

Technical Summary of the Half-Degree Imager (HDI)

mounted on the WIYN 0.9-m Telescope at KPNO

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http://spiff.rit.edu/richmond/wiyn/technotes/tn_index.html

<https://www.noao.edu/0.9m/observe/observing.html>

Half
Degree?

Really?

Only
0.487
Degree





WIYN 0.9m



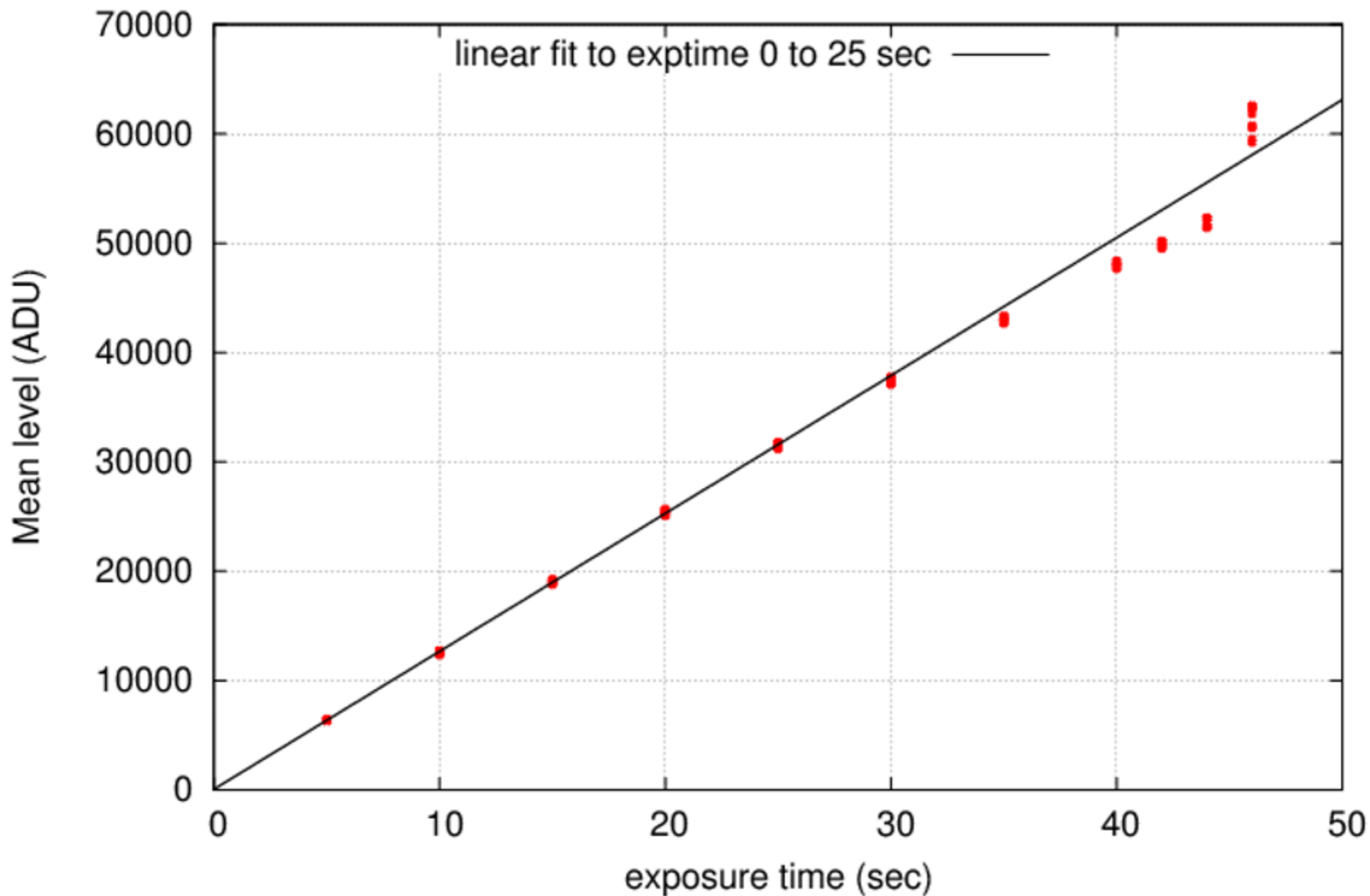
HDI CCD specs

- e2V CCD 231-84
- 4096 x 4112 pixels
- pixel size 15 x 15 microns
- full well capacity 300,000 e-
- peak QE around 80 percent, near V

