NARROW-BAND PHOTOMETRY OF A AND F STARS

E. E. MENDOZA V.

Instituto de Astronomía,
Universidad Nacional Autónoma de México

Abstract. The α and λ photometric systems are used to obtain a bi-dimensional representation of the A and F stars.

The α and λ photometric systems (cf. Mendoza, 1971 and 1975) have been used to measure total absorptions of Hα and O I(λ 7774 Å) lines of A and F stars. The observations were carried out with the 40-in telescope at Tonantzintla, from January to May 1975.

The comparison between Λ and λ and Hβ and Hα photometries is very good. The details will be shown elsewhere.

Provisional results are given in Table I.

TABLE IA

Mean α-indices

Ia	Ib	II	III	IV	IV–V	V	Type
		0.180	0.238	0.225		0.240	A5
				0.249		0.264	A6
0.190			0.230	0.245	0.234	0.248	A7
						0.216	A8
	0.159		0.152		0.195	0.191	F0
					0.162	0.160	F2

TABLE IB

Mean λ-indices

Ia	Ib	II	III	IV	IV–V	V	Type
		0.057	0.038	0.026		0.034	A5
				0.027	0.030	0.028	A6
0.048			0.027	0.027		0.028	A7
						0.021	A8
	0.059		0.036	0.026		0.034	F0
				0.022		0.017	F2

Preliminary conclusions for A and F stars are:

(1) The α-index is a good indicator of stellar gravity for stars of equal spectral type.

B. Hauck and P. C. Keenan (eds.), Abundance Effects in Classification, 79–80.

(2) The α-index is also a good indicator of stellar atmospheric temperature, for stars of equal luminosity class.

(3) The α-index correlates well with the β-index.

(4) The λ-index isolates very well high luminosity stars (classes I and II) from low luminosity classes.

(5) The λ-index does not, apparently, depend on temperature.

(6) The λ-index, for low luminosity classes, is probably related to an abundance effect.

(7) The λ-index is smaller for metallic line stars than for 'normal' stars.

References

Mendoza, E. E.: 1971, *Bol. Obs. Tonantzintla y Tacubaya*, 6, 137.
Mendoza, E. E.: 1975, *Publ. Astron. Soc. Pacific* 87, 505.

DISCUSSION

Spinrad: What are you planning to do with this new photometric system?

Mendoza: It already has been applied to several kinds of stars with very interesting results. I plan also to observe T-Tauri stars in the near future.

Gerbaldi: In your λ-index can you separate the Am stars?

Mendoza: The classic Am stars are very well separated.

Hauck: Have you examined if a correlation exists between your parameter for the Am stars and the Δm_1?

Mendoza: Not yet, the work reported today is based on recent observations.

Baschek: Should one not expect that the infrared oxygen triplet is sensitive to microturbulence in the range considered, so that this effect should be taken into account besides an abundance effect.

Mendoza: The O I lines at λ7774 Å are primarily sensitive to the gravity of high luminosity stars. Preliminary results indicate that these lines may somewhat depend on chemical composition, stellar age and/or microturbulence, etc. The observations under way will decide on this subject very soon.

De La Reza: Concerning Dr. Baschek's remark I want to say that the oxygen triplet in the near infrared is maybe not so sensible to microturbulence if you consider non-LTE effects. In fact some people have shown that the LTE supersonic microturbulence became non-LTE subsonic microturbulence.

Keenan: In answer to Dr. Baschek, the luminosity effect in O I λ 7744 is very strong through G0, and falls off rapidly after that.