

A CATALOGUE OF H α OBSERVATIONS

J.R. Ducati ⁺

Centre de Données Stellaires

11, rue de l'Université - 67000 Strasbourg - France

ABSTRACT. A catalogue of quantitative observations of H α published between 1949 and 1980 has been prepared. It contains 4095 measurements concerning 2700 stars.

We have compiled a catalogue of quantitative H α observations made since 1949, by means of a survey in the literature that revealed the existence of 37 publications in which measurements are given. This catalogue is available at the Stellar Data Center at Strasbourg.

The first part of the catalogue consists in the original measurements, as published by their authors, amounting to 4095 H α magnitudes, ratios, equivalent widths or other forms of quantifying the H α line intensity; as there are stars that were observed by more than one author, or even by the same author, several times, these 4095 observations refer to some 2700 different stars. In this first part of the catalogue, the following data are provided: star identification, spectral type, m_v , the H α measurement, the error in H α , the number of observations, remarks concerning duplicity, variability, emission, etc..., and the reference. Some of these data may not be present, if not provided in the original paper.

The second part of the catalogue represents a tentative to furnish an unified, homogeneous H α system. As a justification to this effort, one must remark that it does not exist, until our days, an accepted system for H α . For the H β case, on the other hand, there is the well-known and widely accepted system developed by Crawford and his co-workers since almost twenty years ago.

It is not always possible to transform a photometric system to another,

⁺ In leave of absence from the Departamento de Astronomia do Instituto de Fisica da Universidade Federal do Rio Grande do Sul, Porto Alegre, Brasil

