

Extinction Law of Nearby Molecular Clouds Based on the LAMOST, 2MASS, and Gaia Surveys

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The extinction law from ultraviolet (UV) to infrared (IR; 0.2–24 μm) is determined by relying on the blue-edge method and color-excess ratios for some nearby molecular clouds (Taurus, Orion, Perseus and California), from the low-mass star-forming region to the massive star-forming region. The observational data are collected from nine photometric surveys, along with stellar parameters from the Apache Point Observatory Galaxy Evolution Experiment and LAMOST spectroscopic surveys. Within the uncertainties, the optical ratio of selective to total extinction (R_{GBP}) does not vary substantially across the clouds, irrespective of the density, specifically $R_{\text{GBP}}=2.302\pm0.027$, where $R_{\text{GBP}}=A_{\text{GBP}}/E(G_{\text{BP}}-G_{\text{RP}})$. The IR extinction law is consistent with Wang & Chen 2019. The extinction law in the UV band is compromised by the shallow depth with $A_V\leq 2$ mag and is hard to describe by one parameter R . In addition, the extinction in the WISE/W1 band is significantly larger than in the Spitzer/IRAC1 band in the dense regions, which is attributed to the ice water absorption.