. As is explained in Alvarez et al. (1998), the frequency peaks above a 99% confidence level are selected and subtracted iteratively from the original time series until the whole spectrum is below this level. Results are shown in Table 2.

3. Conclusions

Preliminary results of the STEPPI 98 campaign are reported. Eleven frequencies for the Delta Scuti star V534 Tau have been detected. A more complete study is in preparation (Li et al., to be submitted to A&A). Information about the STEPPI network can be found at <http://dasgal.obspm.fr/~stephi>.

Table 2. Modes detected in our target star above a 99% confidence level. The resolution is $\Delta\nu \simeq 0.60 \mu\text{Hz}$.

Star	ν (μHz)	period (hours)	A (mmag)	φ (rad)	S/N^c	
V534 Tau	ν_1	448.060	0.619	2.130	0.846	15.8
	ν_2	377.857 ^{a,b}	0.735	1.990	-3.074	10.2
	ν_3	524.963	0.529	1.893	1.560	16.5
	ν_4	252.894	1.098	1.606	2.522	7.4
	ν_5	126.063	2.203	1.250	1.008	4.9
	ν_6	376.606 ^a	0.737	1.250	2.070	6.4
	ν_7	234.217	1.185	1.168	0.128	5.1
	ν_8	191.836	1.447	1.124	2.189	4.8
	ν_9	379.026 ^b	0.732	1.105	-0.044	5.6
	ν_{10}	307.590	0.903	1.033	-2.884	4.6
	ν_{11}	488.765	0.568	0.511	-0.185	4.2

^a Pair of close frequencies (separation of $1.25 \mu\text{Hz}$). ^b Pair of close frequencies (separation of $1.16 \mu\text{Hz}$). ^c Signal-to-noise ratio.

References

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