Searching for Extremely Metal-poor star candidates from LAMOST and SDSS

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INTRODUCTION

The extremely metal-poor stars are important in the Milky Way, which record the heavy element abundances produced in the first generations of stars, thus can help us to understand the earliest nucleosynthesis events.

Thanks to the large sky surveys like HK survey, Hamburg/ESO survey, SDSS, LAMOST, RAVE, SkyMapper, the number of very metal-poor stars especially the extremely metal-Poor stars (EMP, [Fe/H]<-3) have been increased. From high-resolution spectroscopic follow-up observations, more than 200 extremely metal-poor stars have been found, and one stars with [Fe/H]<-7.1 was discovered.

THE METHODS

The EW-ABUNTEST method we used was initially developed by Xu et al (2013), which was an abundance analysis method based on the Equivalent Width (EW) of the CaII K line from low resolution SDSS spectra, and has been verified to be valid to search for EMP candidates especially the ultra metal-poor stars (UMP, [Fe/H]<-4). The ABUNTEST pipeline was used to do the abundance analysis, where the input parameters are the EW of the CaII K absorption line, effective temperature deduced from the photometric color and surface gravity obtained by interpolating the YY isochrone. The metallicities derived from this method have good agreement with the high resolution spectroscopic results.

Here based on this method, we expand the searching of the EMP candidates to both the LAMOST data and SDSS spectra. We used the EW values from gauss fitting to the CaII K lines . Then following the EW-ABUNTEST abundance analysis method, we measured the metallicities for those selected sample.

REFERENCES

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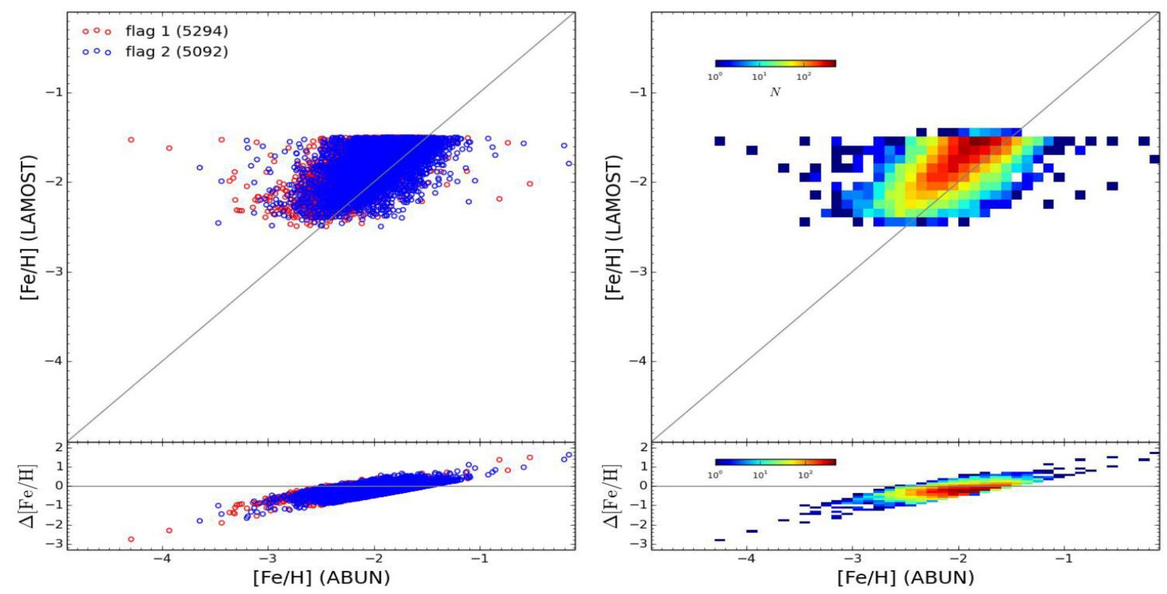

Fig 1. Comparison of [Fe/H] measured by us the those from LAMOST stellar parameter catalog.

