

OBSERVATIONS OF STELLAR ASSOCIATIONS ON THE SPACE TELESCOPE GLAZAR

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On the base of observations by Space Telescope Glazar at 1640A the distribution of early (O-B-A) type stars and absorption matter in the directions of 20 known OB associations have been investigated. The 44 stellar groups are found in these directions. The dust matter is distributed within these groups quite non-uniformly and patchy. It is absent in the space between these groups. It has been shown that 93 stars have dense circumstellar dust envelopes and the half of them are sources of IR-radiation (IRAS observations). Dust clouds exist in the directions of Per OB1, Aur OB1 and Car OB1 at the distances 460, 1000, 1000 pc, respectively. The 20 new stellar groups of OB types are found out.

The telescope Glazar was taken onto orbit around the Earth at 30 March 1987 installed on the board of astrophysical module *Kvant* of *Mir* Space Station.

The telescope has 1.3° field. The diameter of the main Ritchey-Chretien mirror is 40cm, and the focal length is 1.7m. The linear size of view-field is 40mm, the scale of images is nearly 2'/mm, the angular resolution is about 20". The microchannal amplifier was used as a detector of ultraviolet radiation. The received information was registered on the photofilm Kodak 103a-G. The band-pass of the whole system is about 250A with a peak at 1640A. The pointing of the telescope towards the observed field is worked out by cosmonauts with the *Mir* Space Station, the stabilization system of which keeps the given orientation usually with an accuracy about 1'.

Regular observations with orbital telescope Glazar were carried out in August 1987 up to March of 1989. During that time 810 of early type stars were observed in the directions of 20 known stellar associations.

The results of these observations are presented in [1-9]. The limiting apparent magnitude at the wave length 1640A was 11^m at the beginning and decreased to 2.5^m during one and half years. Certainly the absorption is substantially greater at short

wave-length than in V -band. The observations by Glazar at 1640Å enabled us to find out groups of OB- and A-stars at various distances.

Therefore it is of more importance to determine the distances of stellar groups by the method of plots of variable extinction, i.e. by study of the dependence of modules $(m-M)_{1640}$ on color excesses $E(m_{1640} - V)$ of stars. This method was given in [7].

Table 1

RESULTS BASED ON OBSERVATIONS BY GLAZAR

Stellar Association	Num. of Stars (in deg ²)	Limit. Mag. at 1640Å	Number and Distance of Groups in pc						Num. of Stars with Dist Eval.	Num. of Binary Stars	Num. of Unknown Stars
Cas OB1,2	18(19)	9.0	400	700					5(2)	5	1
Per OB1,3	42(12)	10.0	<u>460*</u>	850	<u>1500</u>	<u>2600</u>			6(4)		
Aur OB1,2	42(17)	8.2	600	<u>1100</u>	2000	<u>3000</u>			4(3)	3	
Ori OB1	102(30)	11.0	130	<u>270</u>	<u>510</u>	<u>730</u>	960?		23(10)	2	1
Gem OB1	13(7)	9.0	300	<u>1100</u>	2400?				5(2)	3	
Mon OB1,2	35(10)	9.0	250	<u>600</u>	<u>1700</u>				6(2)		10
CMa OB1	43(10)	9.0	320	570	<u>1100</u>				8(4)		
Pup OB1,2	159(24)	9.0	120	370	700	1250	<u>2400</u>	<u>4000</u>	5(4)	1	43
Vel OB1,2	71(15)	9.0	110	<u>460</u>	<u>1700</u>				5(4)	4	3
Car OB1,2	233(13)	8.5	560	<u>1100</u>	<u>2000</u>	4000	5600		12(10)		5
Sco OB1	22(8)	10.0	<u>250</u>	<u>1700</u>					5(3)		
Cyg OB1,3	30(9)	10.0	300	<u>660**</u>	<u>1300</u>				4(3)		

* - [13] and ** - [14].

By this investigation we find out [4,6-10] 44 stellar groups, the 20 of them were unknown. The 16 of them contain B3- and later B- type stars, while 4 contain also O-B2 type stars.

The distribution of the dust matter in these groups seemed to be non-uniform and patchy. We must point out that the dust is mainly found within groups being absent in the space between them.

It has been shown that 15 stars of A0-F4 spectral type are being binary systems, with the components of hot stars of sdO-sdB types.

The 93 stars with the assumed circumstellar dust envelopes are found out and 53 of them are sources of IR-radiation according to IRAS [11].

The linear sizes and the masses of dust envelopes are determined for 36 stars in the directions of Cas OB1-OB2, Per OB1 and Ori OB1 [12]. These parameters differ strongly: the radii are in the limits $130+3250 \text{ a.u.}$, and the masses are from $10^{-7} M_{\odot}$ up to $10^{-2} M_{\odot}$.

The 66 stars among observed objects are uncatalogued stars.

It has been shown that the interstellar absorption law differs from normal one within the Carina nebulae: $R_{1640}=2.14$ and $R_V=4.0$, while according to the normal law $R_{1640}=1.75$ and $R_V=3.2-3.3$.

The list of studied 20 stellar associations is given in Table 1, with names, numbers of observed stars in each association (where the fields in deg^2 are given in parentheses), limiting magnitude at 1640A, distances of groups (in pc) in directions of these associations, number of stars with the assumed circumstellar dust envelopes (the number of IRAS stars are given in parentheses), number of binary stars and numbers of unknown OB stars.

It is shown that two associations exist in direction Per OB1 ($d=1900-2300 \text{ pc}$ [15-18]), which are projected each on the other. The distance between them is 1000 pc [10,13,19,20].

Dust clouds in the directions of Per OB1, Aur OB1 and Car OB1 exist at distances 460, 1000 and 1000 pc , respectively.

НАБЛЮДЕНИЯ ЗВЕЗДНЫХ АССОЦИАЦИЙ НА КОСМИЧЕСКОМ ТЕЛЕСКОПЕ "ГЛАЗАР"

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По результатам наблюдений, выполненных на космическом телескопе "Глазар" на 1640A, исследовано распределение звезд ранних спектральных классов и поглощающей материи в направлениях 20 известных ОБ-ассоциаций. В направлениях этих ассоциаций обнаружены 44 звездные

группировки. Пылевая материя распределена в объемах этих группировок весьма неравномерно и клочковато. Пыль отсутствует в пространстве вне этих группировок. Показано, что 93 звезды погружены, возможно, в сравнительно плотные околозвездные пылевые оболочки, половина которых является источником ИК-излучения (наблюдение IRAS). Показано, что существуют пылевые облака, в направлениях Per OB1, Aur OB1 и Car OB1, на расстояниях 460, 1000 и 1000 пк соответственно. Обнаружены 20 новых звездных группировок OB спектральных классов.

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