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IR GRISM WAVELENGTH SOLUTIONS USING THE ZERO ORDER IMAGE AS THE REFERENCE POINT

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ABSTRACT

The traditional method of assigning a wavelength scale for WFC3 grism spectra is based on offsets from an associated direct image. While a direct image is still required for identifying the full complex of overlapping orders in the objective spectral images, wavelength assignments for sources with known coordinates can be derived using the offsets from the zero order grism images. The accuracy caused by any non-linearity in the dispersion is estimated at ~0.1 pixel or ~2.5 Å for G102 and ~5 Å for G141. The rms precision of the assigned wavelengths for individual spectra is better than 0.2 pixel. For the same or very similar POSTARGs, the separation from direct image to zero order varies by up to 0.5 pixels in both x and y directions, corresponding to an uncertainty of about ~12Å (G102) and ~23Å (G141).

1. Introduction

The Wide Field Camera 3 (WFC3) has two IR grisms for slitless objective-field spectroscopy, G102 for 8000-11500 Å and G141 for 10500-17000 Å. The assignment of wavelengths for objective grisms on HST is discussed by Pirzkal et al. (2009) for NICMOS and by Kuntschner et al. (2009a, 2009b) for the WFC3 aXe[1] software suite. These methods are based on a direct image of the field followed by a grism exposure (DIM, direct image method extraction), sometimes with an offset to account for the angular deflection of the grism spectra.

However, extraction of spectra with reference to their zero order (ZO) images instead of a direct image is a desirable goal, if the direct image field does not include the object of interest or if the program efficiency is important. A direct image would still be required to help identify the offending sources of overlapping spectra or in case the ZO image falls off the grism image. If contamination due to overlapping spectra is a concern, then methods that are based on an associated direct image may be preferable. We compare the ZO spectral extraction method (ZOE) to the DIM using observations of planetary nebulae with strong emission lines and of the standard stars, GD153 and P330.

[1] http://axe-info.stsci.edu/

Two potential problems with the ZOE method are that the ZO image may be broader than direct stellar images in the dispersion direction and that there may be a color-dependence to the ZO centroids. Both the G141 grism ZO images and the direct images have a FWHM of ~2.5 pixels, whereas the G102 ZO FWHM is about one pixel wider than the direct stellar images in the dispersion direction. This broader profile should contribute <0.1 pixel of extra uncertainty in measuring ZO centroids with respect to a direct image centroid. To quantify the color dependence, the ZO offsets of a red (P330E, G0V) and a blue (GD153, WD) star are measured with respect to their direct images. The GD153 offsets from the direct to the ZO images in (X,Y) are (-252.7,-4.1) for G102 and (-187.6,-0.2) for G141, while for the G star P330E, the corresponding offsets are (-252.4,-4.3) and (-187.6,-0.3) in pixels when the direct image is near the center of the detector (but see section 4.2 below). With a typical rms scatter of 0.2-0.3 pixel in these measures, there is no statistically significant difference in the offsets between the hot and cooler star; and the offsets are the same for all filters used for the direct image.

The Appendix lists the aXe configuration files and the WFC3 image *rootnames* used here.

2. Data Reduction

Software written in the Interactive Data Language (IDL) is used for all of the analysis. A suite of similar software written by D. J. Lindler for NICMOS (Bohlin et al. 2006) is modified to recover spectra in units of electrons/s vs. wavelength from the objective grism images. The subroutine that establishes the wavelengths is called *calwfc_spec_wave.pro*, which is called by the higher-level *calwfc_spec.pro* that also locates the spectrum of interest. These routines utilize the direct image method, which was adopted for NICMOS. A new routine *wfc_wavecal.pro* utilizes the zero order (ZO) spectral image as the reference point for wavelengths and the spectral extractions,

Comparing the expected position to the measured position determines the accuracy of the astrometry in the headers of the **flt_fits* files. For four often observed stars, the mean distance between expected and measured position is in Table 1 for zero POSTARG. Non-zero POSTARGs had the same range of position accuracy. An IR camera pixel is ~0.13 arcsec.

Table 1. Mean difference in pixels between expected and measured positions. GD153 and GD71 have unaccounted high proper motions, which increases the pointing error above the nominal ~1 arcsec.

Star	Mean Distance (pixels)	RMS (pixels)
GD71	16.74	2.73
GD153	22.31	2.97
GRW+70D5824	3.77	6.74
P330E	6.64	2.37

The DrizzlePac Handbook table B.1 (Gonzaga et al. 2012) lists the pointing uncertainties for repeated observations within an orbit (same guide stars), i.e. ~2-20 milli-arcsec, which is <0.15 WFC3/IR pixel. Across multiple visits and telescope orientations, the pointing uncertainties are ~1 arcsec or ~8 WFC3/IR pixels. GD71 and GD153 have mean pointing errors larger than 1 arcsec, because the known large proper motions were not always specified in phase 2. However, a box of 51 x 51 pixels (~6.6 x 6.6 arcsec) centered on the predicted position will accommodate the systematic offsets in Table 1 and will include the actual location of the target on the direct image. The position is measured on the direct image with *calwfc_imagepos.pro*, and then the measured pointing error can be used to correct the ZO position that is predicted from the astrometry for the grism image. The ZO is found in a 31x31 search box by *calwfc_spec.pro;* and even if the ZO falls off the image, the first and second orders can be located. If there is no direct image, the requirements for specifying the target coordinates are stricter.

