Touchstone Throughput Field

NIGHT	EXPID	EXPTIME (s)	AIRMASS	ZP_{meas} (AB)	ZP_{pred} (AB)	gain ($e-$/ADU)	n_{stars}	α_{bore} (°)	δ_{bore} (°)
20190406	4486	15	1.591	26.553 ± 0.002	26.4851	1.710	98	259.9794	-19.0949
20190406	4487	10	1.590	26.549 ± 0.003	26.4852	1.710	99	259.9794	-19.0950
20190406	4488	10	1.590	26.557 ± 0.004	26.4852	1.710	99	259.9794	-19.0950
20190417	7577	10	1.590	26.449 ± 0.007	26.4852	1.710	103	259.9726	-19.0908
20190417	7578	15	1.590	26.448 ± 0.006	26.4852	1.710	103	259.9726	-19.0908
20190417	7579	30	1.590	26.446 ± 0.005	26.4853	1.710	103	259.9726	-19.0909
20190417	7580	60	1.590	26.460 ± 0.006	26.4853	1.710	103	259.9726	-19.0909
20190417	7581	120	1.589	26.464 ± 0.007	26.4853	1.710	103	259.9726	-19.0910

Table 1: NOTE THAT THE MEASURED ZERO POINTS REPORTED IN THIS TABLE COUNT ALL LIGHT WITHIN A 50 PIXEL = 6.67″ RADIUS

- only CIC analyzed
- observed on 20190406 in photometric conditions according to the observing log (without aperture mask in place)
- same field was observed again by Arjun on 20190417 in photometric conditions (with aperture mask in place)
- in both cases (20190406 and 20190417) the seeing was reasonably good
- very nearly the exact same airmass (∼1.59) of observations on both nights
- low galactic latitude $(l_{gal}, b_{gal}) \approx (5°, 10°)$
- exposures within a single night are aligned to within ∼1″.
- pointings of exposure sets on the two different nights are offset by ∼0.5′
- about 100 CIC stars per exposure contribute to the zero point determination
- magnitude range of the stars analyzed is roughly $14 < r_{ps1} < 17$
- zero point measurement uses gain of 1.71 $e-$/ADU which I measured from my 'gain low dome' calibration screen sequences
- gain measurements based on calibration screen data taken in early april and late may agree very well for CIC, both giving 1.71 $e-$/ADU, so don't think there's a clear reason to worry about gain variation over time during the CI run.
- maybe I should add seeing values to the table since I have those (PSF is somewhat asymmetric in the 20190417 data set, elongated vertically in terms of CI pixel coordinates)
- the predicted zero point values are all nearly identical because they all use the mirror area from DESI-347-v15
- the reason the predicted zero points are very slightly different is because these predictions use the very slightly different airmass values when calculating the atmospheric transmission
- the predicted zero point using the DESI-347-v15 mirror area falls in between the zero points with and without the aperture mask
- the zero points with and without aperture mask are different by 0.0996 mag on average, in the sense that with the aperture mask less light is detected for a given source (which makes sense). this 0.0996 mag value just directly compares the zero points, since accounting for the tiny differences in airmass would make a negligible difference
- the 0.0996 mag translates to 9.6% more light gained by removing the aperture mask (although **much of this increase may come from light far from the centroid**). This is a larger differential than suggested by David Schlegel's estimate of ∼6% (from [desi-commiss 1084]).
- **the radius used for the aperture correction is 50 pixels = 6.67″, which is very large relative to the ∼1″ FWHM.**
- α_{bore} and δ_{bore} are the coordinates of the center of CIC in each exposure, according to my astrometric recalibrations based on to Gaia DR2. They are equinox 2000.
- PS1 matches (and r_{ps1} mags) come from `/project/projectdirs/cosmo/work/gaia/chunks-ps1-gaia` files. I'm pretty sure these files include only stars, would be good to confirm that with someone who knows the provenance of these files.