

# Wavelength calibration by combining arc and night sky lines for LAMOST

Sheng Wang · HanQin Qin · ZhongFu Ye

Received: 13 January 2010 / Accepted: 11 August 2010 / Published online: 27 August 2010  
© Springer Science+Business Media B.V. 2010

**Abstract** A novel method is presented for the wavelength calibration of the Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST). The proposed method combines the arc lines and night sky lines, and can achieve high performance. Firstly, the initial wavelength calibration is performed by employing arc lines. Afterwards, the centroids of sky lines are calculated by the initial calibration results and adjusted by the gravity method iteratively. Finally, the ultimate wavelength calibration is obtained by fitting the centroids of arc lines and sky lines with their corresponding wavelengths. Experiments are performed on the data observed by LAMOST, and the results of the proposed method are more accurate than that of the calibration only by arc lines or sky lines. The calibration sky lines are dense in the red channel (5,700–9,000 Å) of LAMOST, but only a few ones are in the blue channel (3,700–5,900 Å). The new method achieves excellent results in the red channel as the substantial sky lines are employed, and the calibration accuracy of the blue channel is also enhanced in some degree by the scarce sky lines.

**Keywords** Wavelength calibration · Data fitting · Arc spectra · Night sky spectra · LAMOST

## 1 Introduction

The Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST) is a meridian reflecting Schmidt telescope with 4 m aperture and 5° field of view

---

S. Wang · H. Qin · Z. Ye (✉)  
Institute of Statistical Signal Processing, University of Science and Technology of China,  
Hefei 230027, People's Republic of China  
e-mail: yezf@ustc.edu.cn