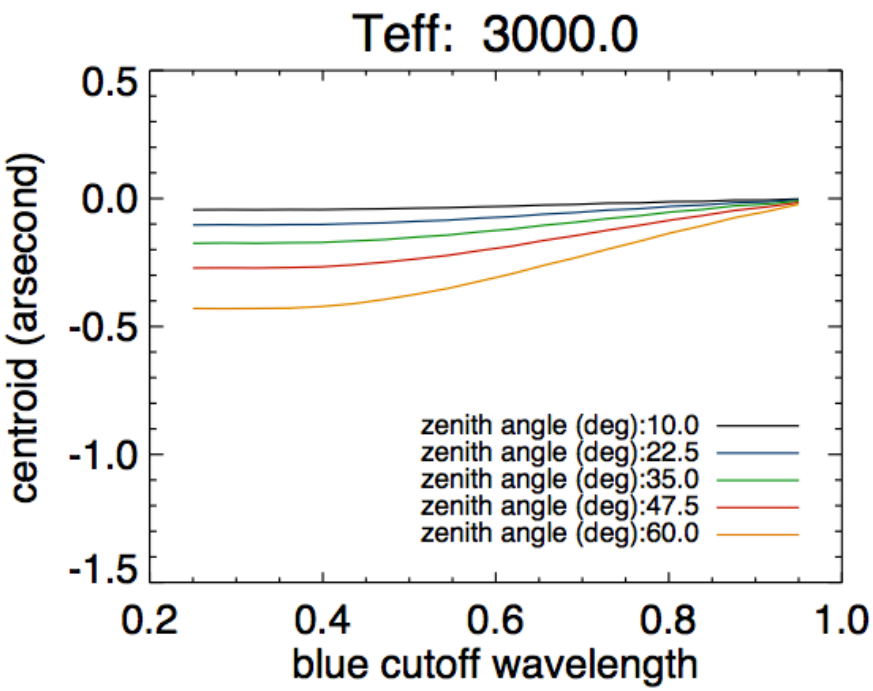
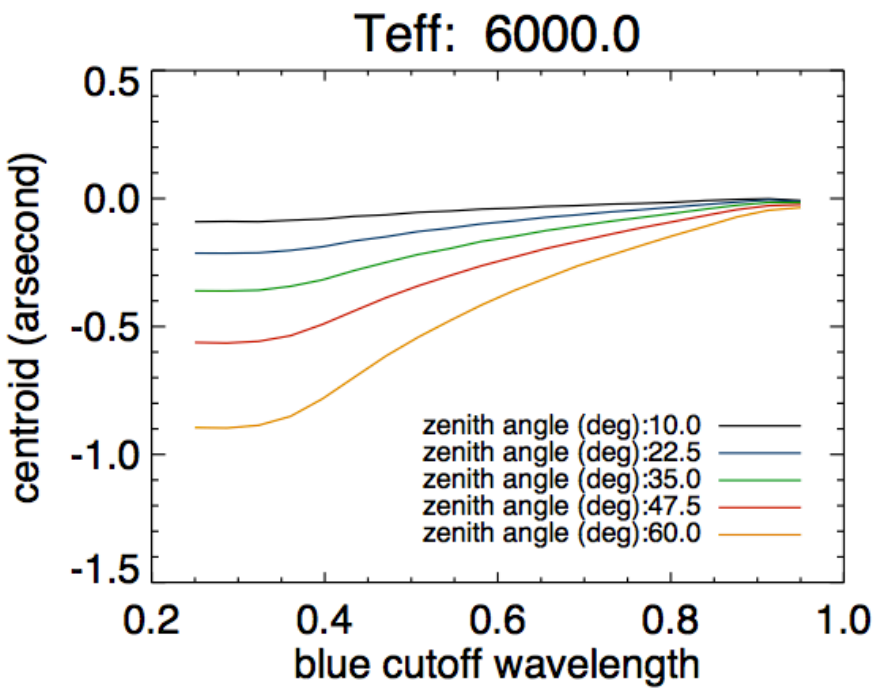
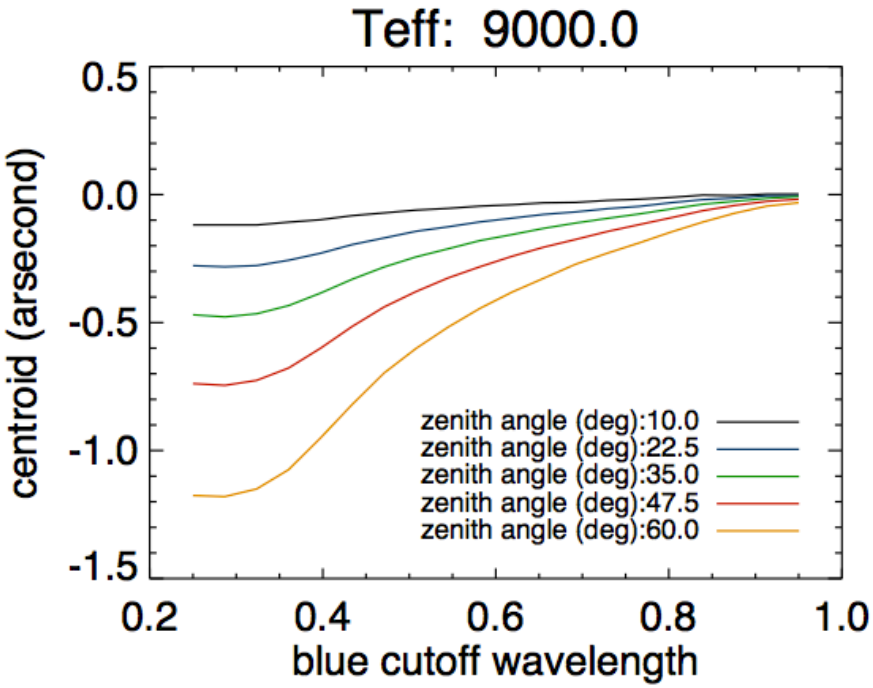
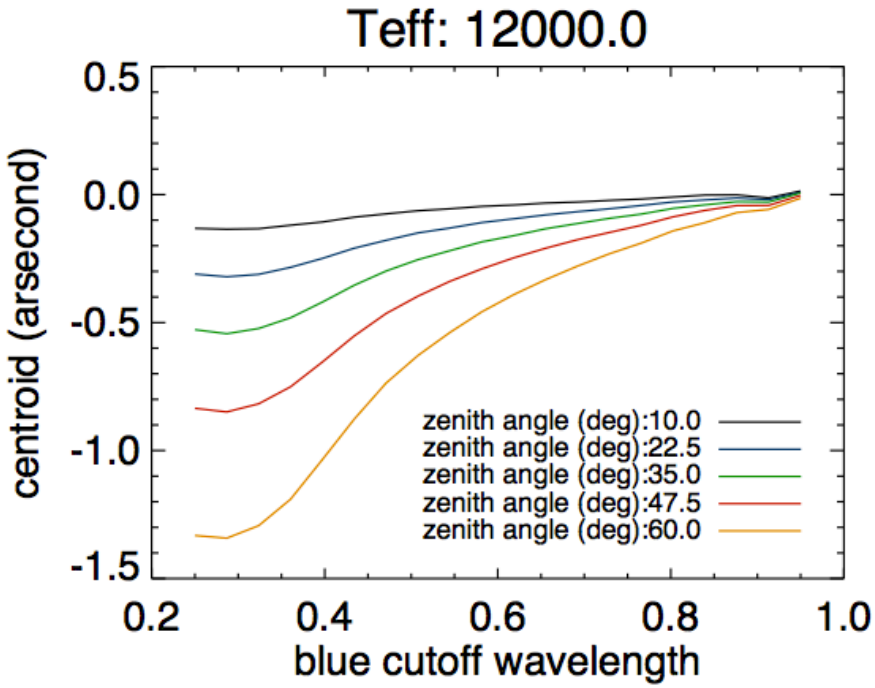
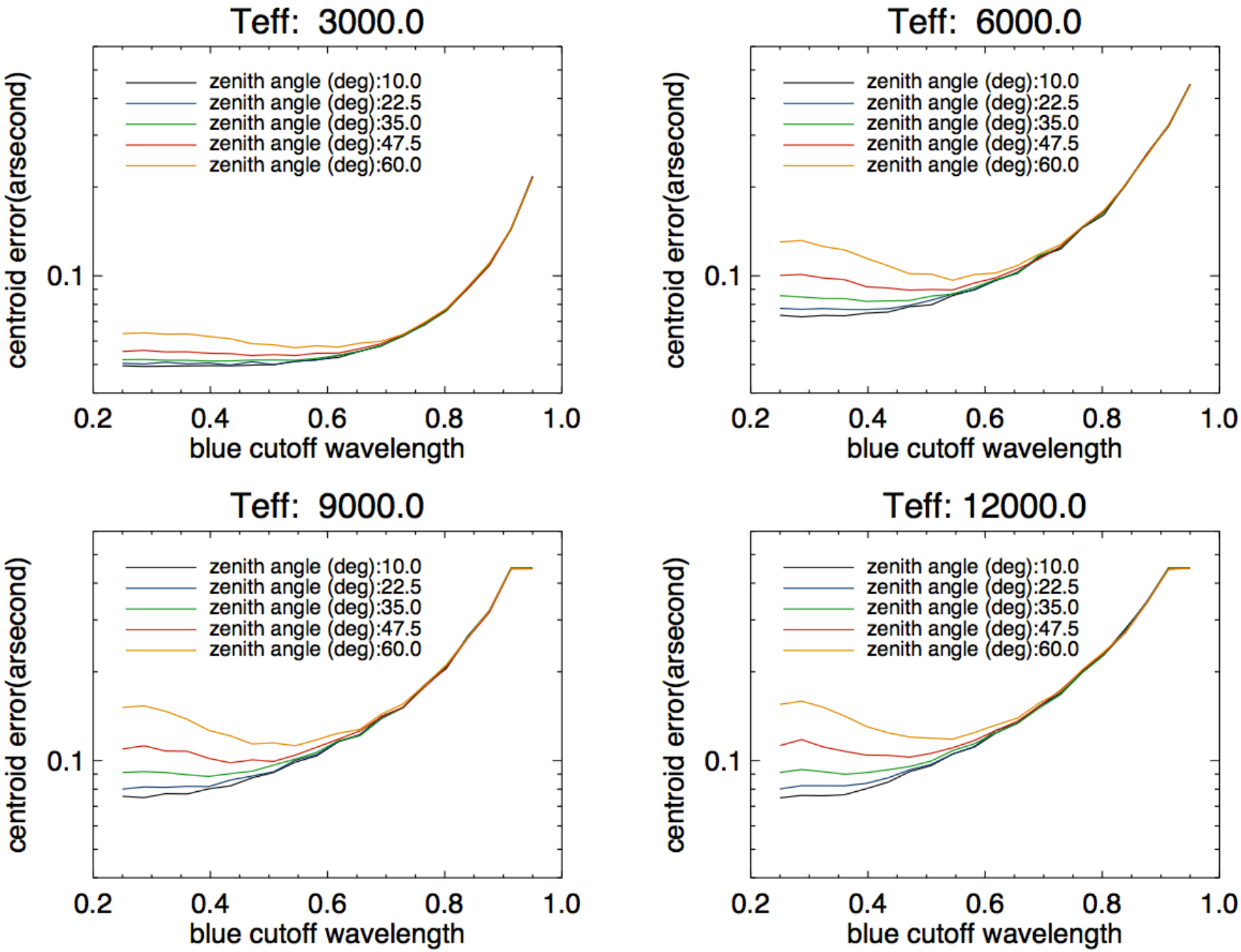
- Goal: choose an optimal blue cutoff wavelength
- Pros and Cons of a shorter cutoff
  - Pros: increase total flux
  - Cons: larger PSF at shorter wavelength
    larger centroid offset
- Conditions: Vmag =12
  red cutoff wavelength =1micron
  r0 = 20 cm at 1 micron
  readout rate 500Hz
  taking into account the QE
- Grid: 5 zenith angles
  4 effective temperatures