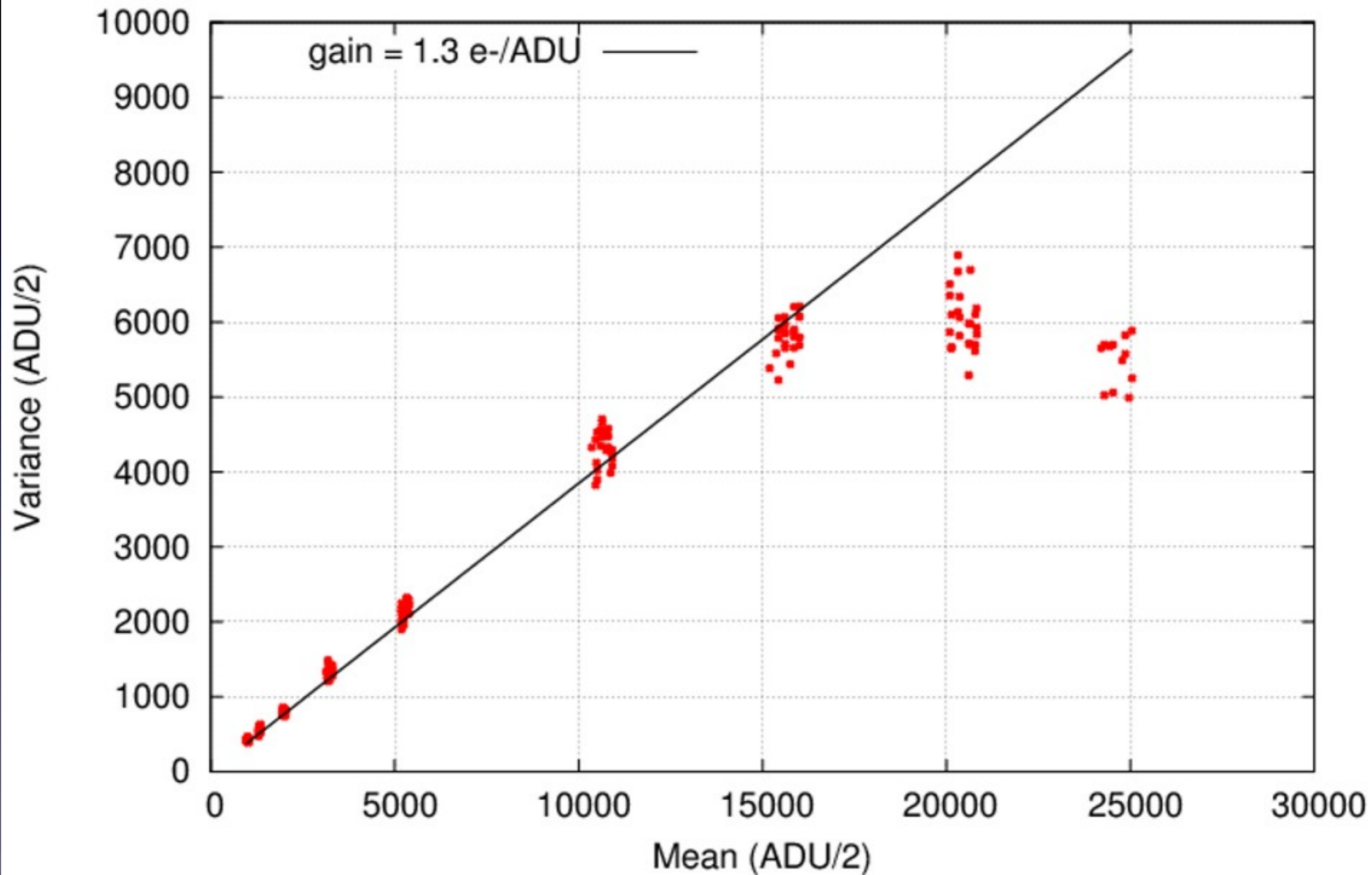
HDI CCD specs

- pixel size 0.43×0.43 arcsec
- field of view 29.2×29.2 arcmin
- readout time: 38 sec (1 amp) or 9 sec (4 amp)
- $T = -105$ C (closed-loop coolant)
- dark current 5 e-/pix/hour
- readnoise 8 e- RMS
- gain 1.3 e-/ADU

B-band domeflat linearity test, WIYN 0.9m, UT Feb 21, 2015



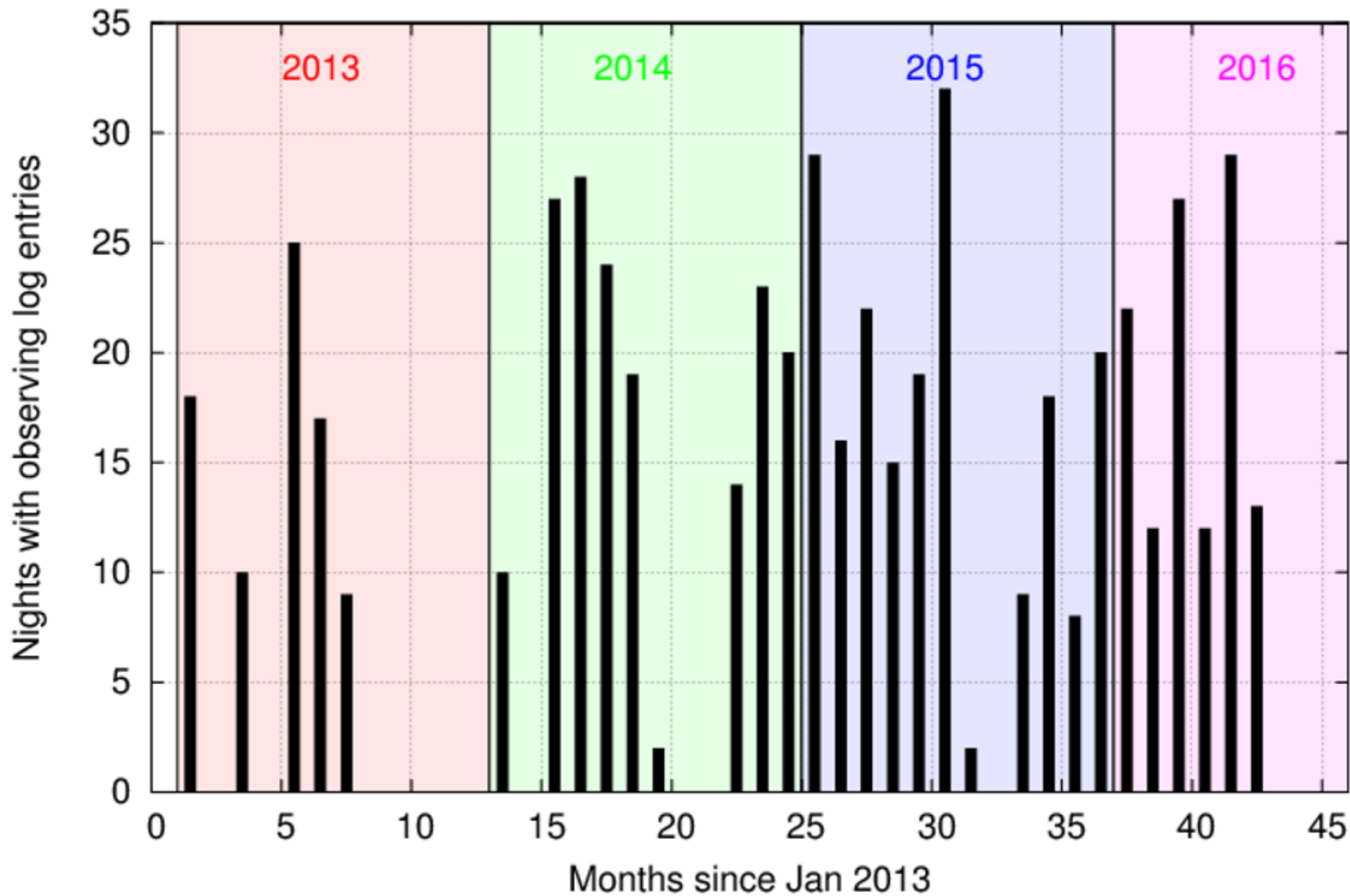
I-band domeflat gain test, WIYN 0.9m, UT Jan 8, 2015



