

VO-COMPLIANT LIBRARIES OF HIGH RESOLUTION SPECTRA OF COOL STARS

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ABSTRACT

In this contribution we describe a Virtual Observatory (VO) compliant version of the libraries of high resolution spectra of cool stars described by Montes et al. (1997; 1998; and 1999). Since their publication the fully reduced spectra in FITS format have been available via ftp and in the World Wide Web. However, in the VO all the spectra will be accessible using a common web interface following the standards of the International Virtual Observatory Alliance (IVOA). These libraries include F, G, K and M field stars, from dwarfs to giants. The spectral coverage is from 3800 to 10000 Å, with spectral resolution ranging from 0.09 to 3.0 Å.

Key words: Stars: late-type, Virtual Observatory.

1. LIBRARIES OF HIGH AND MID-RESOLUTION SPECTRA OF COOL STARS AVAILABLE IN THE WWW

The libraries of high resolution spectra of cool stars (F, G, K and M field stars, from dwarfs to giants) described by Montes et al. (1997; 1998; and 1999) include many of the spectral lines most widely used as optical and near-infrared indicators of chromospheric activity. The spectra have been obtained with the aim of providing a library of high and mid-resolution spectra to be used in the study of active chromosphere stars by applying a spectral subtraction technique. However, these spectra can also be utilized in a wide variety of ways ranging from radial velocity templates to study of variable stars and stellar population synthesis. These libraries can also be used for spectral classification purposes and determination of atmospheric parameters (T_{eff} , $\log g$, [Fe/H]).

The fully reduced spectra in FITS format are available via ftp and in the World Wide Web¹

¹<http://www.ucm.es/info/Astrof/invest/actividad/spectra.html>

I. *Library of high and mid-resolution spectra in the, $H\alpha$, $H\beta$, and $Na\ I D_1, D_2$, and $He\ I D_3$ lines regions of F, G, K and M field stars* (Montes et al. 1997) including 170 intermediate resolution (0.2 – 3 Å) spectra of 116 stars (luminosity class: V, IV, III).

II. *Library of high-resolution UES echelle spectra of F, G, K and M field dwarf stars* (Montes & Martín 1998) including 105 high resolution (0.09 – 0.19 Å) echelle (4800 – 10600 Å) spectra of 83 stars (V). See representative spectra in the $H\alpha$ line region in Fig. 1.

III. *Library of medium-resolution Fiber Optic Echelle spectra of F, G, K and M field dwarfs to giants stars* (Montes, Ramsey & Welty 1999) including 345 intermediate resolution (0.5 Å) echelle (3900 – 9000 Å) spectra of 130 stars (V, IV, III, II, I).

2. ADDITIONAL SPECTRA TO BE INCLUDED:

In addition to the spectra of these libraries (Montes et al. 1997; 1998; 1999), during the last years (1999 – 2006), we have compiled a large number of optical spectra of cool stars taken with different high resolution echelle spectrographs as the FOCES spectrograph (2.2 m telescope, Calar Alto Observatory). The spectral range covers from Ca II H & K to Ca II IRT lines. The spectral resolution varies from 0.08 to 0.35 Å. See the "Spectroscopic survey of cool stars members of young stellar kinematic groups" (Montes et al. 2001, López-Santiago 2005, López-Santiago et al. 2006). These spectra will be available soon in the web² and the VO.

3. VO-COMPLIANT LIBRARIES

The UCM cool stars group in close collaboration with the staff of the Spanish Virtual Observatory (SVO)³

²http://www.ucm.es/info/Astrof/invest/actividad/skg/skg_SS.html

³<http://laeff.inta.es/svo/>

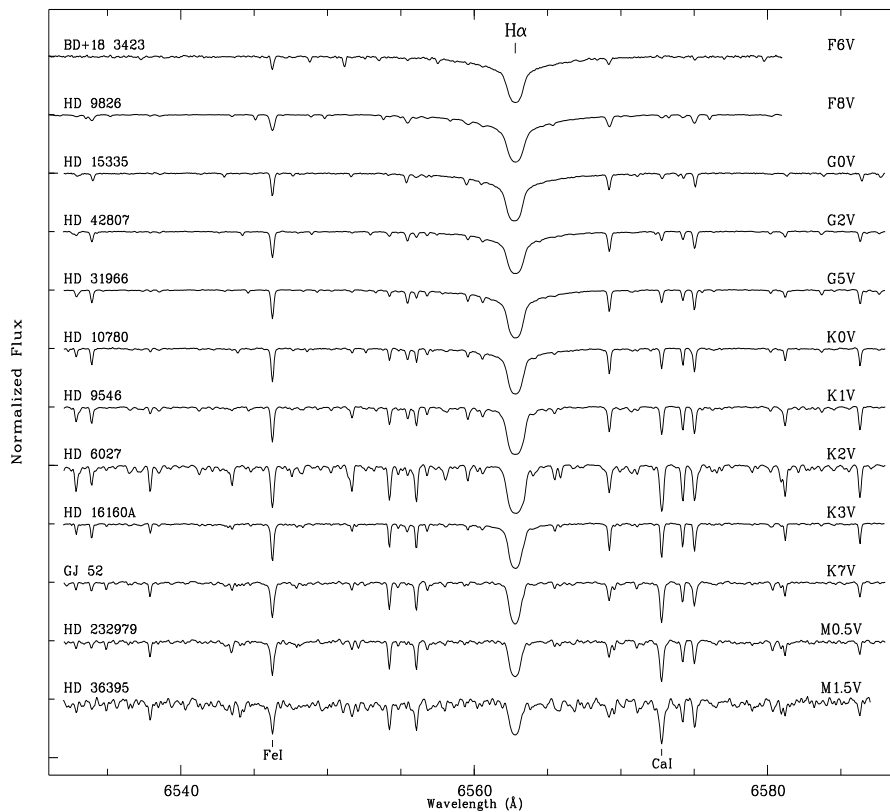


Figure 1. Spectra in the $H\alpha$ line region from the UES echelle spectral library (Montes & Martín 1998).

are working together in order to make available a VO-compliant version of this libraries of stellar spectra. A database with all the relevant information of the stars and the spectra has been developed. Now we are developing a web-based interface to access this data. In this way it will be possible to accessing, visualizing, filtering and retrieving all the relevant information of these spectra and generate the corresponding VOTables, using the SSAP, Simple Spectra Access Protocol. The many VO tools that are or will be ready for the astrophysical community will make easier the use of these spectra in many areas.

4. EXAMPLE OF APPLICATION

As an example of the potential use of these spectra, we are working on establish criteria for spectral classification of cool stars. These criteria are based on equivalent width ratios of several photospheric lines, which are sensitive to effective temperature and luminosity class. Some preliminary results can be found in Montes et al. (2006).

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