



Comparison of stellar parameters derived by SSPP with methods without photometry

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Abstract. Most methods of SSPP estimate stellar parameters based on ugriz photometry. But for LAMOST data without photometry, the stellar parameter estimation is very restricted. The tests of performances of SSPP without photometry are presented by using two external data sets, one is Cross-correlated between SDSS DR7 star and LAMOST star and another is sdss dr7 sample.

Keywords : SSPP: photometry – stellar parameters

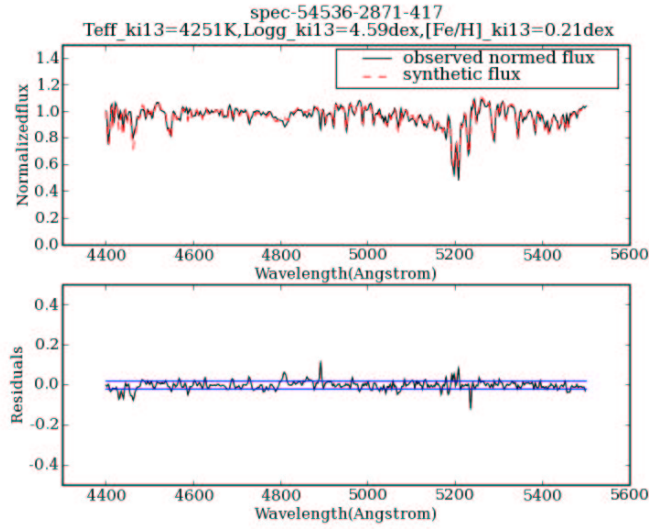
1. Introduction

The main purpose of SSPP (SEGUE Stellar Parameter Pipeline) is to estimate atmospheric parameters for AFGK-type stars, based on medium-resolution spectroscopy and ugriz photometry. Numerous methods have been developed to extract atmospheric-parameter estimates from medium-resolution spectra in a fast, efficient and automated fashion. But each of these approaches exhibits optimal behavior over restricted temperature, gravity and metallicity ranges, outside of these regions they are often uncalibrated. The SSPP implements multi-method philosophy since SDSS stellar spectra cover most of the entire optical wavelength regions, and the combination of multiple techniques results in estimates of stellar parameters that are more robust over a much wider range than those that might be produced by individual methods. For LAMOST spectra which cover the same optical wavelength regions as SDSS spectra but has no photometry, stellar parameters can be estimated by methods of SSPP based only on spectral feature without considering color information. The selected methods are listed in section 2. The comparison of results are presented in section 3 and the conclusions are summarized in section 4.

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Table 1. Methods selected.

T_{eff}	Log g	Fe/h	
Methods Range(K)	Methods	Methods	S/N
ki13 [4200,7500]	ki13	ki13	≥ 15
ngs1 [4000,9999]	ngs1	ngs1	≥ 15
ha24 [4200,7500]	ngs2	ngs2	≥ 20
hd24 [5500,7500]	cai1	caiik1	≥ 10
	cai2	caiik2	≥ 10
	mgh	caiik3	≥ 10

**Figure 1.** One example of the results of the application of the ki13 grid.

2. Methods selected

Line Indices and normalized flux are calculated in the first, detailed calculation process was discussed in (Young Sun Lee & Timothy, 2008). The selected methods and valid ranges are listed in Table 1. Cai2 and mgh are used to cooler stars which T_{eff} adopted less than 5500K. The template search range of ngs is estimated from ki13 not from g-r or g-z. One example of the results of the application of the ki13 grid is shown in Fig. 1

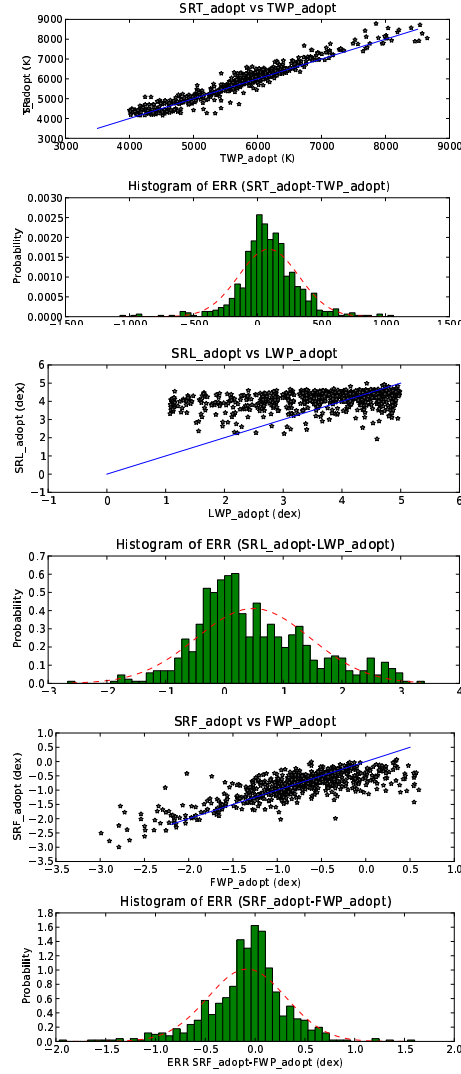


Figure 2. Comparison of the three parameters.

3. Comparison of results

SDSS dr7 star sample was chosen with a cutoff by $S/N < 20$ with sample number=1000. The adopted parameters were comparison is presented by Fig. 2, where SDSS released T_{eff} (Fe/h, Log g) is shorted by SRT(F, L), and T_{eff} (Fe/h, Log g) with no photometry is shorted by T(F,L)WP.

Cross-correlated between SDSS DR7 star sample which cut by $S/N < 20$ and

LAMOST star sample which is cut by $S/N < 10$ was chosen with sample number=150. The adopted parameters were compared in Fig., where SDSS Released T_{eff} (Fe/h, Log g) is shorted by SRT(F,L), T(F,L)WPL is shorted for T_{eff} (Fe/h, Log g) without photometry of LAMOST.

4. Conclusions

The temperature is influenced slightly after removing methods using photometry. Two empirical temperatures estimated from the HA24 and HD24 indices are independent of photometry. For temperature, the only method changed is ngs, the initial search range is determined by temperature of ki13, t_{eff} of ngs and t_{eff} of ki13 is shown in Fig. The Log g and Fe/H is influenced most by photometry. They have scattered away without color range restrictions.

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