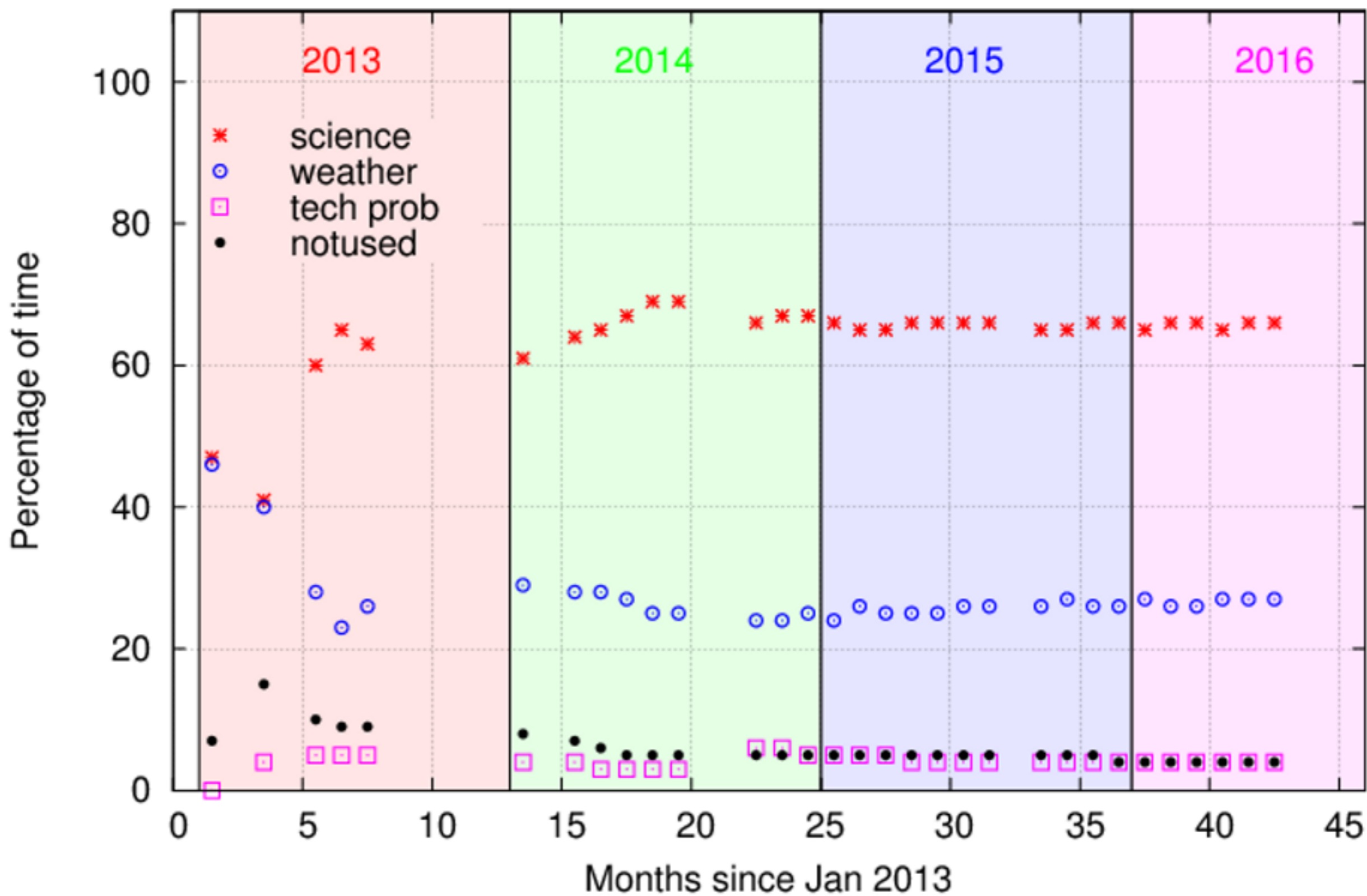
HDI vs. S2KB

	S2KB	HDI
pixel size	0.6 arcsec	0.43 arcsec
field of view	20.5 x 20.5 arcmin	29.2 x 29.2 arcmin
readout time	180 seconds	39 seconds (or 9)
coolant	LN ₂	closed loop