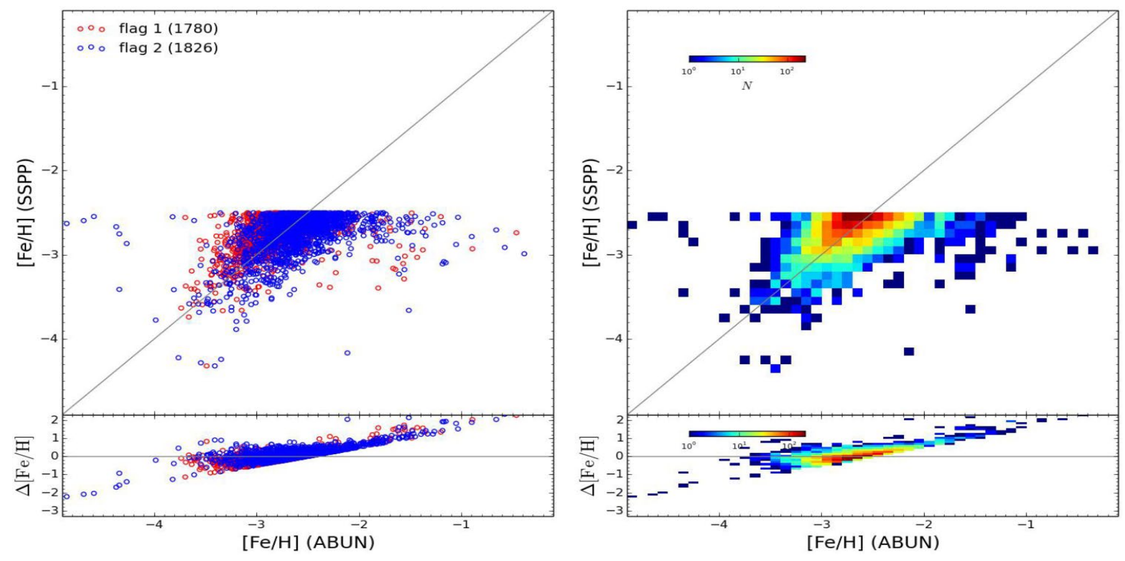

Fig 2. Comparison of [Fe/H] measured by us the those from SSPP.

EARLY RESULTS

Fig 1 shows the comparison of [Fe/H] measured by us for LAMOST spectra and those from LAMOST stellar parameter catalog. Fig 2 shows the comparison of [Fe/H] measured here for SDSS spectra and those determined from SSPP. For a pilot study, we found 7 EMP candidates in LAMOST and 445 EMP candidates in SDSS (24 having [Fe/H] < -3.5). Fig 3 shows an example spectrum of LAMOST EMP candidates.

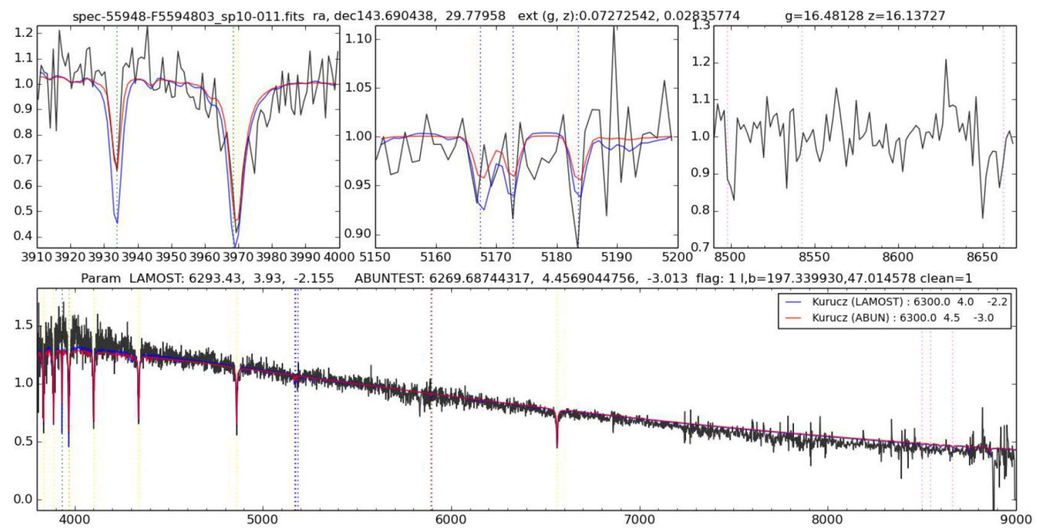

Fig 3. An example spectra of LAMOST EMP candidate.