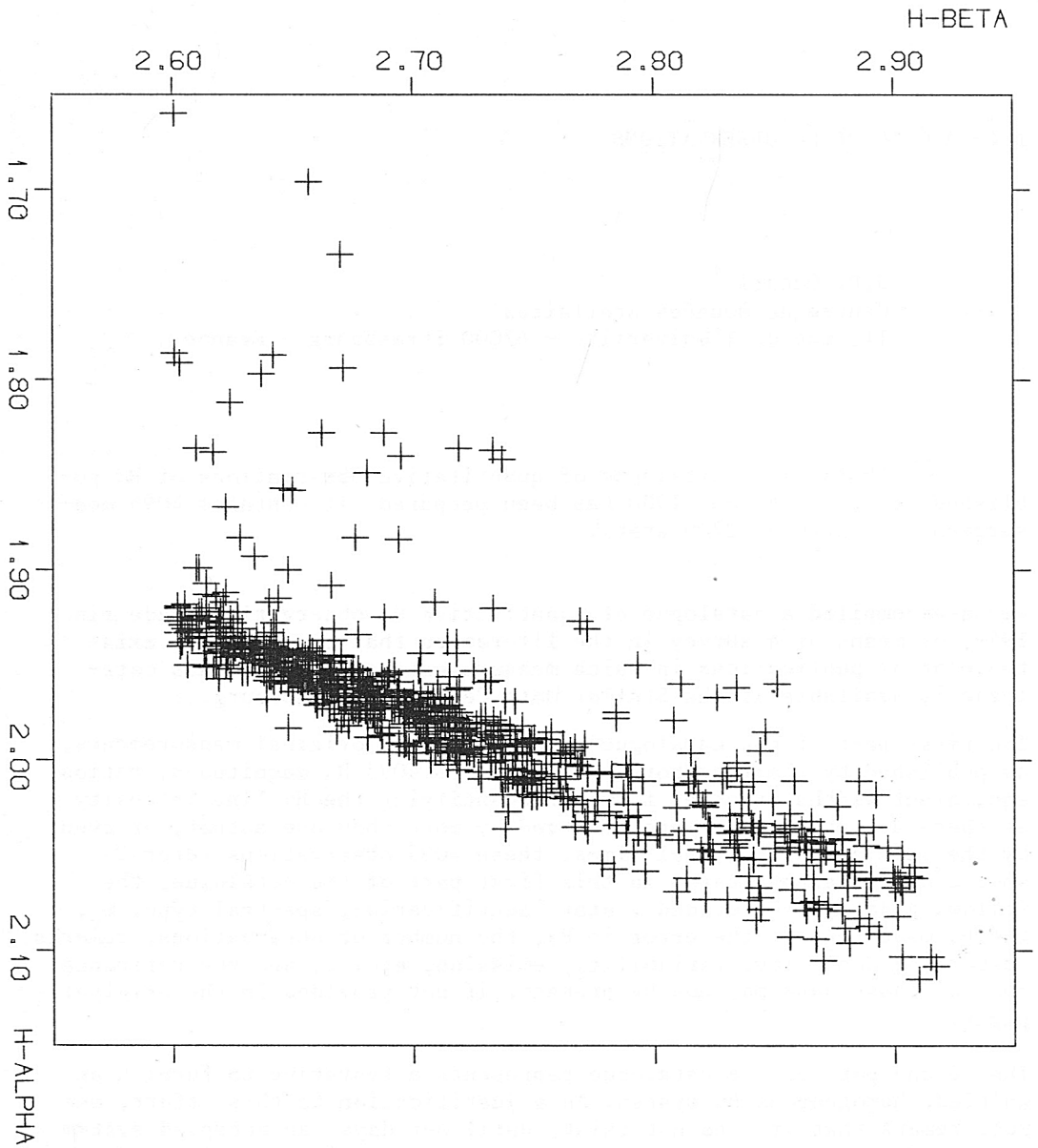


Fig. 1. $H\alpha$ vs. $H\beta$ for 700 stars which have both lines observed. The α -scale is in the Strauss-Ducati system, the β -scale in the standard Crawford system.

since different observing techniques may prevent any meaningful attachment. Studying the first part of this catalogue and looking for suitable systems or lists of observations, we found twelve papers, by seven authors, that have enough data to allow a transformation, in linear form, to another system, at least for a certain range in the respective domains of the H α indices. These twelve papers are : Feinstein (1974, 1978), Dachs and Schmidt-Kaler (1975), Strauss and Ducati (1981), Mendoza (1976 a, b, c, 1977, 1979), Peat (1964, 1966), Andrews (1968), and Cester et al (1977).

Merging these systems, we arrived at a catalogue of 2300 stars with unique α indices. Only in a few cases these indices are means made from more than one author, the general case being that the index in the catalogue comes from a single reference, having undergone a transformation.

The unified indices in the catalogue are given in a system chosen arbitrarily between those that form the catalogue; nevertheless transformation from this system to another one is possible by using equations given in the third part.

As a check for the quality of this transformation, we made a comparison of the H α and H β indices for the stars that have both observed. As figure 1 shows, the correlation for 700 stars is good, taken in account the spread in the observations that occurs generally. The stars that are scattered in the left of the diagram, are in their majority supergiants or emission stars, which classically are separated in this kind of comparison.

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DISCUSSION

Mermilliod: The transformation of the H_{α} measurement into an unique system seems to be rather problematic since the number of common stars between different systems is generally small and the slope of the relation is unfavourable to perform a good transformation. Furthermore, transformation can be made only for normal stars and unfortunately not for the Be stars, for which it would be most interesting.

Ducati: Taking into account these problems we excluded two thirds of the work used to make the general catalogue, forming the unique system only with sufficiently correlated observations if the slope of the correlation equation was great enough to avoid an amplification of the errors. Nevertheless, an important proportion of Be stars was really excluded and this cannot be avoided, since each observer drives an H_{α} system for his specific purpose, which is not the case for H_{β} .

Mermilliod: Mermilliod and Mermilliod published a compilation of Balmer-line photometry ($\alpha, \beta, \gamma, \delta$), made in the frame of the collaboration of the Lausanne Institute of Astronomy with the Stellar Data Center. The description has recently been published in the Bulletin of the CDS.

Mendoza: Why did you not include in your catalogue other hydrogen lines?

Ducati: Catalogues of H_{β} and H_{γ} already exist and are available in the Stellar Data Center in Strassbourg. For H_{β} data, especially, there is the uvby β Catalogue by Hauck and Mermilliod (1980).