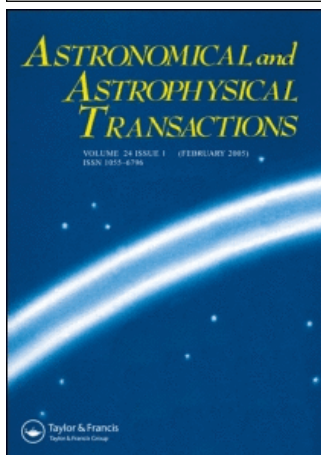


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## THE CHEMICAL COMPOSITION OF TWO PRAESEPE'S GIANTS

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(29 December 1991)

The abundances and physical conditions in the atmospheres of two giant stars of the open clusters Praesepe are investigated. The spectra of the stars were obtained with the Soviet 6-meter telescope with the dispersion  $14 \text{ \AA/mm}$ . The abundances of chemical elements in K giant atmospheres have been derived using the method of the model atmosphere and they have nearly solar values.

We discuss properties of two Praesepe's giant stars: HD73665 and HD73710. Table 1 contains some characteristics of these two stars.

The spectrograms of the K giants were obtained by one of the authors (N.S.K.) at the second camera of MSSP BTA on Kodak 103-aF plates in the wavelength range  $\lambda\lambda 5300\text{--}6700 \text{ \AA}$  with dispersion of  $14 \text{ \AA/mm}$ . In order to identify the lines, a synthetic spectrum was used which was computed using the SYNT software by Tsybal (1980) for the wavelength range  $\lambda\lambda 5300\text{--}6700 \text{ \AA}$ . The atmosphere model of Bell *et al.* (1978) was used in calculations with the following parameters: the effective temperature  $T_{\text{eff}} = 5000 \text{ K}$ , the logarithm of gravity  $\lg g = 3.0$ , the solar abundances and the list of atomic lines from Kurucz and Peytremann (1975).

The computations of abundances in stellar and solar atmospheres were made using the WIDTH-6 software. The atmosphere model was taken from Bell *et al.* (1978) with  $T_{\text{eff}} = 5000 \text{ K}$ ,  $\lg g = 3.0$ ,  $\lg g = 2.25$ , the solar abundance, for three values of the turbulent velocity,  $V_t = 1.6, 1.8$  and  $1.9 \text{ km/s}$ . The method to choose the parameters of the models and turbulent velocity are discussed in more detail by Mishenina *et al.* (1991).

The oscillator strengths  $\lg g_f$  were taken from Kurucz and Peytremann (1975) and Gurtovenko and Kostik (1989).

In order to compare the abundances in the stellar atmospheres with the solar ones, the chemical composition of the solar atmosphere was calculated with the same atomic line parameters as for the stars investigated. The solar atmosphere model of Bell *et al.* (1978) was used, the equivalent widths were taken from Moore (1966).

The abundances of the chemical elements were interpolated for the values  $\lg g = 2.3$ ,  $v_t = 1.8 \text{ km/s}$  and  $\lg g = 2.7$ ,  $v_t = 1.9 \text{ km/s}$  for the stars HD 73665 and HD 73710, respectively. The scale was taken as  $\lg A(H) = 12.0$ .

In Table 2 the abundances of chemical elements are presented for the atmospheres of two giant stars, HD73665 and HD 73710 and the Sun, where  $S_{[7]}$  is the abundance in the solar atmosphere taken from (Anders and Crevesse (1989),  $S_{\odot}$  is the abundance in the solar atmosphere obtained in this paper, and  $n$  is the number of the lines in the spectrum.

**Table 1** Characteristics of the giants stars of the open clusters Praesepe.

<i>HD</i>	<i>BS</i>	<i>V</i>	<i>B-V</i>	<i>Sp</i>
73665	3427	6.39	0.98	K0III
73710	3428	6.44	1.02	K0III

**Table 2** The chemical abundances in the atmospheres of the K Giants of Praesepe and the Sun.

<i>El</i>	<i>HD 73665</i>		<i>HD 73710</i>		$S_{\odot}$	$S_{[7]}$
	<i>n</i>	$Lg g = 2.3$	<i>n</i>	$Lg g = 2.7$		
NaI	3	6.64	3	6.62	6.26	6.33
MgI	2	7.57	2	7.44	7.36	7.58
SiI	19	7.78	19	7.76	7.13	7.55
CaI	7	6.10	6	6.39	6.39	6.36
ScI	4	3.53	3	3.51	—	3.10
SCII	6	3.14	8	3.07	2.99	3.10
TiI	32	5.05	31	5.06	4.78	4.99
TiII	6	4.77	6	4.78	—	4.99
VI	24	4.01	24	4.14	4.01	4.00
CrI	16	5.90	13	5.79	5.70	5.67
CrII	2	5.91	2	6.09	—	5.67
MnI	10	5.56	12	5.91	5.77	5.39
FeI	93	7.42	90	7.52	7.55	7.67
FeII	7	7.43	7	7.52	—	7.67
CoI	8	4.93	9	4.84	4.80	4.92
NiI	37	6.25	37	6.35	6.21	6.25
SrI	3	4.02	3	4.12	2.77	2.90
YI	3	3.14	1	3.24	3.29	2.24
YII	5	2.55	2	2.99	2.18	2.24
ZrI	14	3.74	16	3.76	3.48	2.60
MoI	4	3.17	3	3.42	2.65	1.92
MoII	2	3.55	2	3.50	—	1.92
RuI	4	4.16	3	4.32	—	1.84
BaI	2	4.17	2	3.48	—	2.13
BaII	1	1.56	2	2.36	1.60	2.13
LaII	2	0.96	2	1.05	0.76	1.22
CeII	3	1.73	3	1.91	1.48	1.55
PrII	1	2.43	1	2.19	1.39	0.71
NdII	2	2.94	2	3.21	2.18	1.50

The accuracy of the abundance determination is 0.20 dex for the iron lines and other elements represented by numerous lines, and not higher than 0.5 dex for the elements represented by one or two lines.

The chemical composition of Praesepe giant stars is consistent with their origin in the interstellar medium with enrichment by different contributions of heavy metals due to explosions of Type I and Type II Supernovae.

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