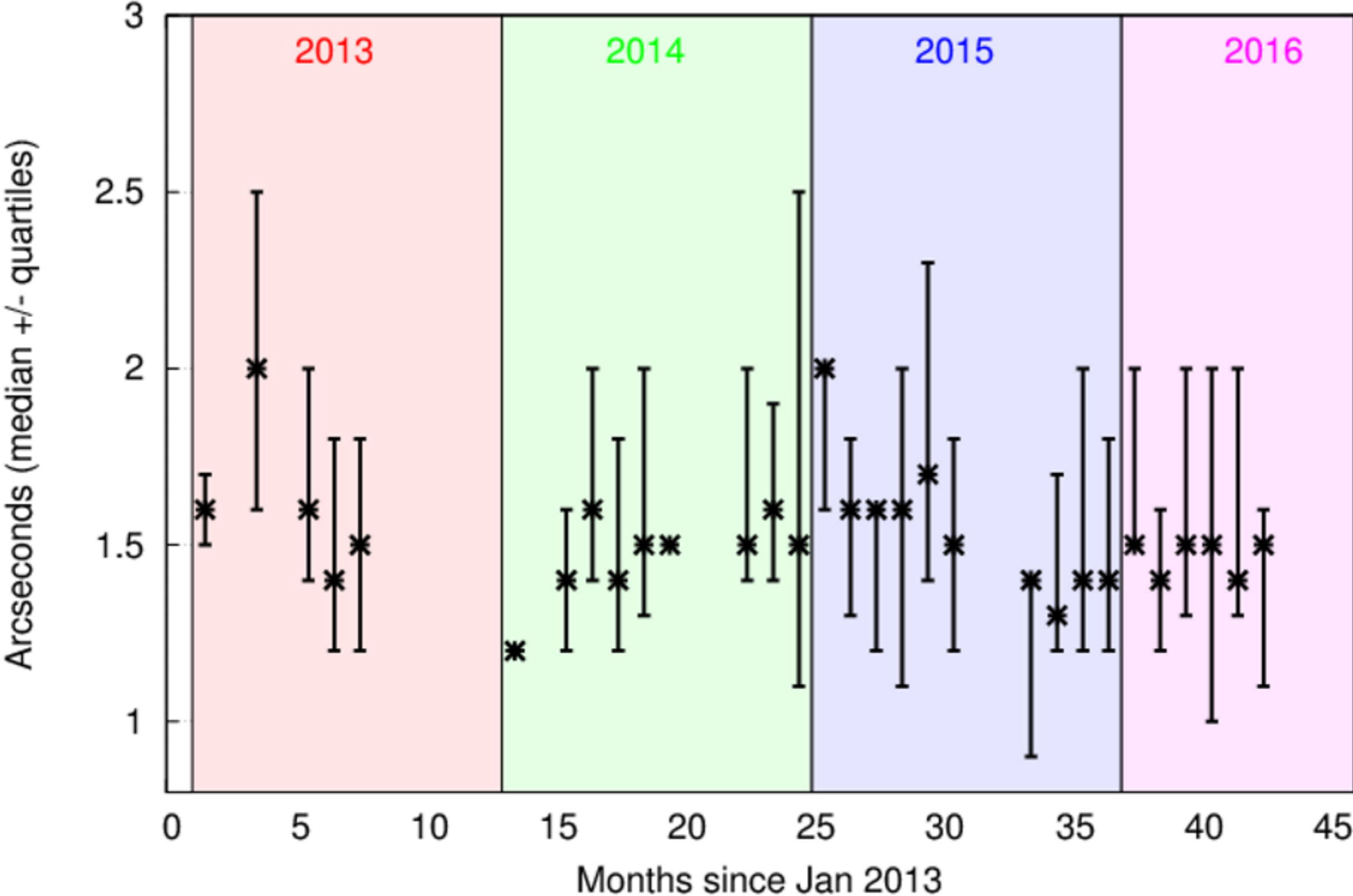
Nights recorded in night logs, WIYN 0.9-m



Use of night time in night logs, WIYN 0.9-m



Seeing recorded in night logs, WIYN 0.9-m



Where to find the details?

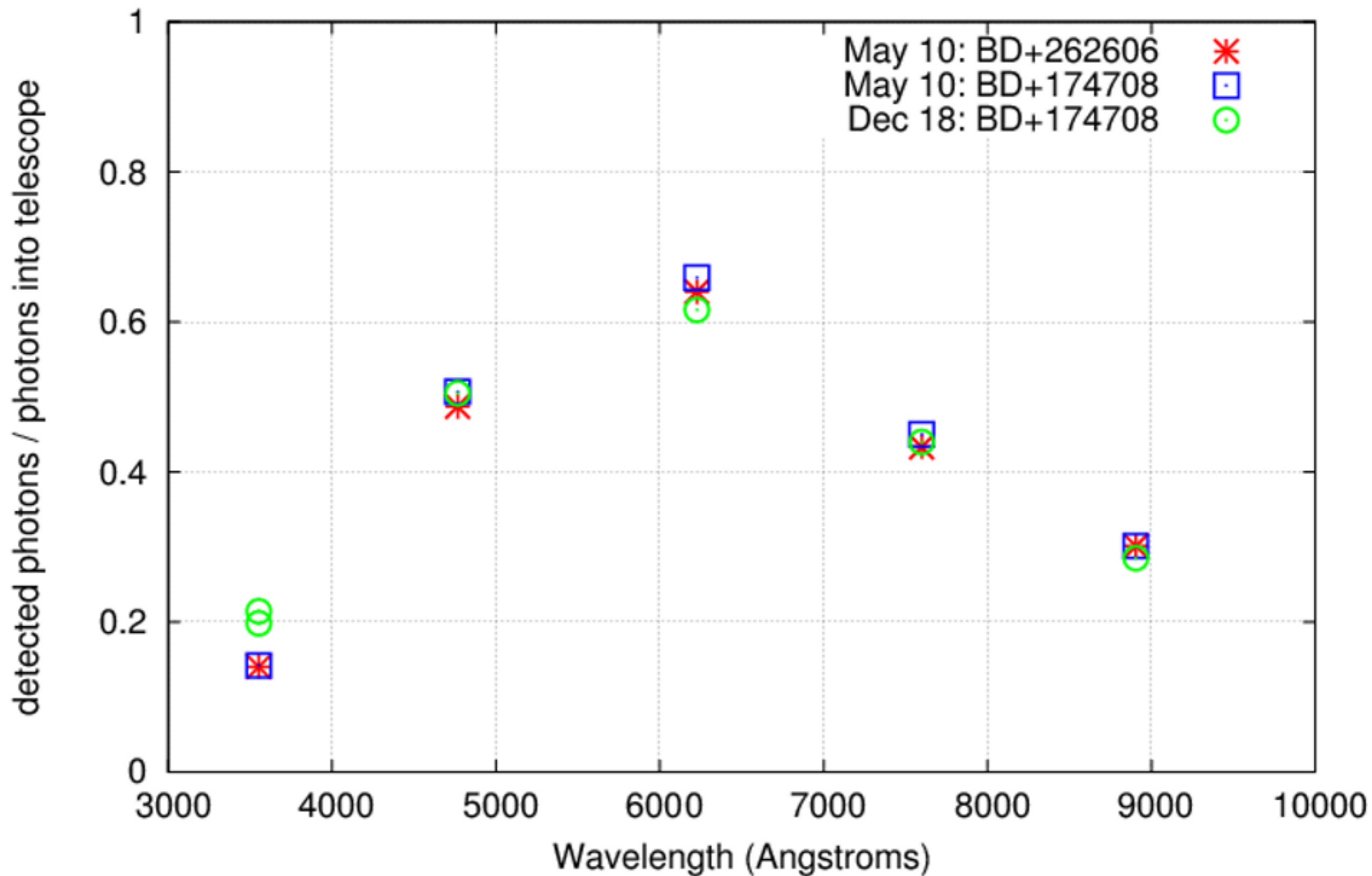
http://spiff.rit.edu/richmond/wiyn/technotes/tn_index.html

