

INVESTIGATION OF COMPONENTS OF THE BINARY SYSTEM 38 PER

L.S. Lyubimkov, T.M. Rachkovskaya, S.I. Rostopchin, A.E. Tarasov
Crimean Astrophysical Observatory,
334413, Ukraine, Crimea, p/o Nauchny, E-mail: sir@crao.crimea.ua

ABSTRACT. Radial velocities V_r of components of the binary system 38 Per are measured using high resolution and high signal/noise ratio spectra. The orbital elements were updated on the basis of these data and early published measurements of V_r . The following values of effective temperature and surface gravity for the secondary component (star B) are found from its spectral type B2 V and the statistical relation of de Jager and Nieuwenhuijzen (1987): $T_{eff} = 21000 \pm 1500$ K $\lg g = 4.0 \pm 0.2$. Using these values we found the fundamental parameters for the primary component (star A): $T_{eff} = 22700 \pm 1500$ K and $\lg g = 3.4 \pm 0.2$. The rotational velocities of the components are measured from HeI lines: $v \sin i = 80 \pm 7$ km s^{-1} for A and $v \sin i = 95 \pm 10$ km s^{-1} for B.

The atmospheric helium abundance is determined; it is relatively high for A ($\text{He}/\text{H} = 0.19 \pm 0.06$) and nearly normal for B ($\text{He}/\text{H} = 0.11 \pm 0.03$). From evolutionary tracks the relative ages of the components $t/t_{MS}(\text{A}) = 0.96 \pm 0.05$ and $t/t_{MS}(\text{B}) = 0.54 \pm 0.03$ are determined, i.e. the primary is near the end of the main sequence (MS) phase and the secondary is near the middle of this phase. This investigation

together with our previously results for α Vir (Lyubimkov et al., 1995), V380 Cyg (Lyubimkov et al., 1996) and 45 ε Per (Tarasov et al., 1995) confirms the correlation between the helium abundance and the stellar age. An explanation may be connected with mixing already on the MS phase.

Full version of this paper will be submitted in *Astronomicheskij Zhurnal*.

Key words: Stars: binary: 38 Per

References

- de Jager C., Nieuwenhuijzen H.: 1987, *Astron. Astrophys.*, **177**, 217.
- Lyubimkov L.S., Rachkovskaya .., Rostopchin S.I., Tarasov A.E.: 1995, *Astron. Zh.*, **72**, 212.
- Lyubimkov L.S., Rachkovskaya .., Rostopchin S.I., Tarasov A.E.: 1996, *Astron. Zh.*, **73**, 55.
- Tarasov A.E., Harmanec P., Horn J. et al.: 1995, *Astron. Astrophys. Suppl.*, 110, 59.