The observed magnitude in the various optical bands are affected by gas and dust in both their galaxy of origin and our galaxy. Since the color bands are affected differently, to get correct color ratios, we must correct for these extinctions.

Galactic (Milky Way) Extinction

The extinction due to the light passing through our galaxy depends on the galactic coordinates as revealed by full-sky dust maps produced by Schlegel, Finkbeiner and Davis (1988)[1]. SDSS uses[2] the tables in this paper to calculate the extinction in each waveband for each galaxy and lists them in the PhotoObjAll table.

To apply the extinction, simple subtract it (the galaxy gets brighter) from the measured magnitude:

$$m_{\lambda,galactic\ corrected} = m_{\lambda,measured} - m_{galactic\ extinction}.$$

Or, using the SDSS column headings,

$$m_{\lambda,galactic\ corrected} = \mathrm{cModelMag\_}\lambda - \mathrm{extinction\_}\lambda.$$

Internal Extinction

The extinction due to the light passing through the galaxy of origin depends on the inclination of the galaxy and the color of the light. This has been studied in I band by Giovanelli *et al* (1994)[3] and for the SDSS bands by Shao *et al* (2007)[4]. The correction is again a subtraction (after equation 9 in Shao *et al*):

$$m_{\lambda,internal\ corrected} = m_{\lambda,measured} + \gamma_1 \log_{10}(b/a).$$

where γ_1 is a color-dependent parameter and b/a is the ratio of the minor to major axes. Using the SDSS column headings, this becomes:

$$m_{\lambda,galactic\ corrected} = \mathrm{cModelMag\_}\lambda + \gamma_1 \log_{10}(\mathrm{expAB\_}\lambda).$$

where expAB is the ratio of axis derived from the exponential model of the intensity distribution of the galaxy and γ_1 can be found in table 4 in Shao *et al*:

TABLE 4

FITTING PARAMETERS OF THE LINEAR RELATIONSHIP BETWEEN M^* AND THE LOGARITHM OF THE INCLINATION

Band	$M_1^*(1)$	γ_1	χ_1^2	$M_2^*(1)$	γ_2	χ_2^2
u	-18.65 ± 0.03	2.19 ± 0.08	18.82	-18.58 ± 0.02	1.48 ± 0.06	7.24
g	-19.90 ± 0.02	1.68 ± 0.06	31.36	-19.84 ± 0.02	1.14 ± 0.04	15.31
r	-20.53 ± 0.02	1.37 ± 0.05	48.28	-20.48 ± 0.02	0.92 ± 0.04	26.29
i	-20.84 ± 0.02	1.08 ± 0.06	41.61	-20.81 ± 0.02	0.73 ± 0.04	26.77
z	-20.92 ± 0.02	0.80 ± 0.07	30.98	-20.89 ± 0.02	0.54 ± 0.04	23.71

[1] Schlegel, D. J., Finkbeiner, D. P., & Davis, M., 1998, *Maps of Dust Infrared Emission for use in Estimation of Reddening and Cosmic Microwave Background Radiation Foregrounds*, ApJ, **500**, 525

[2] www.sdss3.org/dr10/algorithms/magnitudes.php#extinction

[3] Giovanelli, R., Haynes, M. P., Salzer, J. J., Wegner, G., da Costa, L. N., & Freudling, W. 1994, *Extinction in Sc Galaxies*, AJ, **107**, 2036

[4] Shao, Z., Xiao, Q., Shen, S, Mo, H. J., Xia, X., & Deng, Z. 2007, *Inclination-Dependent Luminosity Function of Spiral Galaxies in the Sloan Digital Sky Survey: Implications for Dust Extinction*, ApJ, **659**, 1159