- [Tech Note 9: Behavior of HDI after strong saturation](#) (Feb 24, 2015)
- [WIYN 0.9-m Annual Report, June 2015](#) (May 28, 2015)
- [Tech Note 10: The ion pump and noise measurements of HDI in Nov-Dec, 2015](#) (Dec 12, 2015)
- [Tech Note 11: Focus tests in Jan, 2016](#) (Jan 29, 2016)
- [Tech Note 12: Focus/collimation tests in Feb, 2016](#) (Feb 12, 2016)
- [Tech Note 13: Shutter tests in Feb, 2016](#) (Feb 18, 2016)
- [Tech Note 14: Noise in HDI images caused by bad grounding](#) (Mar 15, 2016)
- [Tech Note 15: Modifications to HDI's grounding strap](#) (Apr 8, 2016)
- [WIYN 0.9-m Annual Report, June 2016](#) (Jun 29, 2016)
- [Tech Note 16: A routine for determining a good focus position](#) (July 8, 2016)
- [Tech Note 17: Calculations of overall system throughput](#) (Jan 2, 2017)

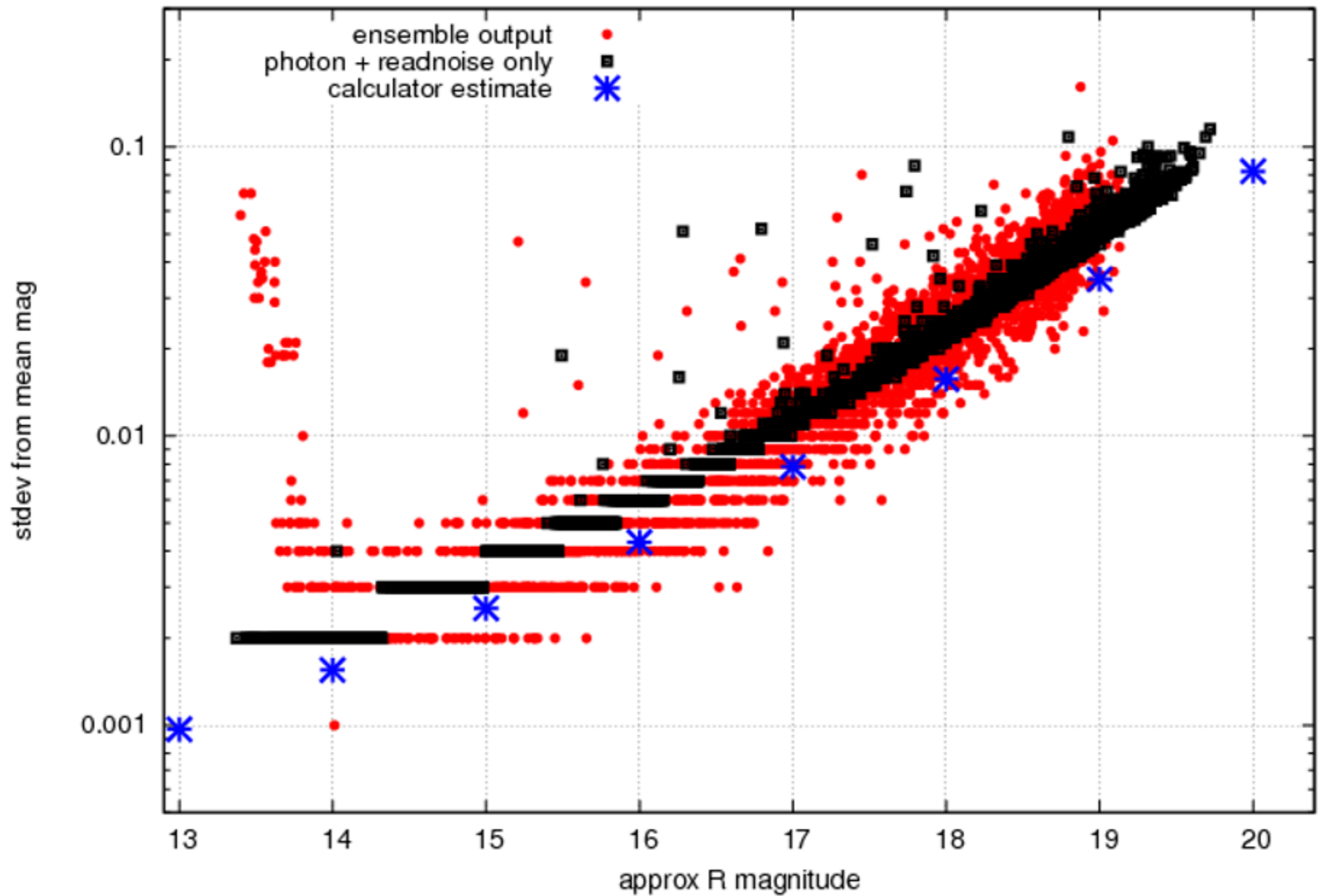
The on-line manual for HDI will be updated as required:

