Chinese Astronomers Created an Empirical Stellar Spectra Library from LAMOST

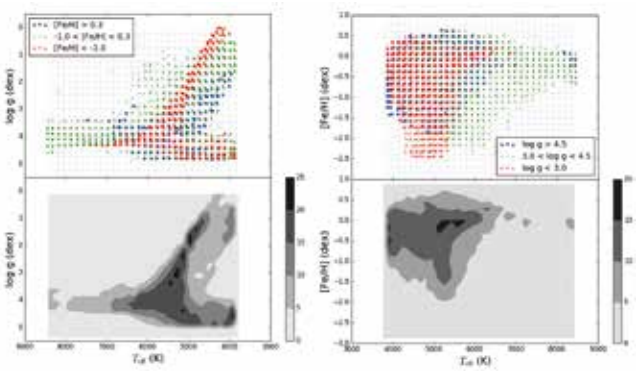
Astronomers from the National Astronomical Observatories of Chinese Academy of Sciences (NAOC) present an empirical stellar spectra library created with spectra from the LAMOST Data Release 5 (DR5). This library represents a uniform data set and covers a wide span of parameter space. This is the first empirical library that offers the most complete empirical spectra of K-type stars.

With the large number of red stars observed by LAMOST, Drs. DU Bing and LUO Ali *et al*. generated denser K type templates to fill in what is missing in current empirical spectral libraries, particularly the late K-type.

The template spectra in the library have a resolution of R~1800, with well-calibrated fluxes and rest-framed wavelengths. By performing an internal cross-validation and external comparisons, they verified that the template spectra were labeled with accurate stellar parameters. All of the spectra are available online in the FITS formats.

Empirical stellar spectral libraries are crucial for many areas of astronomical research, including, but not limited to, spectral typing, modeling the spectral energy distributions and stellar populations of galaxies, and determining stellar properties. Stellar template libraries are also an important teaching resource, from examples of stellar spectra for introductory classes to detailed radiative transfer at the graduate level.

A Reviewers of this work highly appraised this paper: "The authors present a set of spectra templates that cover an impressive span of parameter space and which will certainly be used to match spectral observations, calibrate atmospheric models and demonstrate the differences among different stars. These data are important to the field." … "I was finally able to download the templates and looked at a bunch of them and they are really wonderful."



Distribution of the library in the Teff—log g and Teff—[Fe/H] plane of the adopted atmospheric parameters for the F, G, K and late-type A stars. In the top left panel, the color of the symbols distinguishes different metallicity classes, while in the top right panel, the color of the symbols distinguishes different classes of surface gravity. The bottom panel shows a contour map of the numbers of stars in the Teff—log g (left) and Teff—[Fe/H] (right) planes with grid steps of (150 K, 0.25 *dex*) and (150 K, 0.15 *dex*), respectively. (Image by courtesy of LUO Ali's team)

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