

Astronomy 4100, Homework # 09, 2 February 2015 (due 11 February 2015).

1. A photodiode has a QE of 40% over wavelengths of 500-600 nm. The reflectivity, fraction of photons reflected, off the face of the diode is measured to be 30%. If the face of the diode is coated with an anti-reflective coating that reduces the reflectivity to 5% what will the QE of the coated diode be?
2. A certain detector is measuring the intensity of the light from a stable black-body source which is estimated to produce 10^4 photons incident on the detector during a trail. Three identical trials yield 113, 120, and 115 mV for signals from the detector. Estimate the detective quantum efficiency (DQE) of the detector. The DQE is the square of the signal/noise output of the detector divided by the signal/noise of a perfect detector. (HINT: estimate the signal and noise of the output with the three trails.)