- [Observer's guide to HDI](#) (Dec 28, 2016)

WIYN 0.9-m overall throughput (2016)



_master field, R_4-pix aper diff mag, WIYN 0.9m HDI UT Oct 19, 2013



Signal-to-noise calculator for CCD photometry at WIYN 0.9m

Michael Richmond

Aug 13, 2013

Dec 28, 2016

This form allows you to calculate the signal-to-noise ratio for a star observed with the WIYN 0.9-m telescope. You can vary the parameters and see the sort of results to expect.

Assumptions:

- WIYN 0.9-m telescope at Kitt Peak
- reflectivity of primary from 2012 measurements, assumes reflectivity of secondary is the same
- standard Johnson-Cousins filters
- the star has the same spectrum as Vega, so it will give inaccurate results for very cool, red stars.
- sky values for Kitt Peak, assuming 3-day moon
- extinction coefficients for Kitt Peak, from Direct Imaging manual

If you want to see the calculations themselves, try reading [the Perl source code to the calculator](#). Or, if you just want to see the equations and calculations, try [this article by Steve Howell](#).

CCD:

Filter: This calculator uses Bessell filters, which are close to Johnson UBV, Cousins RI.

Mag Limits: List values for magnitudes between: and at intervals of mag.

Moon phase: (days: 0 = new, 14 = full)

Airmass:

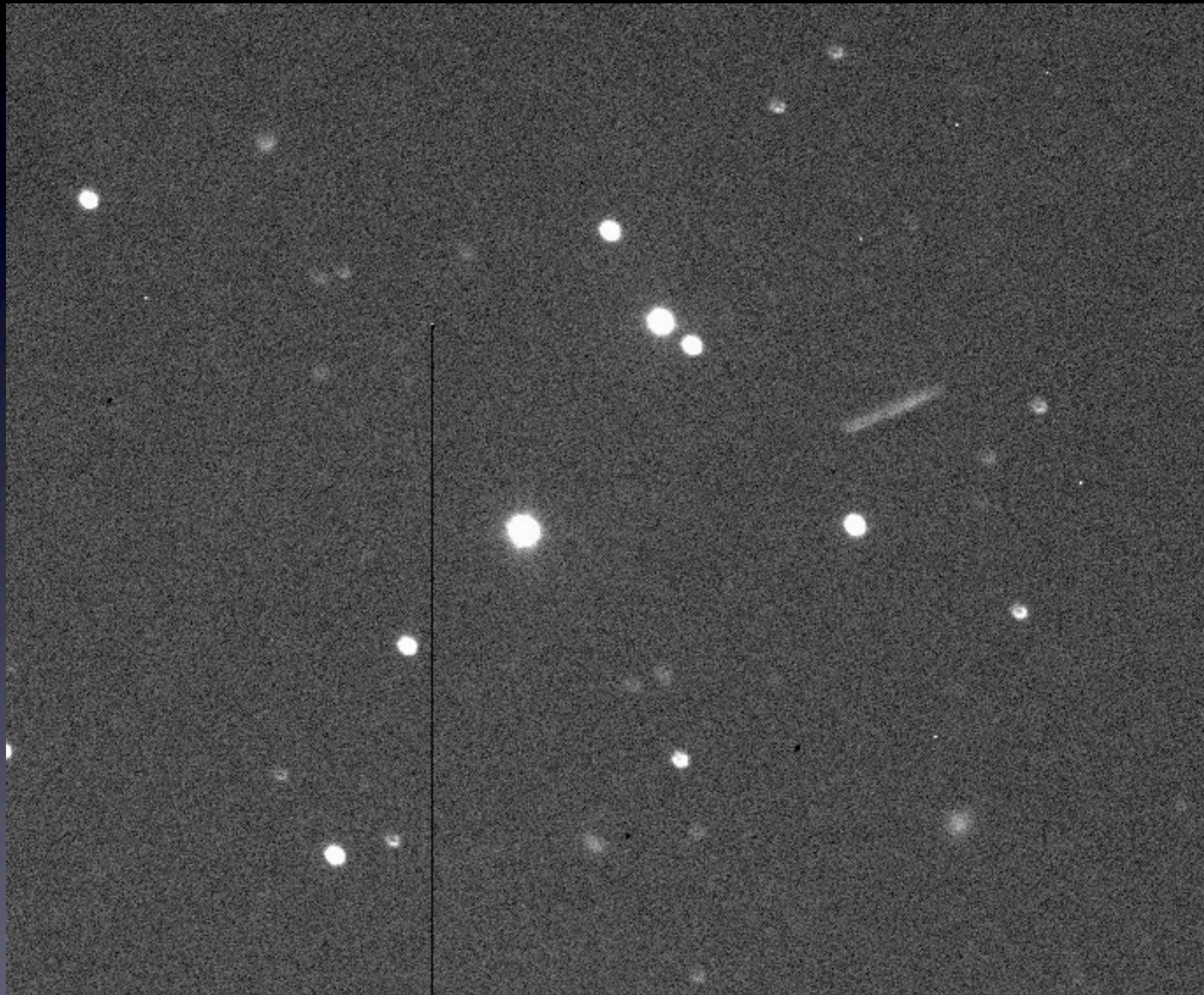
Exposure time: (seconds)

