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AN EXAMPLE OF AM-PRO COLLABORATION AT THE PIC DU MIDI: THE OATBLS

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Abstract. The objective of the OATBLs is to access the Bernard Lyot Telescope to make observations and thus contribute to the astrophysical studies being conducted on the Pic du Midi site by the statutory observers. The members of the association are called upon in the event of a deficit of the latter, who remain the priority in the planning.

Keywords: OATBL, Pic du Midi, Bernard Lyot, association, am-pro collaboration.

1 Introduction

Like any service observer, the members of the association work with the TBL operations team. They carry out one-week observation missions at the summit of the Pic du Midi and follow the guidelines of the scientific programs established by the supporting astronomers. The observation schedule is established every six months. Three months before the beginning of each semester, it is presented to the OATBLs, who can then fill the places left vacant by the statutory observers. The OATBLs do not only replace the TBL statutory observers. They also have their own amateur research program to which they contribute with discretionary time obtained in collaboration with the OMP. We will first present the instrument and the association. Finally, we will conclude with the preliminary results obtained from observations made during discretionary time.

2 An example of amateur-professional collaboration

2.1 The means of observation: the Bernard Lyot Telescope

Located at an altitude of 2778 m in metropolitan France at the Pic du Midi, the Bernard Lyot telescope is of Cassegrain type. Its mirror has a diameter of 2 m and a focal length of 50 m. The mount is of horseshoe type. The Narval instrument is a spectro-polarimeter with a resolution of R = 65000, installed in 2006. Both spectroscopy and spectro-polarimetry modes are used thanks to Narval. In 2019, Neo-Narval arrived at the Bernard Lyot telescope: it was a stabilisation in radial velocity v of less than 3 m/s of Narval. The study of planetary systems in exoplanetology is the objective of this instrument. The stellar activity of host stars will be studied using the configuration for spectro-polarimetry: the study of the magnetic field of these stars will then be made possible.

2.2 The association and the amateur research program

Since 2016, OATBLs have been filling the schedule of service observers, in addition to the statutory ones. The OATBLs are there to supplement the statutory staff if the schedule cannot be filled. Since 2018, the amateur program has been studying stars with high metallicities. More than 30 target areas have already been recorded. The association involves its members to develop tools and programs to analyze TBL data.

[1] OATBL, IPSA, SAF

2.3 First results of the OATBL's amateur research program

Figure 1 correctly details the data to be processed or the data to be understood in the context of the High Metallicity Stars Program. More than 36 spectra have been obtained. Having the study of these spectra already started, we are focusing on the region of the H alpha line.

Emission spectra of VV Cep, and the eclipse of its companion, were obtained by the members of the association during discretionary time. Amateurs attempted to deconvolve the spectra using Gaussian and Lorentzian lines. The understanding of the phenomena is helped by the constant dialogue with the astronomers of the OMP. In addition, there is a great involvement of the members of the association to exploit the data collected: development of python / Matlab programs (especially by student members of OATBLs), data analysis with OATBL2fits. The first idea is that members use existing spectroscopy software to understand the spectra already obtained. Finally, it is also the intergenerational mutual aid that counts: students and young amateurs can work with an older member to share their knowledge.

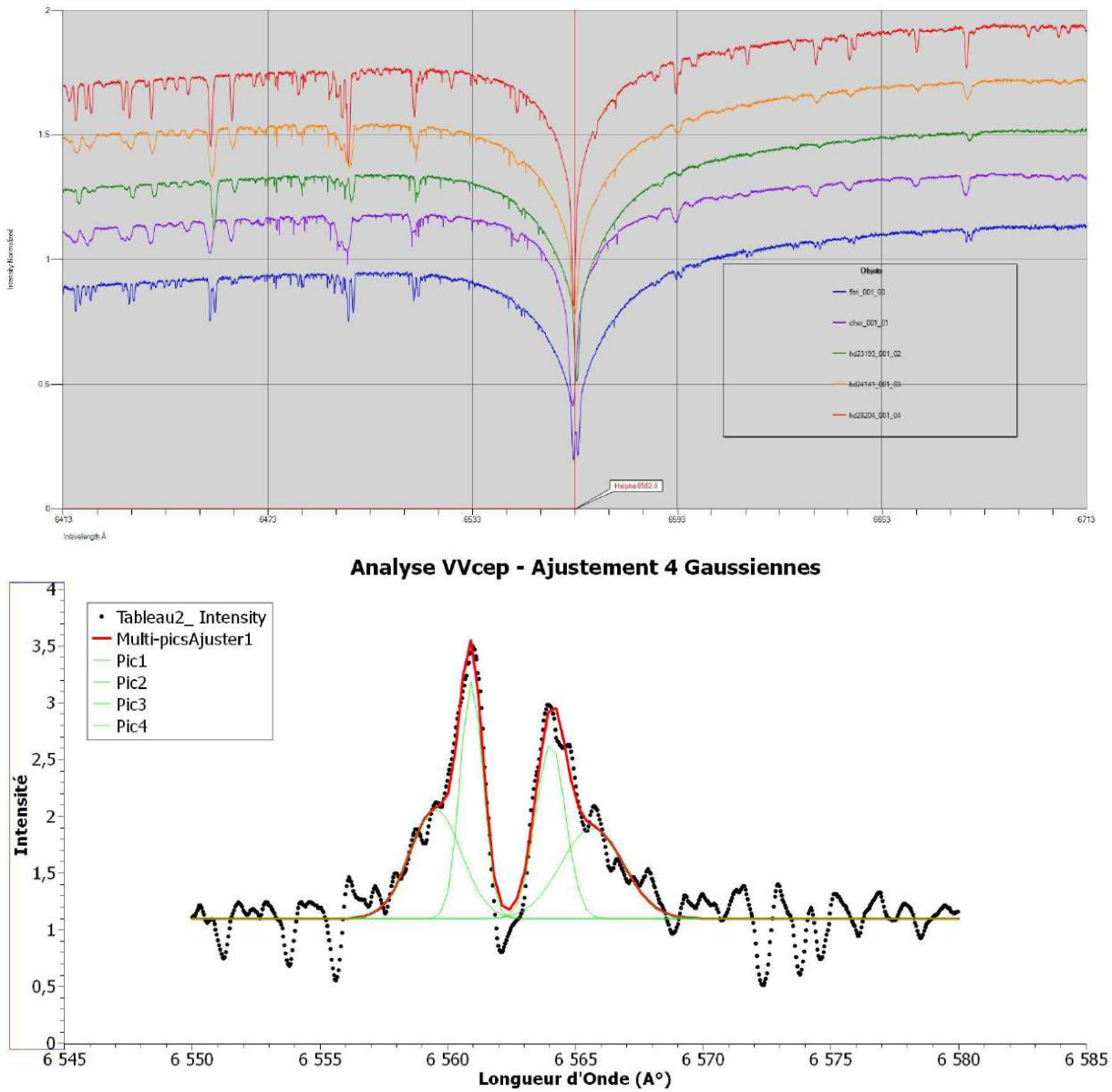

Fig. 1. Top: Data set for 5 stars with high metallicity: alpha balmer line. **Bottom:** Eclipse for VVcep observed by the OATBLs.

3 Conclusions

For the near future, the objective of the OATBL members is as follows: to analyze the spectra of the 36 high metallicity star datasets and deconvolute the spectra correctly while writing in parallel a bibliographic report. A future report will be published and available online on the website of the association.