

THE ASSOCIATIONS OB 110 AND OB 112 IN M 33 GALAXY

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The associations OB 110 and OB 112 in M 33 galaxy (Humphreys and Sandage, 1980) form a powerful group of young stars. This rich star cloud is situated far (~ 6 kpc) from M 33 nucleus. The abundance of hot stars and its huge dimensions (900 x 1500 pc) make it similar to the association OB 78 (400 x 800 pc) in the Andromeda galaxy. We use distance modulus $(m-M)_V = 25.35$ given by Sandage and Carlson (1983) and $E_{B-V} = 0.03$.

The observations of OB 110 and OB 112 were obtained in the period 1983 - 1984 by 2 m Ritchey-Chretien telescope in the Rhodopes Mountains (Bulgaria). Because of its large field ($1^\circ \times 1^\circ$), plate-scale ($12''.8 \text{ mm}^{-1}$) and slow focal ratio (f/8) this telescope is suitable for observations of exceedingly crowded stellar fields in which the background density of the unresolved stellar images is high.

The U, B, V photometry of more than 150 stars allowed the building up of diagrams colour - magnitude (Fig. 1 a,b) and colour - colour (Fig.2 a,b). The lines of the intrinsic colours of the main sequence stars and the supergiants (Ia) were shown on Fig.2 as well. The error of our photometry does not exceed $0^m.1$ in V and B and $0^m.15$ in U. The absence of strong H II regions facilitates the star photometry.

The diagrams gave the possibility to separate very confidently the high luminosity stars and the red supergiants from the foreground stars of our Galaxy. Probably all stars with $B-V < 0.35$ and $U-B < -0.2$ (indicated by closed circles on Fig.1 and Fig.2) are members of the upper part of the main sequence which appears in 17.5 - 18 magnitude. The stars situated higher and on the right from the main sequence (crosses on Fig.1 and Fig.2) are on the whole stars of the foreground. Some of the objects marked by crosses and situated on the right and down from the main sequence have non-stellar nature. Their characteristic is $B-V > 0.4$ and at the same time they have large negative

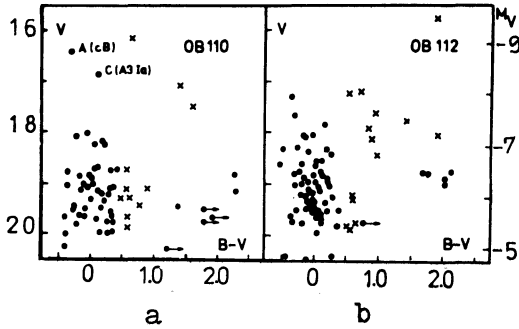


Fig.1. Colour - magnitude diagrams of the associations OB 110 (a) and OB 112 (b) in M 33.

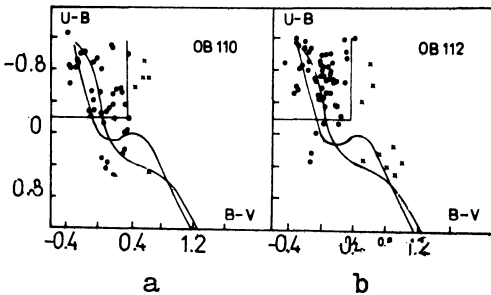


Fig.2. Two-colour diagrams of the associations OB 110 (a) and OB 112 (b) in M 33.

U-B. Four objects of this kind are seen on Fig.2a and three - on Fig.2b. Six stars belonging to OB 110 association and five from OB 112 are probably red supergiants. They appear when $V \approx 19^m$ ($M_V \approx -6.3$) and $B-V \approx 2.0$ which coincides with the results obtained by Humphreys and Sandage (1980) concerning the bright blue and red stars in M33. The stars marked by A and C in OB 110 are undoubtedly M 33 members having in mind their spectrums determined by Humphreys (see Humphreys and Sandage, 1980). This gives $M_V = -8.9$ for A and $M_V = -8.5$ for C.

The stellar magnitudes of the brightest blue stars enabled to estimate the ages of the associations. Using the method of Hodge (1983) we obtained 4.1×10^6 years for OB 110 and 6.5×10^6 years for OB 112.

A more detailed study of this star cloud and the adjacent neighborhood as well as a chart of the measured stars would be published later.

References

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 Humphreys, R.M., and Sandage, A. 1980, *Ap. J. Suppl.*, 44, 319.
 Sandage, A., and Carlson, G. 1983, *Ap. J. Lett.*, 267, L25.