FWHM: (arcsec)

Radius for photometry: area over which signal is measured (arcsec):

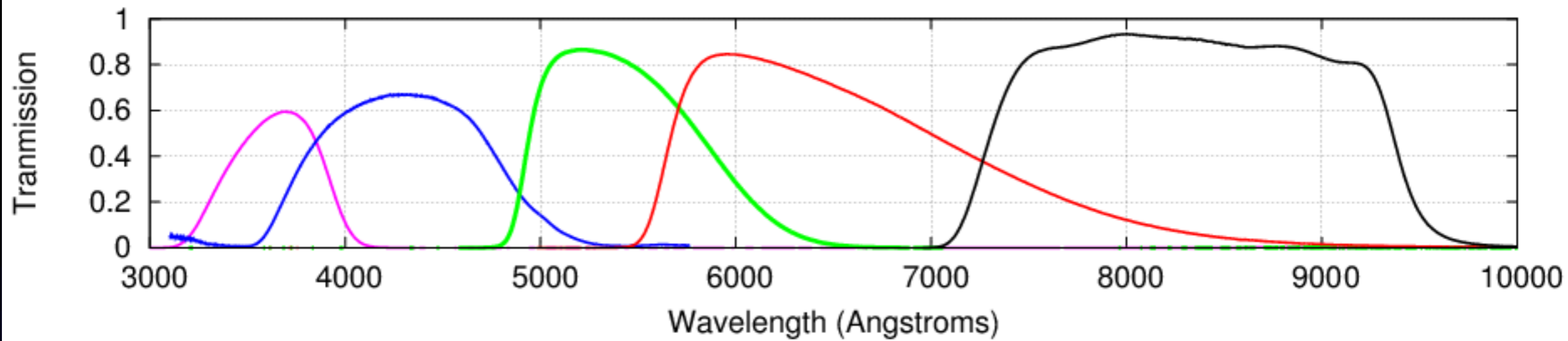
You may have to wait 10-20 seconds for result.

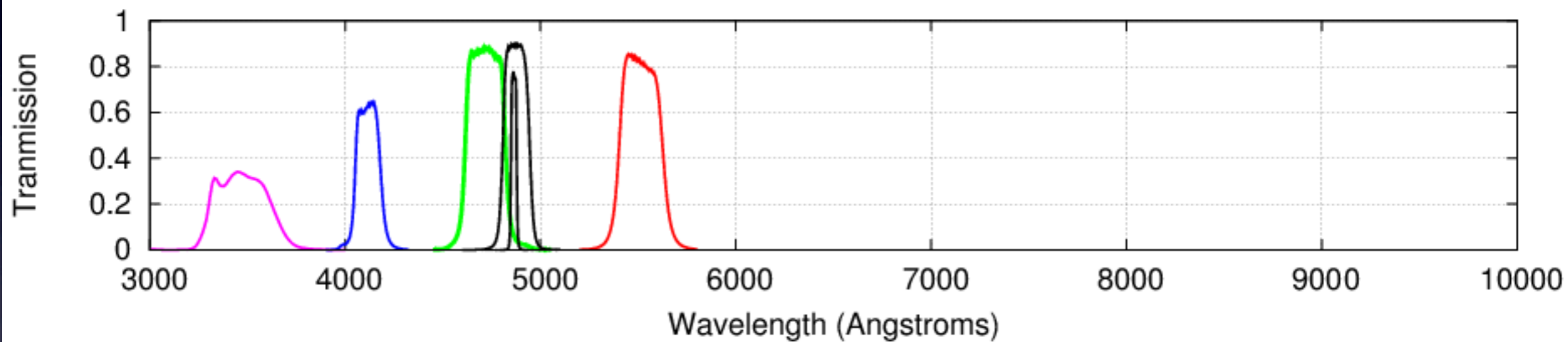
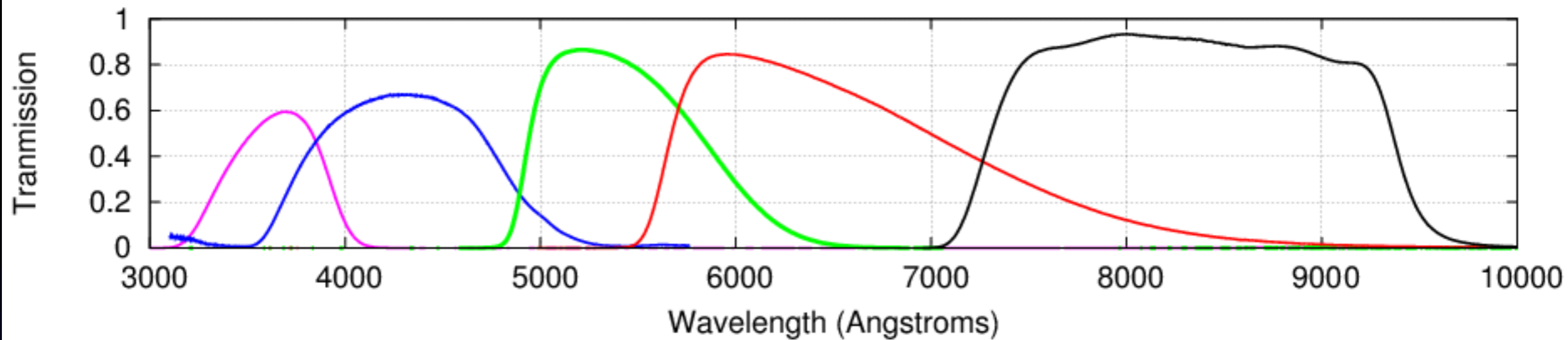
Tired of trailed asteroids?

