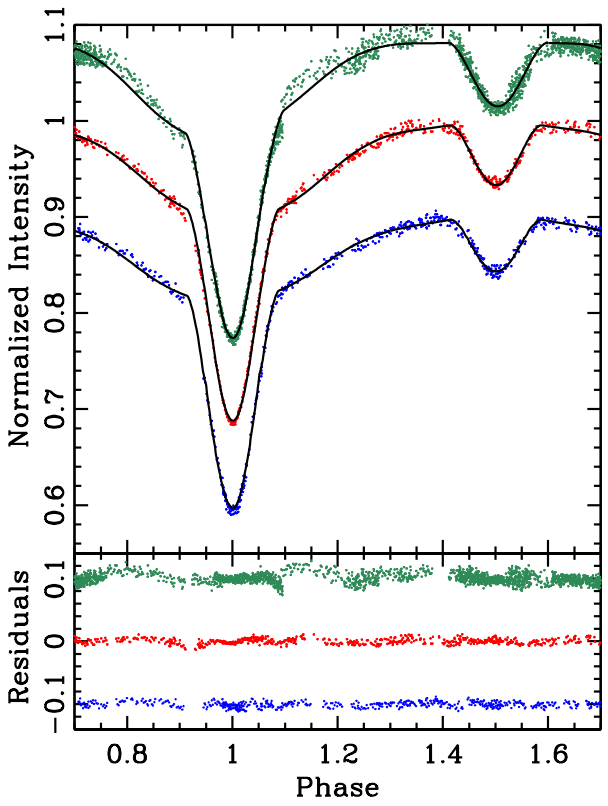

Fig. 4. Comparison of the observed and computed light curves of V1898 Cyg. From top to bottom the CS-V, DM-B and DM-V light curves, respectively. In the lower panel residuals have been plotted to show the goodness of the fits. The color figure can be viewed online.

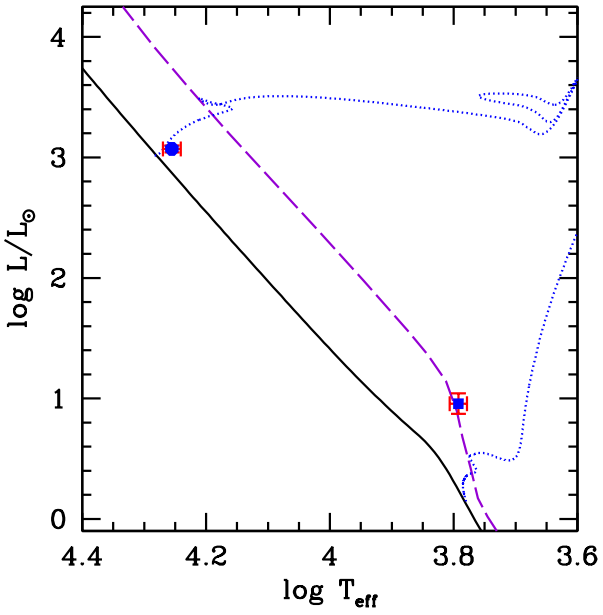

Fig. 5. Location of the two stellar components of V1898 Cyg in the log $T_{\rm eff}$ − log L diagram, together with evolutionary models for 1.15 and 6.0 $M_{\odot}$. The solid circle corresponds to the primary and the solid square to the secondary with error bars. The zero-age main-sequence (continuous line) and terminal-age MS (long-dashed-dotted line) are also plotted. The evolutionary tracks are shown by dotted lines. The color figure can be viewed online.

6. DISCUSSION AND CONCLUSION

Since the sum-of-squares in the analysis of CS light curve is too large when compared to the DM's light curves, and there is doubt about the light constancy of their primary comparison star, we take weighted mean orbital parameters obtained by the analysis of the DM's B and V light curves. The mean parameters obtained from the light curve analysis are: $i = 73^{\circ}.05 \pm 0.02$, $r_1 = 0.3291 \pm 0.0013$, $r_2 = 0.2464 \pm 0.0012$, $T_2 = 6200 \pm 200$ K. The fractional radius of the secondary component exceeds its corresponding Roche lobe radius by about 4%. Combining the results obtained from RVs analysis we have derived the astrophysical parameters of the components and other properties listed in Table 4. The mass and radius of the massive primary star are derived with an accuracy of 0.6 and 1.4 percent, while for the less massive donor star we obtain 0.4 and 0.5 percent. The observed and computed rotational velocities of the components are in good agreement, showing nearly synchronized rotation. In Figure 5, we plot the location of the V1898 Cyg stellar components in a log $T_{\rm eff}$ − log $L/L_{\odot}$ diagram. The evolutionary tracks for masses 6 and 1.16 $M_{\odot}$ are also shown in this figure. For constructing the solar metallicity evolutionary tracks, we used the Cambridge version of the STARS CODE which was originally developed by Eggleton (1971) and substantially updated by Eldridge & Tout (2004). The continuous and dashed lines from left to right show the zero-age and terminal-age main-sequences, respectively. While the primary star is located very close to the ZAMS the secondary, less massive star appears to have evolved up to the giant branch as is common in semi-detached Algol-type binaries. The appearance of the components in the HR diagram is common for the classical Algol-type binaries. The donor seems to have higher temperature and luminosity, and most of its atmospheric material has been transferred to its companion. Since the secondary component fills its Roche lobe it transfers its mass to the more massive component. Therefore the orbital period change is attributed to the mass transfer. However, the gainer