

[**꺄ST-01**] 1SWASP J093010.78+533859.5:

A Possible Hierarchical Quintuple System

Jae-Rim Koo^{1,2}, Jae Woo Lee¹, Byeong-Cheol Lee¹, Seung-Lee Kim¹,
Chung-Uk Lee¹, Kyeongsoo Hong¹, Dong-Joo Lee¹, and Soo-Chang Rey²

¹*Korea Astronomy and Space Science Institute*, ²*Chungnam National University*

Among quadruples or higher multiplicity stars, only a few doubly eclipsing binary systems have been discovered. They are important targets to understand the formation and evolution of multiple stellar systems because we can obtain accurate stellar parameters from photometric and spectroscopic studies. We present the observational results of this kind of rare object 1SWASP J093010.78+533859.5, for which the doubly eclipsing feature had been detected previously from the SuperWASP photometric archive. Individual PSF photometry for two objects with a separation of about 1.9 arcsec was performed for the first time in this study. Our time-series photometric data show that the brighter object A is an Algol-type detached eclipsing binary with an orbital period of 1.3 days and the fainter B is a W UMa-type contact eclipsing binary with a period of 0.23 days. Using the high-resolution optical spectra, we obtained well-defined radial velocity variations of the system A. Furthermore, stationary spectral lines were detected and should have originated from the other stellar component, which was confirmed by the third object contribution from the light curve analysis. No spectral feature of the system B was detected, probably due to its faintness. We obtained the binary parameters and the absolute dimensions from each light curve synthesis. The primary and secondary components of the system A have a spectral type of K1 and K5 main sequences, respectively. Two components of the system B have nearly the same type of K3 main sequence. Light variations at out of eclipses were appeared in both systems, interpreting as the effect of stellar spots on these late spectral type stars. We estimated the distances to the systems A and B individually. They may have similar distances of about 70 pc and seem to be gravitationally bound with a separation of about 130 AU. In conclusion, we suggest that 1SWASP J093010.78+533859.5 is a quintuple stellar system with a hierarchical structure of a triple system A(ab)c and a binary system B(ab).

[**꺄ST-02**] **Analyzing the binary system using standard stellar models**
: HIP 20916 and HIP 101769

Minje Beom¹ and Yong-Cheol, Kim^{1,2}

¹*Department of Astronomy, Yonsei University, Seoul 120-749, Korea*

²*Yonsei University Observatory, Seoul 120-749, Korea*

The standard stellar models for HIP 20916 and HIP 101769 have been constructed to determine the properties of the binary system. Augmented with speckle data which is the magnitude difference between stars of the binary system, the previously determined parameters, such as [Fe/H], distance, total mass, and etc, are used to construct the standard stellar models. And the Green table is used to convert L and T_{eff} into M_v and color for comparison between models and observational data. We present the constructed stellar models of the system.