Table 1. Blue-shifted lines in HR 6000.

Element	Mult.	λ(Å)	χ_{low}	shift (Å)	Notes
		Ultraviolet range			
C II	1	1334.532	0.00	−0.10,−0.2	triple
O I	2	1302.168	0.00	−0.10	double
Mg II	1	2795.528	0.00	−0.15	broad shifted line
Mg II	1	2802.698	0.00	−0.15:	broad shifted line
Si II	4	1260.422	0.00		double ?
Si II	3	1304.370	0.00	−0.10	double
Fe II	3	2343.496	0.00	−0.10	broad shifted line
Fe II	2	2382.039	0.00	−0.10	broad shifted line:
Fe II	1	2585.876	0.00		blended ?
Fe II	1	2599.395	0.00	−0.10	broad shifted line
		Optical range			
Na I	2	3302.368	0.00		very sharp no-shifted line
Na I	2	3302.978	0.00		very sharp no-shifted line
Na I	1	5889.953	0.00	−0.05	very sharp strong line
			0.00	−0.10	weak broad line
Na I	1	5895.923	0.00	−0.05	very sharp strong line
K I	1	7664.911	0.00	−0.05	sharp line
K I	1	7698.974	0.00	−0.05	sharp line
Ca II	1	3933.663	0.00	−0.10	weak broad line

1. The interstellar lines

Castelli et al. (1984) detected strong blue-shifted components of C II, O I, Mg II, Si II, Fe II lines in the IUE spectra, all arising from zero excitation potential lower level.

Optical counterparts observed in the UVES spectrum of HR 6000 are the Na I lines at 5889.951 and 5895.924 Å, and the K I lines at 7664.911 and 7698.974 Å. They are all blue-shifted by 0.05 Å from the laboratory wavelength. In addition, the large abundance that we derived from the Na I doublet at 3303 Å, in clear conflict with that from other Na I lines (Sect. 5), suggests that also these lines are of interstellar origin, although they are not shifted, but only narrower than the predicted ones.

The position of the Na I and K I lines does not change in the spectra observed on September 2005 and March 2006. This implies that they move with approximately the same radial velocity of HR 6000 and of the Lupus complex, to which HR 6000 seems to belong. This fact and the absence of any sharp component for the K and H Ca II profiles support the hypothesis of the interstellar rather than circumstellar origin for the blue-shifted lines. In fact, according to Holweger at al. (1999) a criterion to discriminate in

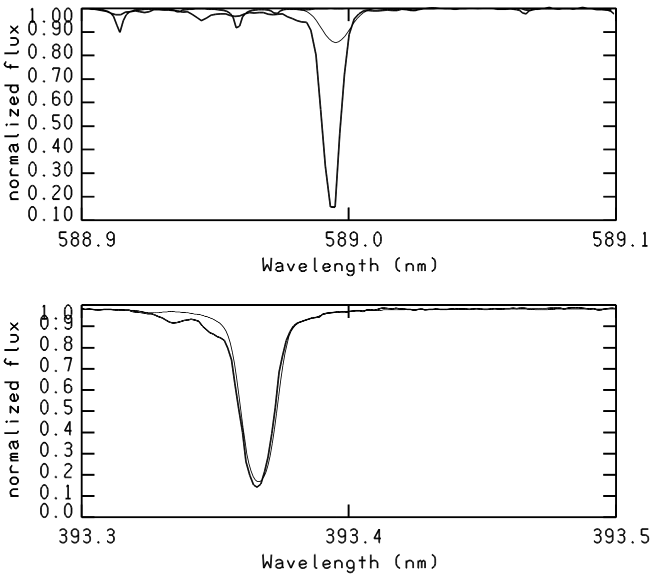

Fig. 1. Observed (thick line) and computed (thin line) profiles of Na I 5889.951 Å (upper panel) and Ca II 3933.663 Å (lower panel). A broad weak profile can be observed on the extreme blue wings in both lines.

favour of the circumstellar origin is the ratio of the equivalent widths of the non-stellar Na D and Ca II K lines that should be well below unity. This is not the case of HR 6000.

Additional very weak broad features affect the blue wings of Ca II K, Na I 5889.953 Å, and to a less extend the blue wing of Na I 5895.924 Å. Their shift is about −0.1 Å from the line core (Fig. 1). They also do not change in the spectra observed at two different epochs. A possible explanation is that they originate in some other part of the interstellar medium.

All the interstellar lines observed in the spectrum of HR 6000 are listed in Table 1.

References

Castelli, F., Cornachin, M., Morossi, C., & Hack, M. 1984, A&A, 141, 223

Holweger, H., Hempel, M., & Kamp, I. 1999, A&A, 350, 603