"Binary and Multiple Stars in the Era of Big Sky Surveys"
Litomyšl, Czech Republic, September 9 – 13, 2024

New Spectroscopic Observations of The Semidetached Binary V375 Cas

B. ÖZKARDEŞ[1,2], H. BAKIŞ[3]

[1] Astrophysics Research Centre and Observatory, Çanakkale Onsekiz Mart University, Terzioglu Kampusu, TR-17020 Çanakkale, TÜRKİYE

[2]Department of Space Sciences and Technologies, Faculty of Sciences, Çanakkale Onsekiz Mart University, Terzioglu Kampusu, TR-17020 Çanakkale, TÜRKİYE

[3]Department of Space Sciences and Technologies, Faculty of Sciences, Akdeniz University, Konyaaltı Kampusu, TR-07070 Antalya, TÜRKİYE

In this study, we aimed to present the preliminary results for V375 Cas, which is one of the target stars of the project titled by ‘Spectroscopic Investigation of Selected β Lyrae Type Eclipsing Binary Stars’.

Spectroscopic observations and reductions

https://tug.tubitak.gov.tr/tr

Spectroscopic observations of V375 Cas were made at the TUBITAK National Observatory (TUG, Türkiye) in 2020 and 2021 using TFOSC (TUG Faint Object Spectrograph and Camera) and a 2048x2048 Andor iKon-L 936 CCD camera attached to the 1.5-m telescope (RTT150). Grism number 9 with a slit width of 10.68 arcsec, which has a spectral coverage of 3350−9400 Å, was used, and the corresponding spectral resolution is ~5100 for echelle. The exposure time was 2400 s.

A total of 12 spectra of V375 Cas have been collected during observing programme. For all observations, an iron-argon lamp was used for wavelength calibration. Halogen lamp spectra for flat fielding were also taken every night. We use the IRAF* package to reduce the spectroscopic images and to extract the spectrum.

* IRAF is distributed by the National Optical Astronomical Observatories, operated by the Association of the Universities for Research in Astronomy, Inc., under coop- erative agreement with the National Science Foundation.

Radial velocities and orbital solution

Radial velocities (RVs) of both components of V375 Cas were measured using Gaussian fittings to selected spectral line. According to the B2V spectral type of the system, there should be strong neutral He lines in the observed spectra. But we used H alpha line (6562.79 *Å*) because the secondary star's spectral lines could be clearly detected (see Fig 1).

There are some papers (Özkardeş (2021); Li et al. (2022)) about the information of multiplicity of the system in the literature photometrically. As a first examination, we could not detect the presence of the third body in the spectra.

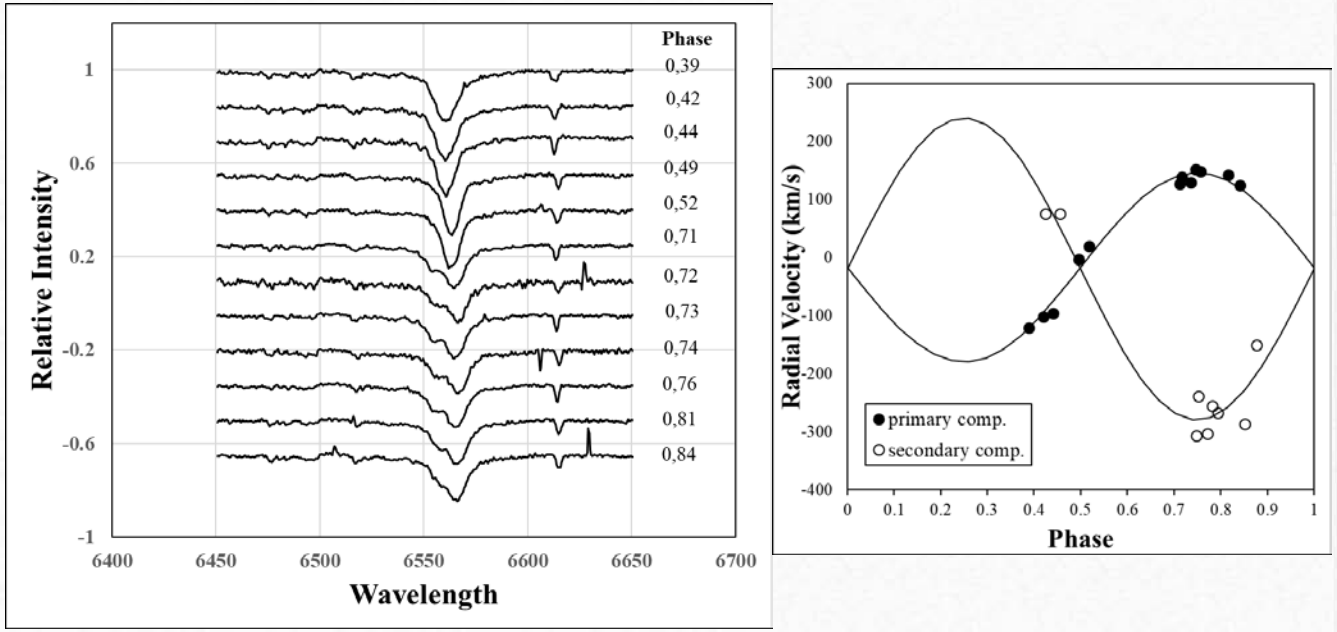

Fig 1. Left panel shows the composite spectra of the HI line at 6562.79 Å while right panel shows the best theoritical fit to the radial velocity curves of the system.

Table 1. Spectroscopic orbital parameters of V375 Cas

Parameter	Value
P (days)	1.47344 (const.)
T_0 (HJD+2452501)	0.1930 ± 0.0192
e	0 (assumed)
K_1 (km/s)	162.9 ± 11.1
K_2 (km/s)	260.3 ± 44.2
q	0.626 ± 0.098
$V\gamma$ (km/s)	-19.3 ± 8.6
$M_1 \sin^3 i$ ($M_\odot$)	6.55 ± 0.87
$M_2 \sin^3 i$ ($M_\odot$)	4.86 ± 0.75
$a_1 \sin i$ (AU)	0.0243 ± 0.0018
$a_2 \sin i$ (AU)	0.0328 ± 0.0018

Using the least-square method for best curve fitting the orbital parameters were obtained. The best fitting orbital elements we derived are given in Table 1.

In our next work, it is planned to determine the radial velocities of the components using a spectral disentangling method such as KOREL and to obtain the atmospheric model parameters of the components using the disentangled spectra.


THANK YOU.