Teff: 3000.0
centroid (arsecond)
0.5
0.0
-0.5
-1.0
-1.5
0.2
0.4
0.6
0.8
1.0
blue cutoff wavelength
zenith angle (deg):10.0
zenith angle (deg):22.5
zenith angle (deg):35.0
zenith angle (deg):47.5
zenith angle (deg):60.0


Teff: 6000.0
centroid (arsecond)
0.5
0.0
-0.5
-1.0
-1.5
0.2
0.4
0.6
0.8
1.0
blue cutoff wavelength
zenith angle (deg):10.0
zenith angle (deg):22.5
zenith angle (deg):35.0
zenith angle (deg):47.5
zenith angle (deg):60.0


Teff: 9000.0
centroid (arsecond)
0.5
0.0
-0.5
-1.0
-1.5
0.2
0.4
0.6
0.8
1.0
blue cutoff wavelength
zenith angle (deg):10.0
zenith angle (deg):22.5
zenith angle (deg):35.0
zenith angle (deg):47.5
zenith angle (deg):60.0


Teff: 12000.0
centroid (arsecond)
0.5
0.0
-0.5
-1.0
-1.5
0.2
0.4
0.6
0.8
1.0
blue cutoff wavelength
zenith angle (deg):10.0
zenith angle (deg):22.5
zenith angle (deg):35.0
zenith angle (deg):47.5
zenith angle (deg):60.0


Teff: 3000.0
Teff: 6000.0
Teff: 9000.0
Teff: 12000.0
zenith angle (deg):10.0
zenith angle (deg):22.5
zenith angle (deg):35.0
zenith angle (deg):47.5
zenith angle (deg):60.0
centroid error(arsecond)
0.1
0.2
0.4
0.6
0.8
1.0
blue cutoff wavelength

Conclusions:

- The offset of the centroid means there is a angle difference between the NIR light and AO light. The difference is predictable and is a function of the stellar elevation.
- For the red objects that will challenge the WFS during IR observing, the centroid errors are optimized with a blue cutoff between 0.5 and 0.6 microns (+/- 5%).
- We should have plenty of wfs photons for blue objects (regardless of cutoff) since the K band limit (K~9) is much lower than the R band limit ~15.