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Radial velocity study of close binary star - S Ant using 45 cm Cassegrain telescope at Arthur C Clarke Institute

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The binary star system S Antlia, period 0.648 days, spectral type A9(Vn), m_v = 6.4 is classified as a double – line spectroscopic binary and such a double line spectroscopic binary has never been studied on the 45cm telescope at ACCIMT before. Though S Ant has been a target for several photometric studies in the past it has only been studied in spectroscopy twice. Therefore it is very important to study this system in spectroscopy.

From the observed H alpha line profiles, we noticed that the observed H alpha line profiles have been distorted significantly. Since Hα is not a pure photospheric line it could reflect the motions of H gas streams in the contact binary system envelop. As the spectrum of the secondary is weak compared with that of the primary and has been blended with the spectrum of the primary it is very difficult to resolve them. We have used several deblending tasks in IRAF to separate them. We have also tried to find out the broadening functions of the system. But not succeeded. Since this contact binary system has a short period we can't use long exposure time to obtain a high S/N ratio in our spectra due to the smearing of spectral lines with Doppler broadening. Therefore the secondary component is not resolvable with the ACCIMT telescope.

The radial velocity values between phases 0.5 and 1.0 are similar to that of given in the previous studies and the velocity values of the rest of the phases are highly deviated from the accepted values. The moving gas streams from primary to secondary could alter the H alpha line profile significantly. In order to verify this, we observed purely photospheric lines Fe(I) 5167.49 ^{o}A and Al(II) 5285.85 ^{o}A from phase 0 to 0.5. We found that the radial velocity values obtained from these photospheric lines are tally with the values given in the previous studies. We calculated the amplitudes of the velocity curve of the primary component from phase 0.5 to 1.0 and from phase 0 to 0.5 separately. The observed primary amplitudes at phase 0.75 and 0.26 are found to be 83 $\pm$ 18 Km/s and -84 $\pm$ 18 Km/s respectively. These values are comparable with the previously observed radial velocity value, 77 km/s. Since the error given by IRAF is very small, the RMSE given by MATLAB was taken is taken as the standard error.

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