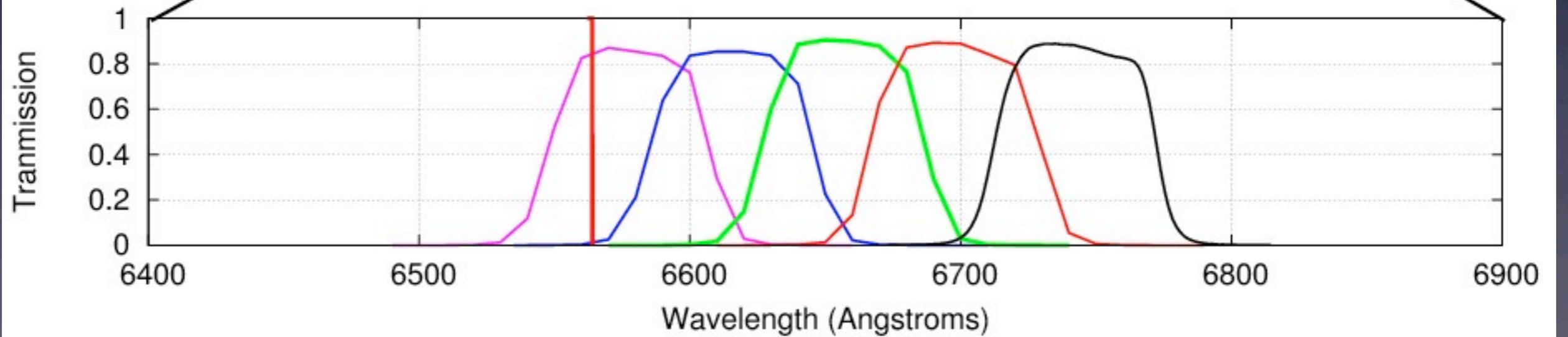
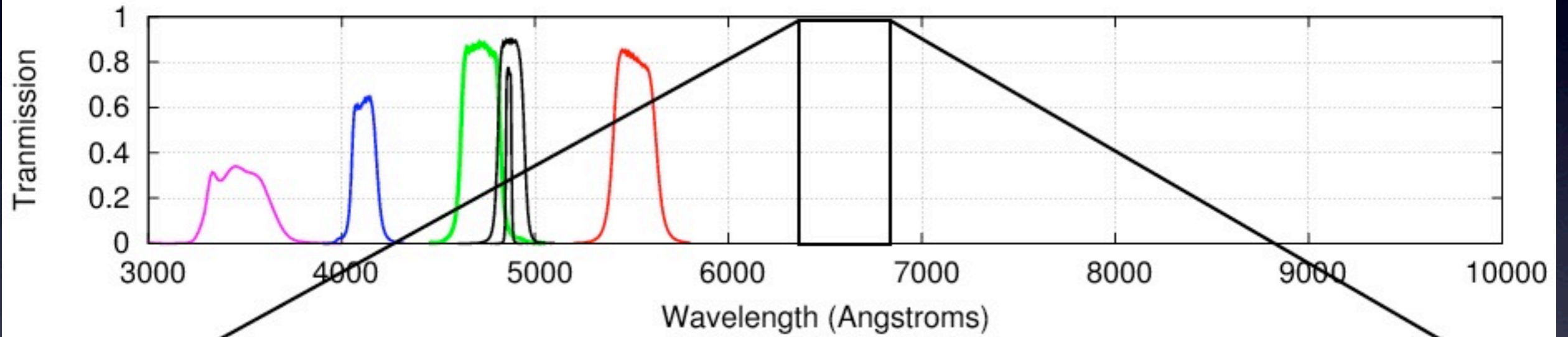
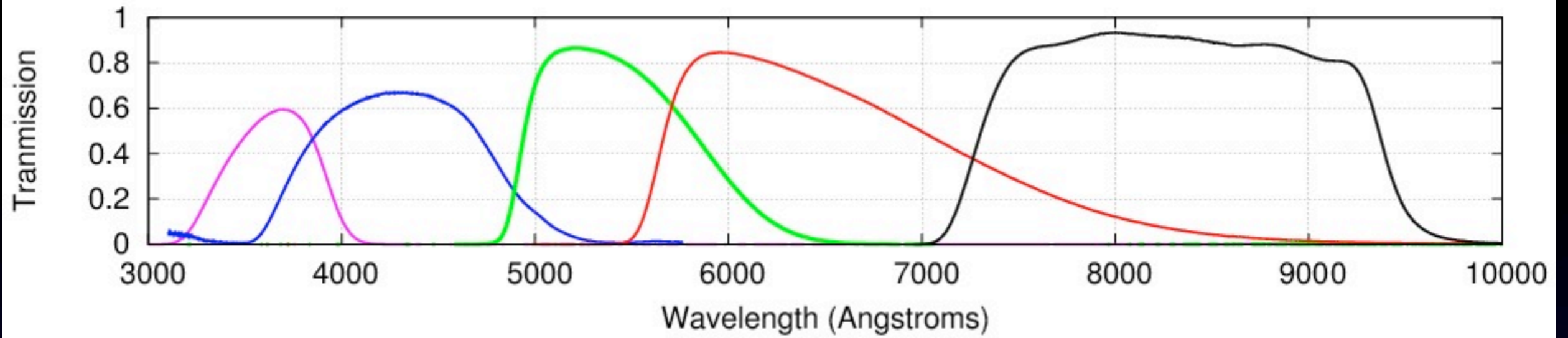


Non-sidereal tracking!









Annoying “features”

- no choice of binning (only 1x1)
- no sub-frame readout
- no user-selectable gain (fixed at 1.3 e-/ADU)
- awkward focus procedure