

On Precise Correction of the Milky Way Dust Extinction

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Although space measurement projects like Gaia have achieved a photometric measurement accuracy of one-thousandth, our existing extinction correction is currently limited by a 1% accuracy bottleneck. However, thanks to the millions of high-quality spectra and precise atmospheric parameters provided by LAMOST, we now have a unique opportunity to address this bottleneck in unprecedented detail. Using the accurate (err \sim 0.01-0.03 mag) multi-band reddening for millions of stars measured by the "star-pair" technique, our research has accomplished several important objectives.

Firstly, we have corrected the systematic errors of SFD and Planck extinction maps. Secondly, we have measured the reddening coefficients for colors from far-UV to mid-IR, and obtained an empirical relationship between the reddening coefficients and temperature and extinction. Finally, we have systematically depicted the two-dimensional distribution of the extinction law (R_v) in the Milky Way, and found that it is in agreement with the molecular cloud.

Overall, our research has laid a strong foundation for future advancements in this area and has the potential to improve our understanding of the structure and properties of the Milky Way.