17271 - WFC3 UVIS Deep PSFs

Cycle: 30, Proposal Category: CAL/WFC3

(Availability Mode: RESTRICTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(3) GRW+70	WFC3/UVIS	2	22-Dec-2022 15:01:00.0	yes

2 Total Orbits Used

ABSTRACT

The UVIS PSF will be sampled in 5 different filters to measure the fraction of light in the PSF at large radii (>150 pixels), by exposing a bright star well past the point of saturation in the core. By observing GRW+70 5824, a frequently observed spectrophotometric standard star, we circumvent the issues high level of saturation in the core of the PSF imparted by thelong exposure times, as the flux of this source is well characterized by other calibration programs. Thus, the signal in the wings of the PSF is allowed to integrate significantly, and can be compared to the flux in the core of the PSF from other observations. This measurement of the PSF wings in these filters allows for better computation of aperture corrections for extended objects, as well as better PSF modeling.

Currently, the encircled energy models for the UVIS filters terminate at 150 pixel (6 arcseconds) and are assumed to contain 100% of the light.

However, measurementsof data taken in HST 11919 show that 1-2% of the flux of the source lies within 150-700 pixels in F275W/F625W. These errors in the encircled energy curves thus overpredict the amount of light inside 150 pixels, and lead to errors in the absolute measurements of flux from spatial scans. The filters chosen in this experiment are some of the most used wide band UVIS filters, and cover the majority of the wavelength range observable by the UVIS channel, so other filters encircled energy models may be adjusted via interpolating the results from these filters.

OBSERVING DESCRIPTION

The bright, isolated white dwarf star GRW+70 5824 will be observed in F225W, F336W, F475W, F555W, and F814W using pairs of long exposures, which will saturate the core of the PSF, but allow siginficant signal to be accrued in the wings of the PSF. In the first orbit, we take 6 exposures (F814W is observed twice to compensate for the source's lower brightness in this band). At the end of the first orbit, a small dither of 10.5 pixels in X and Y is applied (to mitigate bad pixel effects) and the exposures in orbit 1 are repeated.

We select the same apeture (UVIS CENTER) and POS TARG used in 11919 that placed the source in amp C, as this is the most observed/stable position on the detector. This helps reduce effects from the flatfield and other calibrations having spatial errors, when compared to the typical standard star monitoring observations.

The exposure times for each filter are selected to give a similar total number of electrons (and thus SNR) deposited on the detector across all 5 filters, while allowing buffer dumps during the exposure in the middle of the orbits, maximizing orbital efficiency. We use computed flash levels to bring the per pixel flash levels to approximately 20 electrons to mitigate CTE effects.

Visit

Proposal 17271, Visit 01 Thu Dec 22 20:01:01 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: AFTER 28-FEB-2023:00:00:00

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.582 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-6)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	GRW+70	RA: 13 38 49.2465 (204.7051938d) Dec: +70 17 7.26 (70.28535d) Equinox: J2000	Proper Motion RA: -0.07946163100704791 sec of time/yr Proper Motion Dec: -0.024556000062148087 arcsec/yr Epoch of Position: 2015.5	V=12.6	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=CALIBRATION
Description=[PHOTOMETRIC]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	475	(3) GRW+70	WFC3/UVIS, ACCUM, UVIS-CENTER	F475W	FLASH=14	POS TARG -50.7,-54.9	Pattern 1, Exps 1-6 in Visit 01 (1)	250 Secs (500 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
2	814_A	(3) GRW+70	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	FLASH=14	POS TARG -50.7,-54.9	Pattern 1, Exps 1-6 in Visit 01 (1)	375 Secs (750 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
3	814_B	(3) GRW+70	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	FLASH=14	POS TARG -50.7,-54.9	Pattern 1, Exps 1-6 in Visit 01 (1)	375 Secs (750 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
4	225	(3) GRW+70	WFC3/UVIS, ACCUM, UVIS-CENTER	F225W	FLASH=20	POS TARG -50.7,-54.9	Pattern 1, Exps 1-6 in Visit 01 (1)	560 Secs (1120 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
5	336	(3) GRW+70	WFC3/UVIS, ACCUM, UVIS-CENTER	F336W	FLASH=20	POS TARG -50.7,-54.9	Pattern 1, Exps 1-6 in Visit 01 (1)	500 Secs (1000 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
6	555	(3) GRW+70	WFC3/UVIS, ACCUM, UVIS-CENTER	F555W	FLASH=13	POS TARG -50.7,-54.9	Pattern 1, Exps 1-6 in Visit 01 (1)	250 Secs (500 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***

Orbit Structure