To extract spectra from the **_flt.fits* files with the ZOE method, many details are in the *calwfc_spec.pro* routine, where the grism header astrometry solution and the target celestial coordinates provide target pixel coordinates, as if an imaging filter were in place. The offsets from the target coordinates to the zero order were first determined by Petro (2010), Table C-2, where the offsets in (X,Y) pixels are (-252,-4) and (-188,0) for G102 and G141, respectively. A box of 31x31 pixels (~4x4 arcsec for the platescale of 0.13 arcsec/px), centered on the predicted position is searched for the brightest pixel and the IDL procedure *cntrd* is used to refine the ZO position to the sub-pixel level. To locate the spectral orders, an 11 px high search box around the approximate Y-position is used by *calwfc_spec* to find the exact centroid Y-positions of the -1, +1, and +2 orders that fall on the image. The wavelength ranges for the searches are 8000-11000 Å for G102 and 10333-16000 Å for G141. Because planetary nebulae (PNe) have weak continua, the bright emission line at 10830 Å that is used for the wavelength calibration defines the (X,Y) location of the faint -1 order. After the order positions are found, a linear fit to the Y-pixel vs. the X-pixel is made to define the angle and exact position for the spectral trace. The average angle of the grism spectra with respect to the image rows determines the approximate location of the spectral trace. For ~100 spectra with each grism, the average slope and rms scatter in degrees are (0.67, 0.05) for G102 and (0.41, 0.07) for G141.

For a 2σ angular variation of 0°.14, the deviation over the 1014 pixel detector width is 2.5px, which means that the exact orientation must be found to maintain sub-pixel precision in the centering of spectral extractions.

3. Wavelength Solution

3.1 Reference Wavelengths

To derive a global wavelength solution, the approach of Pirzkal et al. (2009) for NICMOS and of Kuntschner et al. (2009a, 2009b) for WFC3 is adopted. While Kuntschner analyzed only the 2009 observations of the planetary nebulae, Hb12 (PN G111.8-02.8) and Vy2-2 (PN G045.4-02.7), newer observations of Vy2-2 from proposal IDs 13093 and 13094 are included in our updated calibration. Just as for the previous work, our results depend on the effective wavelengths of emission features in a ground-based PNe reference spectrum. However, a Vy2-2 reference spectrum with dubious provenance was used in the Pirzkal and Kuntschner ISRs to establish the reference wavelengths. This spectrum matches Hora et al. (1999) longward of 11500 Å; but at the undocumented shorter wavelengths, the match with WFC3 observations is poor for the 10830/10938 HeI/Pγ ratio, as illustrated in Figure 1. Instead, our reference is a high-resolution spectrum of IC5117, which has an excitation level similar to Vy2-2 and has

