Observational aspects of Herbig Ae/Be stars and of candidate young A/B stars

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Citation for published version (APA):
PART B

Candidate young A/B stars

In Part A typical characteristics of Herbig Ae/Be stars are described. Furthermore, we have discussed properties by which they could be recognized observationally. However, to obtain data sets that include all possible evidences to select a real Herbig Ae/Be star is very complicated. In general one will use for such a procedure observational characteristics that are easy to obtain. Such observations normally include spectra and multiwavelength photometry with IRAS data. The simple selections criteria are then the detection of emission features and the presence of an IR-excess. However it is well known, and discussed in Part A, that other objects, besides pre-main sequences stars, do fulfill such criteria also, e.g. LBVs, post-AGB stars, Symbiotics systems. Furthermore, we have discussed that pre-main sequence A- and B-type stars do not always show properties which are historically described to be characteristic for the Herbig Ae/Be class. For these reasons it is in many cases not easy to discriminate between true and candidate Herbig Ae/Be objects.

In this part we will discuss such objects, which were originally selected as Herbig Ae/Be candidates. A more detailed analysis of the observational characteristics show that they are probably more evolved. This group contains very interesting objects as is shown in Chapter B1, in which the discovery of a new galactic Luminous Blue Variable (LBV) is reported. Previously only about four LBVs were known in our Galaxy. We have analysed the possible LBV properties of WRA 751 in more detail in Chapters B2 and B3.

A well known B[e] star is HD 45677. The B[e]-group was collected to consist of evolved objects with masses less than those of LBVs and comparable with B[e] stars observed in the LMC. In recent publications, however, HD 45677 was described as a possible Herbig Be star. In Chapter B4 new observational evidences together with the analyses of about 100 years of known brightness measurements of this star indicate that its pre-main sequence nature must be questioned.

Another object for which the pre-main sequence status is doubtful is HD 147196. Although it was not recognized as such in the literature it is a Be star located in the dark cloud region ρ Ophiuchus. In Chapter B5 we show that the emission line nature of this object is variable, which indicate the difficulties to select homogeneous samples on the bases of spectral observations. Finally in Chapter B6 we discuss the possible youth of HR 6000, an object not showing any observable peculiarities at first sight. However, as being the close neighbour of a well known Herbig Ae star, HR 5999, a comparable youth is likely. Indeed, a weak near-IR excess, photometric variability and being a strong X-ray source, suggest the presence of a T Tauri companion. HR 6000 maybe, therefore, a very young “main sequence” object. Such objects are very interesting in probing the evolution of pre-main sequence to “normal” main sequence stars.