CHAPTER 6

Conclusion

The observation were acquired using the 1-m McLellan telescope and HERCULES spectrograph during October 2004 to August 2007 in New Zealand. The data was completely analyzed by using Least-Squares Deconvolution technique to find out the mean profiles of the spectrum and obtained radial velocity curve. RV curve was fitted to analyses the orbital solution. The rotational velocity was succeeded by Fourier Transform. These results were displayed in table 6.1 and figure 6.1

Table 6.1: The new orbital solution of EI Eri.

Parameter	**New value from this analysis**
K (km/s)	27.82 $\pm$ 0.25
e	0.0
ω	-
T_0 (HJD)	2453 304.4522 $\pm$ 0.0052
P (days)	1.947 145 $\pm$ 0.000 037
γ (km/s)	20.61 $\pm$ 0.19
T (HJD)	2453 304.4522 $\pm$ 0.0052
$a \sin i$ (km)	744 900 $\pm$ 6900
$f(M)$ ($M_\odot$)	0.004 34 $\pm$ 0.000 11
$v \sin i$ (km/s)	54.23
$\sharp_{obj}$	42
$\sharp_{rej}$	6
σ (km/s)	1.31

Orbital parameters were determined using radial velocity curve. The standard error of an observation is 1.31 km/s. phase of line profile were then computed using revised ephemeris

HJD = 2 453 304.4522 + 1.947 145 $\times$ E.

From the standard deviation, the orbital motion is possibly cyclic. These orbital parameters could be estimated mass of secondary component from the mass function value.

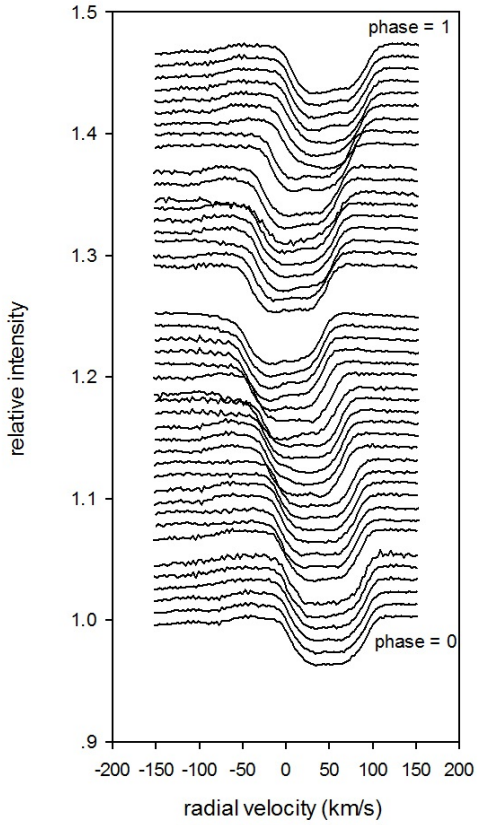

Figure 6.1: The variation LSD profiles according to phase of EI Eri.

Mass of primary stellar component was estimated equal to the Sun due to the spectral type. Using the observed mass function and the orientation of system was assumed to be parallel with the line of sight, i.e. the inclination is about $90°$. Then, the mass of the secondary stellar component can be estimated about $0.182 \pm 0.005 M_{\odot}$. So, our conclusion is the secondary component should be a Dwarf according to its stellar mass.

The projected rotational velocity ($v \sin i$) was also determined from the broadening line profile using Fourier Transform. The results were derived from about 43 spectral absorption lines. From the measured zero minimum of the Fourier transformed broadening profile, we can conclude that the mean value of $v \sin i$ is 54.23 km/s and is showed in table 6.1. The different in velocity value is a result of spot on their surface. Since this research was limited from the time and observed data, all information of EI Eri cannot be analyzed, including the properties of third body of this system. Besides that, more investigation on the primary component will help to study the spot variation on its surface by Doppler

imaging technique.