

tings, while each measurement of separation is an average of 4 measures of the double distance.

It is possible now, after nearly four years and seven observing missions at La Silla, to make the first conclusions on the work done.

Regarding the air tranquillity, La Silla is largely superior to the average of European sites of which I have direct observing experience. 51% of the nights have been completely utilizable or in part (26% "good quality" nights and 25% "sufficient quality" nights), while during the remaining 49% of nights, bad seeing or covered sky have prevented the observations. A comparison with the seeing measurements made at Cerro Vizcachas has allowed to establish that, when the value measured there is better than 0".7, generally, the images at the GPO can be considered good; in these conditions the diffraction image presents itself as stable and the "turbulence" is less than 0".14 (for the definition of "turbulence", see Danjon and Couder, 1935, or Texereau, 1958).

Up till now, a total of 1840 measurements of 432 systems, down to separations of 0".18, have been made at La Silla. Figure 5 shows the histogram of the percentages of the measurements made by class of separation.

From these first results, it is my firm belief that La Silla is a very valid site for the observation of visual double stars. The contribution that a good observer (who could rely full time, for this kind of observations, on the GPO astrograph, or on an instrument of superior class) could give to the astronomy of visual double stars and to the knowledge of stellar masses, would be fundamental.

A Final Plea

It is exactly because of the validity of the arguments exposed above that the voices heard in recent times "on the arid mountain" regarding the future of the small instruments are a cause of worry. They contribute to make even more uncertain the future of this branch of astronomy with great traditions, still scien-

tifically valid, and which has lost none of its reasons of existence.

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Long-term Photometry of Herbig Ae/Be Stars in the Strömgren System

P. S. THÉ and E. BIBO, *Astronomical Institute "Anton Pannekoek", University of Amsterdam, the Netherlands*

Introduction

Our working group on the study of Herbig Ae/Be stars has joined Sterkens group of Long-term Photometry of Variables from the beginning on. The photoelectric photometry is based on

Strömgren's system and is done with the small ESO telescopes at La Silla. Since the magnitude limit for accurate measurements is about 9, in this long-term photometry we have monitored only the brighter 27 members of the Herbig Ae/Be stellar group. When after

some time a star turned out to be non-variable we have discontinued observations of it. The study of Herbig Ae/Be stars, which usually are varying irregularly, is done for giving a better explanation of the complex problems connected with the variability of these ob-

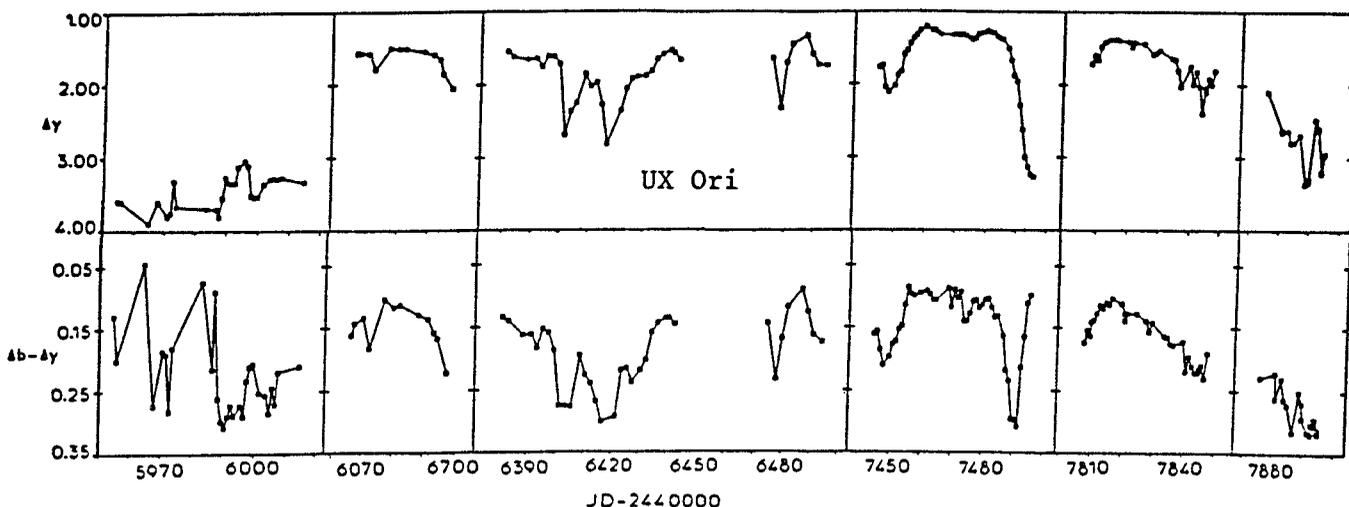


Figure 1: The light curve of UX Ori. The star remains quite a long time at maximum brightness, but can leave it, and stay many days close to its minimum brightness.

