

Astronomy 4100, Homework # 12, 16 February 2015 (due 25 February 2015).

1. You have a CCD array with a gain of 14 counts per electron. It has a read noise of 5 electrons per pixel and dark current of 50 counts/sec. In the r-filter the sky brightness is 82 counts/sec. You want to observe a nebula that spreads over 10 pixels and has uniform brightness of roughly 200 counts/sec/pixel. What S/N do you get for the signal from the nebula if you integrate the signal for 1 second, for 10 seconds, and for 100 seconds. How does the S/N change if you spend 1/2 of the time observing a dark part of the time and the other 1/2 taking data from the nebula?