

ASTRONOMY

NEW H—ALPHA EMISSION STARS IN A REGION TO THE EAST OF THE T—ASSOCIATION NEAR RHO OPHIUCHI.

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ICHTISAR

Dalam artikel ini disadjikan hasil daripada survey objek^a yang mempunjai emisi H-alpha dan terletak dalam daerah seluas 25 deradjat persegi, yang berpusat pada bintang $\Omega-24^{\circ}12765$ (R.A. = $16^{\text{h}}38^{\text{m}}.5$; Dec. = $-24^{\circ}22'$; 1950). Hanya 33% daripada bintang^a beremisi H-alpha yang telah ditemukan oleh Dolidze dan Arakelyan (1959) dalam daerah tersebut diatas, dapat ditemukan kembali pada katja^a potret kita. Sedjumlah 32 bintang H-alpha emisi yang baru telah ditemukan. Letak dan peta^a pengenalan mereka disadjikan djuga pada achir tulisan ini.

ABSTRACT.

The result of a survey of H-alpha emission objects in an area of approximately 25 square degrees centered on the star $\Omega-24^{\circ}12765$ (R.A. = $16^{\text{h}}38^{\text{m}}.5$; Dec. = $-24^{\circ}22'$; 1950), is presented. Only 33% of the H-alpha emission stars discovered by Dolidze and Arakelyan (1959) which are located in the present survey region, are redetected in our plates. A total number of 32 new H-alpha emission objects are found. Their positions and finding charts are given.

INTRODUCTION.

The region of the T-association near Rho Oph and Sigma

Sco has been the subject of many investigations. Struve and Rudkjbing (1949) pointed out that this region contains H-alpha emission stars of which the spectra are reminiscent of the spectra of stars found by Joy(1946) in Taurus. They exhibit emission lines of hydrogen and calcium.

Using the Tonantzintla Schmidt type telescope Haro (1949) has found 17 new H-alpha emission stars. Using the 70 cm meniscus telescope at Abastuman Observatory, Dolidze and Arakelyan (1959) found 68 new H-alpha emission stars by extending their survey region to the east. Hidajat(1961) has also restudied the region of Rho Oph and Sigma Sco.

A survey of T Tauri stars is usually not complete because this type of stars is variable in light and also variable in H-alpha emission intensity. In order to determine whether the region to the east of the T-association near Rho Oph still contains unknown H-alpha emission stars we have attempted to restudy the region, which already had been surveyed by Dolidze and Arakelyan.

DESCRIPTION OF THE SURVEY REGION.

Originating from the surroundings of the bright and dark nebulosities in the region of Rho Oph and Sigma Sco, two dark lanes are extending to the east. The star CD-24012765 (R.A. = $16^{\text{h}}38^{\text{m}}.5$; Dec. = $24^{\circ}22'$; 1950) is seen projected just at the edge of the southern dark lane. This star is located at the center of our survey region, the area of which is about 25 square degrees. No emission nebulosities are situated in this field.

THE PHOTOGRAPHIC PLATES

For the survey, spectral plates were taken using East man Kodak 103a-E emulsion, exposed behind a 2 mm Schott RG1 filter. With the 6° objective prism and this plate-filter combination one obtains short stellar spectra of approximately 0.6 mm in length, with the H-alpha line on the red end of the spectrum.

Two unwidened plates were taken, each of 30 min. and

40 min. exposure time, while another widened plate was taken on which two exposures were made of 75 sec. and 12 min. The widening of the spectra on the latter plate is approximately 0.12 mm.

On the unwidened plates H-alpha emission intensities of medium strength can be detected without much doubt. This is not the case when the intensity is weak with respect to the continuum. Only if the H-alpha emission shows up on two different plates are we more certain that the emission is real. For the bright stars we use the short exposure widened plates. On such spectral plates even if the H-alpha emission is weak with respect to the continuum it can be detected more certainly than on unwidened spectral plates.

