ON THE DEREDDENING OF SYMBIOTIC STARS

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In studying low dispersion spectra of symbiotic stars and following the usual dereddening procedure we obtain from different pairs of the Balmer lines $H\alpha$, $H\beta$ and $H\gamma$ considerably different values for the interstellar absorption C at $H\beta$. There is a tendency the values to be $C_{\alpha\beta} > C_{\alpha\gamma} > C_{\beta\gamma}$. For one of the objects we obtained $C_{\alpha\beta} = 2.03$, $C_{\alpha\gamma} = 1.51$, $C_{\beta\gamma} = 0$. The mean values for a sample of 13 objects with measured H_γ are $C_{\alpha\beta} = 1.82$, $C_{\alpha\gamma} = 1.63$ and $C_{\beta\gamma} = 1.13$. That could be caused by processes taking place in the emitting gas and neglected in the theory as well as by nonlinearity of the detector system. Selfabsorption in the Balmer lines and collisional excitation could affect in different ways the Balmer decrement.

The emitting gas formations in the symbiotic systems are of various densities and shapes. In different phases of activity and orbital motion the line intensities change and in some cases considerable selfabsorption in the Balmer and HeI lines has been observed (Tomov, 1991).

In order to find out what steepens the Balmer decrement we calculated the C values for 25 well observed planetary nebulae from Kaler's catalogue (1976) and the same tendency was established. For 7 objects $\Delta C \leq 0.15$ and there one can safely use the average of $C_{\lambda_1\lambda_2}$. For 5 nebulae "optically thick" in the Balmer lines $\Delta C \geq 0.50$ and the means are $C_{\alpha\beta} = 1.20$, $C_{\alpha\gamma} = 1.02$, $C_{\alpha\delta} = 0.89$, $C_{\beta\gamma} = 0.60$, $C_{\beta\delta} = 0.42$. A priori one has no reason to consider either the average or $C_{\alpha\beta}$ as real interstellar absorption as it is the common practice.

On using the theorical Balmer decrement for planetary nebulae optically thick in the Balmer lines (Capriotti, 1964), we show that the C values must have the observed behaviour when the selfabsorption is not taken into account. Limitting our estimates to $H\delta$, we obtained that $C_{\alpha\delta}$ is the value closest to the real absorption C at $H\beta$. If $H\delta$ is not measured, the most reliable is $C_{\alpha\gamma}$. This conclusion is supported by the symbiotic system PK $26-2.2$. It has been observed two times a year apart and $C_{\alpha\gamma}$ is practically the same while $C_{\alpha\beta}$ changes by 0.4 and $C_{\beta\gamma}$ by 1.0.

We must note that there are several objects which show an opposite behaviour of $C_{\lambda_1\lambda_2}$ and our conclusions do not account for them.

References

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