

MODS1 Preliminary Sensitivity Numbers

All values include telescope and atmosphere at 1.20 airmasses. To evaluate signal-to-noise, use gain=2e⁻/ADU and readout noise of 2.5 e⁻ RMS.

Imaging Mode:

Formula:

$$\log S_x = \log S_{x,0} - 0.4m_x + \log t_{\text{exp}}$$

where:

log S_x = log counts in ADU for filter X

m_x = SDSS X-filter magnitude in AB units

t_{exp} = exposure time in seconds

log S_{x,0} = ADU zero point (counts for m_x=0.0^{mag} in 1 second):

| Filter | log S _{x,0} |
|--------|----------------------|
| u_sdss | 10.25 |
| g_sdss | 10.95 |
| r_sdss | 10.90 |
| i_sdss | 10.91 |
| z_sdss | 10.57 |

As general guidance: an r=15^{mag} star will just saturate the red CCD in 30sec in 0.6-arcsec seeing.

Spectroscopic Mode:

Formulae:

$$\log S_\lambda = \log S_{\lambda,0} - 0.4AB_{79} + \log t_{\text{exp}}$$

$$AB_{79} = -48.59 - 2.5 \log f_\nu$$

where:

log S_λ = log counts in ADU/Angstrom at wavelength λ

AB = Spectral AB magnitude in AB79 units

f_ν = flux in units of erg/sec/cm²/Hz

t_{exp} = exposure time in seconds

log S_{λ,0} = ADU zero point for the wavelength/disperser:

| Red Channel | | | Blue Channel | | |
|-------------|-------|----------------------|--------------|-------|----------------------|
| Mode | λ (Å) | log S _{λ,0} | Mode | λ (Å) | log S _{λ,0} |
| Grating | 6000 | 7.79 | Grating | 3500 | 7.91 |
| | 6500 | 7.78 | | 4000 | 7.89 |
| | 7000 | 7.70 | | 4500 | 7.79 |
| | 7500 | 7.60 | | 5000 | 7.65 |
| | 8000 | 7.48 | | 5500 | 7.51 |
| | 8900 | 7.19 | | | |

Table does not include slit losses compared to seeing.