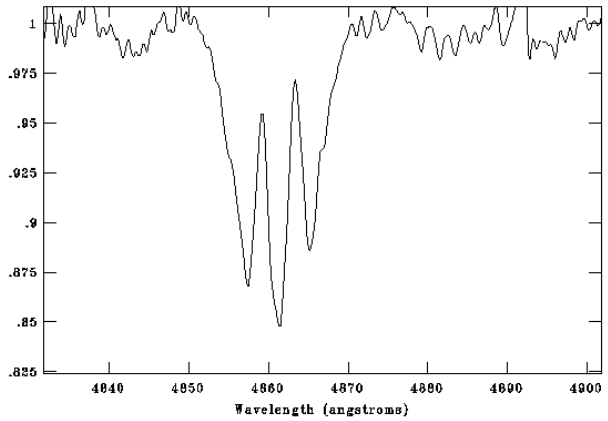

Fig. 1. Hβ profile in the spectrum of HD 143448.

2. OBSERVATIONS AND REDUCTION

The sample contains stars brighter than 11.3 magnitude in the V band. The observations were collected with the Jorge Sahade 2.15 m telescope at Complejo Astronómico El Leoncito, San Juan, Argentina. We used a REOSC spectrograph in simple and cross dispersion mode. The spectra cover the range 3600–6000 Å with a resolution around 3.6 Å/2px for simple dispersion and 0.28 Å/2px and a spectral range between 3700–5700 Å for cross dispersion. The detector was a CCD TEK of 1024 × 1024 pixels, of size 0.024 mm, thinned and back illuminated. Data reduction was carried out using IRAF tasks. The S/N for spectra in cross dispersion was about 100 and 200 for the classification spectra.

2.1. *MK classification*

The spectral classification in the MK system was derived using the WINMK code version 2.4 developed by Richard Gray at the Appalachian State University, USA[1]. The classification was carried out by comparison with MK standard stars taken with the same equipment and conditions and using the MK technique (Gray & Corbally 2009).

2.2. *Comments about some stars*

Star number 1 is a blue straggler with emission in Hβ and we have classified its spectrum as B1Ve. This star was previously classified by Morris (1961) as B3 IV and by Garrison, Hiltner, & Schild (1977) as B1.5 V. The profile of Hβ is similar in all 5 echelle spectra of star number 1 that we have taken and it is shown in Figure 1.

Star 6 shows emission in Hβ but it is probably a non-member of the cluster according to its absolute proper motion, although its position in the HR diagram fits well (see below). The classification spectrum of Star 11 shows Hg II λ 3984 and probably but less clear Mn II λ 4206. Star 25 is a Bp star of the Silicon type with λ 4200 well seen at the classification dispersion. Star 59 is also a Bp star of the Silicon type but with lower excitation level. Star 10 is an SB2 and eclipsing binary (González & Levato 2010, private communication). Star 26, HD 143511, was extensively studied by González & Levato (2006) and it is an SB2 and also an eclipsing binary with a period of 5.53546 days. It is probably a non-member of the cluster according to its absolute proper motion. Kilambi found stars 4, 6, 10 and 60 to have the Stromgreen m_1 index larger than normal. Additional features for each star are included in the notes to Table 1.

2.3. *Proper motions*

We have included in Table 1 the absolute proper motions in RA and DEC in mas yr^{-1}, taken from the SPM4 (van Altena et al. 2010, private communication) which contains 100 million stars. This catalogue is an excellent tool, among other purposes to decide about membership to open clusters. From the proper motion point diagram shown in Figure 2, it is clear that stars 6, 11, 15, 21 and 26 are probable non-members of the cluster. All of them have proper motions differing by more than 3σ from the average absolute proper motion of the cluster. We have used this criterion to decide about membership from the proper motion data.

3. RESULTS

3.1. *Reddening and distance*

The spectral types and the projected rotational velocities derived in this paper are listed in Table 1. The first column shows Feinstein's identification, the second is the HD number when available, or the CPD number. Columns 3 and 4 list the proper motions taken from van Altena et al. (2010, private communication), Column 5 lists the V magnitude taken from Feinstein (1971), Column 6 the MK types derived in the present paper, and Column 7 the projected axial rotation velocity also derived in this paper (see below). Comments have been included at the end of the table. They include conclusions about membership and the Hipparcos parallaxes available for five stars of the sample. Using the intrinsic $B-V$ for each MK type taken from the calibration published by Allen (2001) and using the observed $B-V$ taken from Feinstein (1971) we derived and interstellar extinction of 0.55 mag. adopting A_v =

[1] www1.appstate.edu/dept/physics/MK/xmk22.htm.