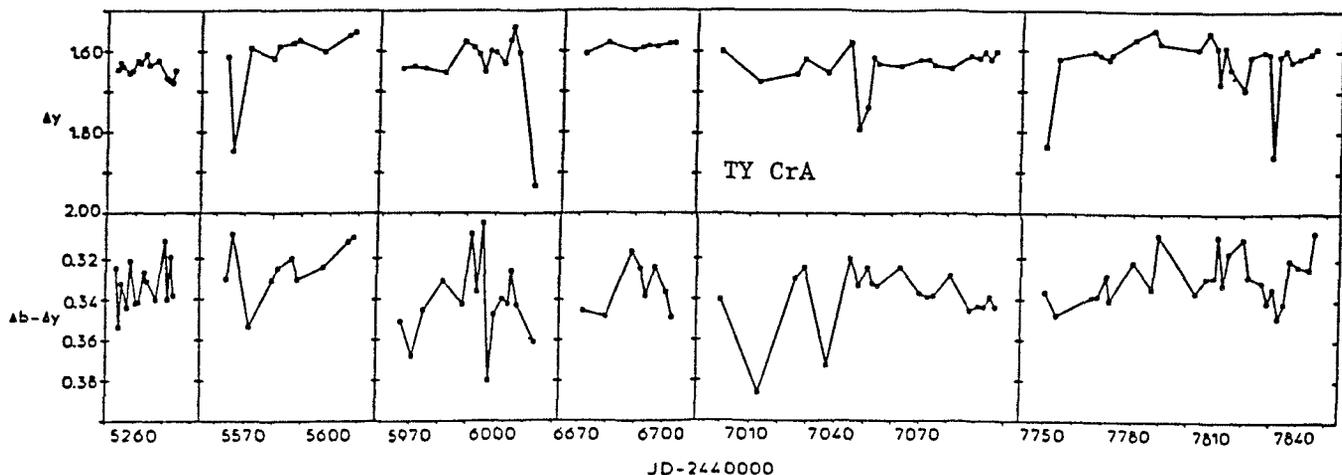


Figure 2: The light curve of TY CrA. There are fewer observations compared to those of UX Ori, but from the figure it is clear that the star remains close to its brightness level all the time, with sudden changes to lower brightness.

jects. We have in mind the study of three problems, explained further below, which can only be done with long-term photometry on the same photometric system.

Type of Variability, and its Correlation with Spectral Type and Spectroscopic Variations

The first purpose of the long-term photometry of Herbig Ae/Be stars is the determination of the shape of the light curve and the range in brightness. Light curves of UX Ori and TY CrA are shown in Figures 1 and 2 as examples. It is then important to know whether the type of variability and/or the brightness amplitude has some relation with the spectral type and luminosity of the star. In other words, do they depend on the location of the star in the Hertzsprung-Russell diagram, which is determined by the evolutionary state of the object?

Many observations were also made simultaneously with spectroscopic observations. For the study of the variable emission lines in the visual and/or in the UV, the knowledge of the brightness level of the star at the time when the spectroscopic observations were made, is necessary. Recent results of such studies have been reported by Tjin A Djie et al. (1989), for the visual spectral region, and by Blondel et al. (1989), for the ultraviolet.

Correlation Between Light and Colour Variability

A specific problem shown by several Herbig Ae/Be stars is that the light variability is correlated with the changes in colour in a special way. In the beginning, the colour of such a star becomes redder when the star dims, but after reaching a certain "turning point", it gets bluer when becoming fainter again. A typical

example of a star exhibiting such a behaviour quite strongly is UX Ori, as shown in Figure 3.

There are several mechanisms proposed to explain this behaviour (Zajtseva, 1986, Pugach, 1981, Grinin, 1988), but no one adequately explains the observed phenomena. A revised mechanism for Grinin's (1988) explanation of the long-term photometric behaviour of UX Ori is reported in a recent paper by Bibo and Thé (1990).

Periodicity in the Light Variations

Although apparently irregular, it seems that in the light variations of Herbig Ae/Be stars, there are quasi-periodicities. These are perhaps caused by periodic variations in the characteristics of the stellar atmospheres. Such a quasi-period (of about 49 days) was found in the light variations of the star HR 5999 (A7 IIIe) by Baade and Stahl

(1989). By using a stronger code on the data used by Baade and on those obtained by the long-term photometry (spanning in total a time interval of about 7 years), we have found in addition a quasi-period of about 110 days. An explanation for this behaviour is still lacking.

This study is made in collaboration with M.R. Pérez and J.R. Webb.

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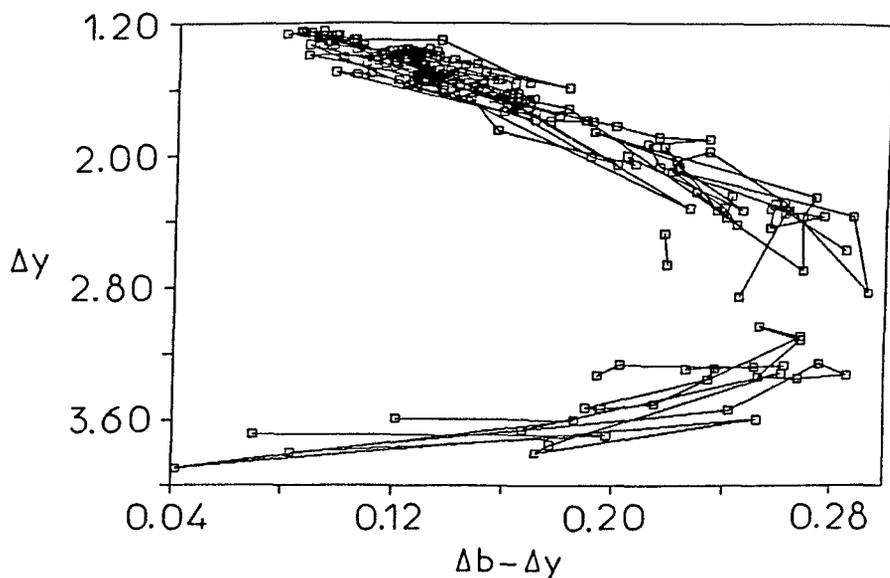


Figure 3: The magnitude-colour relation of UX Ori. The star becomes redder when it dims, but after a certain turning point it gets bluer when decreasing in brightness further.