Furthermore, in order to be able to determine the spectral class of the stars, if not too faint, a Kodak LN unwidened plate was exposed behind a Schott RG8 filter, while a Ila-0 widened plate was taken without filter.

COMPARISON WITH DOLIDZE AND ARAKELYAN'S RESULTS.

A total number of 36 H-alpha emission stars found by Dolidze and Arakelyan fall in the region covered by our plates; these are Nos. 39, 42 to 75 and 88 in Dolidze and Arakelyan's Tables I and II. Twelve (or 33%) of these stars show H-alpha emission on our plates. They are tabulated in Table I, together with the H-alpha emission intensity determined by Dolidze and Arakelyan. From this table we see that all the stars which have strong and very strong emission are redetected on our plates, except Dolidze and Arakelyan's star no. 52, which, according to them has strong H-alpha emission, but does not show any emission on our spectral plates.

The reason that many of Dolidze and Arakelyan's stars which have weak and medium emission intensity do not show this on our plates may be partly due to the fact that these stars are variable. Two of Dolidze and Arakelyan's stars listed in Table I turn out to be of spectral class M6.

In addition to the twelve stars referred above, 32 new stars were found which have H-alpha in emission on at

least two plates. Their positions and spectral types, if any, are given in Table II, and the finding charts are given at the end of this paper. The charts, made from a visual plate, are approximately 9 x 9 min. of arc. North is at the top and east to the left. The numbers of the stars in the finding charts refer to the numbers in the first column of Table II.

TABLE I.

List of Dolidze and Arakelyan's stars re-detected in the present survey.

D-A No.	H-alpha intensity	Sp.
42	5	-
44	4	-
46	4	-
47	3-2	M6
49	2	-
50	2	-
51	3	-
60	2	-
64	3	-
68	3	-
70	3	-
72	2	M6

In addition to Dolidze and Arakelyan's H-alpha emission stars, there are two stars known to have H-alpha emission lines, which are located in the present survey region. These are the stars: MH α 276-52 (R.A. = $16^{\text{h}}44^{\text{m}}.6$; Dec. = $-25^{\circ}46'$; 1875) and HD 150193 (R.A. = $16^{\text{h}}33^{\text{m}}.8$; Dec. = $-23^{\circ}39'$; 1875). The former star was discovered independently by Merrill and Burwell (1950) and Mayal (1951) and is listed as Wolf-Rayet star No. 63 in Roberts' (1962) catalogue. On our IIA-0 spectral plate this star has the lines.

TABLE II.

List of new H-alpha emission stars.

No. TH α	R.A. (1875)	Dec. (1875)	Sp.
23-1	16 ^h 24. ^m 9	-26 ^o 57'	M0
2	25.3	-26 12	
3	27.6	-26 13	
4	28.4	-22 28	
5	28.5	-24 54	
6	28.7	-23 44	G
7	31.2	-26 14	
8	31.3	-22 54	
9	32.1	-24 46	A
10	33.6	-24 11	
11	34.0	-24 28	
12	34.1	-22 35	B
13	34.3	-26 07	
14	34.4	-22 49	B
15	34.6	-24 27	
16	34.8	-22 35	
17	35.9	-24 48	A3
18	36.8	-21 53	M9
19	36.9	-23 59	
20	36.9	-25 21	F2
21	37.2	-23 24	
22	37.4	-22 58	
23	37.4	-25 39	
24	37.5	-25 22	F5
25	37.8	-24 49	
26	39.6	-23 13	M0
27	40.1	-24 56	M0
28	40.5	-25 06	
29	41.9	-22 58	
30	42.5	-22 52	M1
31	44.2	-25 39	K
32	44.8	-25 12	

Remark: The H-alpha emission intensity of all the stars in this table is weak.

H-beta, HeII ($\lambda 4686 \text{ \AA}$) and H-gamma in emission. The strength of H-gamma is a little less than that of H-beta, while HeII is approximately as strong as H-beta. Merrill and Burwell (1950) have announced that Minkowsky has found the spectrum of this star to contain bright lines of HeI and FeVII.

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