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IS HD 90994 A "REDUCTION VARIABLE"? *

Discrepant results in reducing uvby observations of HD 90994 (= HR 4119 = 30 Sex = β Sex, B6V) led us to gather the photometric values given for that star in the literature. Original observational UBV data (i.e. not resulting from a compilation) are presented in Table I, while original uvbyβ indices are given in Table II, together with the results of our own observing runs. The penultimate line of Table II corresponds to observations carried out with the Danish 50 cm telescope at La Silla. The indices in the seven-colour (Geneva) system are the following (Rufener, 1976, 1981): m_v = 5.055, U = 0.391, V = 1.119, B_1 = 0.825, B_2 = 1.572, V_1 = 1.819 and G = 2.344, with σ_v = 0.006 and σ(colours) = 0.003. In the DAO system where HD 90994 was selected as a standard star, the indices are (Hill et al., 1971): V = 5.04, c(35-44) = -0.683, c(38-44) = -0.474, c(38-42) = -0.372, c(44-54) = -0.094, c(42-56) = -0.168 and B-V = -0.12.

Table I

UBV observations of HD 90994

V	U-B	B-V	n	Ref.
5.00		-0.14		Bouige, 1959
	-0.518	-0.145		Belyakina & Chugainov, 1960
5.07	-0.50	-0.14		Cousins & Stoy, 1962
5.09	-0.54	-0.13		Iriarte et al., 1965
5.09		-0.126		Haggkvist & Oja, 1966
5.10	-0.53	-0.14		Johnson et al., 1971
5.07	-0.51	-0.14	5	Crawford et al., 1971

* Based on observations collected at the European Southern Observatory, La Silla, Chile

Table II

uvbyβ observations of HD 90994

V	b-y	m_1	c_1	n	β	n	Ref.
					2.730	3	Crawford & Mander, 1966
	-0.056	0.108	0.487	1	2.736	1	Cameron, 1966
5.1	-0.064 ±0.009	0.116 ±0.011	0.466 ±0.010	7			Crawford & Barnes, 1970
	-0.059 ±0.005	0.116 ±0.005	0.475 ±0.007	2	2.731 ±0.007	2	Johansen & Gyldenkerne, 1970
5.07	-0.064	0.116	0.466	std	2.730	std	Crawford et al., 1971
5.04					2.738	4	Stokes, 1972a
5.08	-0.065	0.113	0.480	7	2.727	7	Stokes, 1972b
					2.733	10	Claria, 1974
					2.722 ±0.011	7	Feinstein, 1974 (obs. in 1970 & 1972)
	-0.065 ±0.006	0.115 ±0.007	0.485 ±0.004	31			Grønbech et al., 1976
					2.729 ±0.004	24	Grønbech & Olsen, 1977
	-0.062 ±0.008	0.107 ±0.008	0.478 ±0.001	2	2.732 ±0.003	4	Warren & Hesser, 1977
	-0.067 ±0.004	0.109 ±0.003	0.480 ±0.011	3	2.725 ±0.004	10	Warren & Hesser, 1977
5.072 ±0.004	-0.064 ±0.004	0.116 ±0.010	0.481 ±0.009	4			Heck & Manfroid, 1980 (obs. in June 1978)
5.077 ±0.010	-0.060 ±0.004	0.107 ±0.004	0.498 ±0.005	16			see text (obs. in March 1980)
5.076 ±0.004	-0.067 ±0.003	0.119 ±0.004	0.480 ±0.002	10			Manfroid & Renson, 1982

HD 90994 is also known as a β standard (Crawford & Mander, 1966) and has been extensively used as such in spite of the variations shown, amounting up to $\sim 0^m.06$ in V, $0^m.013$ in b-y, $0^m.032$ in c_1, $0^m.020$ in m_1 to take only the uvby photometry.

These variations might however result from reduction problems as HD 90994 has an extreme value in b-y (refer for instance to Oblak et al., 1976). If the standard stars used for a given run are not well spread enough in the ranges of the photometric indices, the extrapolation to extreme reduced values can be wrong. Since the (b-y) term appears in all the reduction equations (see e.g. Crawford & Barnes, 1970), all reduced color indices can be affected. This kind of problem will be treated in detail elsewhere (Manfroid & Heck, 1982).

However in a recent paper, Manfroid & Renson (1982) believe HD 90994 could be also intrinsically variable by $0^m.01$ or slightly more in y and by $0^m.02$ in u. They even suspect this variation to be periodic, with $P \simeq 8^d$ (or the double, with a double maximum).

We would then urge a series of detailed observations with carefully selected standard stars in order to precise the type of possible variations of the star, independently from reduction problems.

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