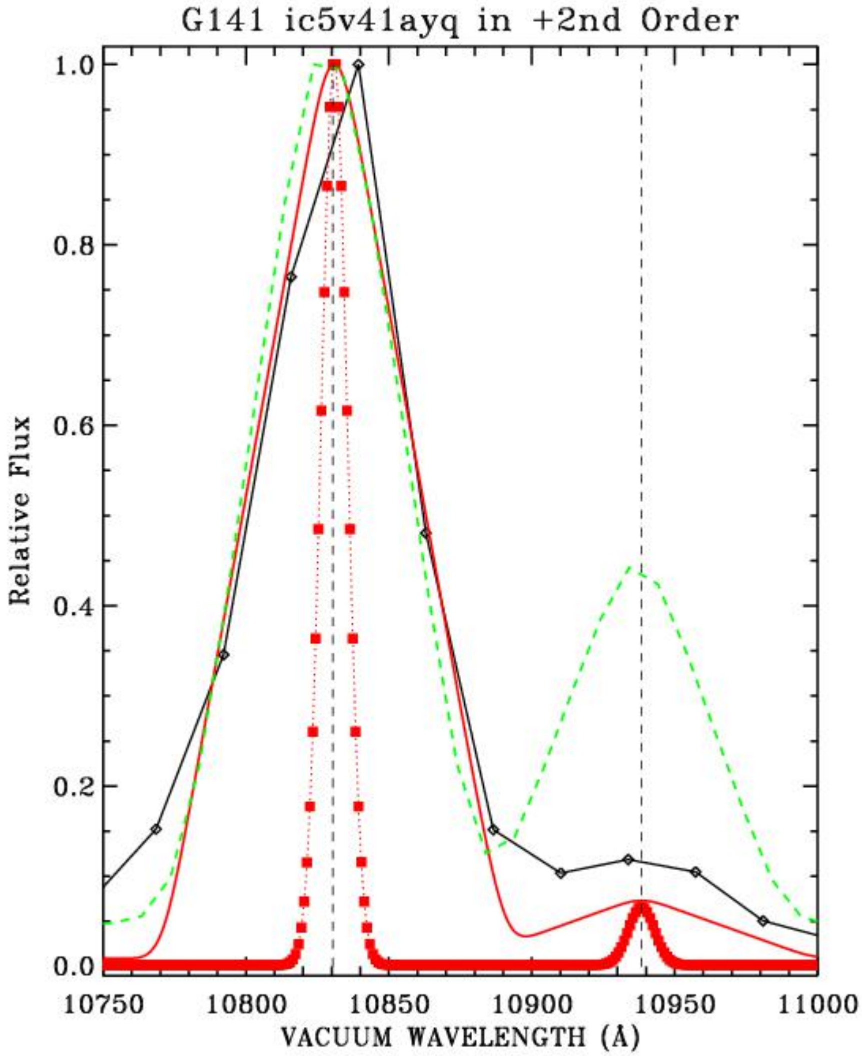

Figure 1. The spectral region that includes the 10833 Å He I and 10941 Å HI P γ lines where the vertical dashed fiducials are at their lab vacuum wavelengths, as shifted to the -71km/s radial velocity of Vy2-2. Solid black line and diamonds: the WFC3 G141spectrum of Vy2-2 in second order. Red dots and squares: IC5117 ground based spectrum shifted from its -26 to the -71 km/s radial velocity of Vy2-2. Solid Red line: same IC5117 spectrum smoothed to the approximate resolution of G141. Dashed green line: mystery spectrum used for previous analyses of Vy2-2 but is a poor match to the Vy2-2 WFC3 line ratio of HeI/Pγ.

observations between 0.8 and 1.7 μm (Rudy et al. 2001, Rudy 2013) that agree better with the WFC3 observations in Figure 1. The radial velocity of -71.2 km/s for Vy2-2 defines the fiducial lab wavelengths, i.e. IC5117 is shifted from its -26.1 km/s radial velocity to the -71.2 km/s of Vy2-2. The radial velocity of -5 km/s must be accounted in assigning wavelengths to the emission features of Hb12 (= PN G111.8-02.8).

In Table 2, the centroids of the unsmoothed, original IC5117 profiles agree to ~1Å with the lab wavelengths, which establishes the precision of the reference line wavelengths. The algorithm for measuring the centroids must be the same for the smoothed effective wavelengths in Table 2 as for measuring the features in the WFC3 spectra. To emphasize the importance of the line peaks over the line wings, which are prone to contamination from weaker lines, a continuum level is subtracted; and each line is clipped to zero below 50% of its peak. A signal-weighted centroid of the clipped feature defines the apparent wavelength.

Because the effective wavelength of the smoothed features depends on the instrumental resolution, separate values are required for G102 and G141, as well as for first and second order in each grism. Thus, four values of the effective WFC3 wavelength appear in Table 2. To match the WFC3 resolution, the IC5117 spectrum is convolved with a triangular function with FWHM of 80 and 120 Å for G102 and G141, respectively in first order, and 40 and 60 Å in second order, as illustrated in Figure 2. Among our five reference lines in Table 2, the biggest shift of the smoothed profiles from the lab wavelength is 2.3 Å for 16411.7 Å of G141 in first order. The three lines, 8448.7, 10052.2, and 16113.7 Å, are not used in our analysis; and 8448.7 shows a large shift for the G141 first order due to the richness of the emission line features in that region. For comparison, the final column labeled K09 of Table 2 contains the Kuntschner et al. (2009a, 2009b) values after conversion to vacuum.

Table 2. Wavelengths (Å) of Emission Line Features in IC5117. All values are vacuum, except for the column lab-air. The centroids of the profile are listed before any convolution and after smoothing to the four different cases of the WFC3 grism resolution. IC5117 is shifted to the rest frame by +26.1 km/s, while the error (Err) is the unsmoothed wavelength minus the lab-vac value.

Ion	lab-air	lab-vac	Unsmooth	Err	G102-1st	G141-1st	G102-2nd	G141-2nd	K09
OI	8446.4	8448.7	8448.1	-0.6	8443.9	8418.0	8444.9	8446.7	8448.7
[SIII]	9068.6	9071.1	9071.7	0.6	9070.0	9070.0	9071.4	9070.5	9071.1
[SIII]+Pε	Blend*	Blend*	9534.8	...	9535.1	9535.1	9535.1	9535.2	9533.2
HI P7	10049.4	10052.2	10053.0	0.8	10060.2	10063.5	10052.2	10053.6	10052.2
HeI	10830.3**	10833.3**	10833.4	0.1	10833.5	10834.5	10833.4	10833.4	10833.3
HeI	12818.1	12821.6	12822.7	1.1	12820.8	12820.8	12821.6	12821.0	12823.0
HI Br13	16109.3	16113.7	16112.6	-1.1	16112.1	16111.4	16112.4	16112.3	16113.7
HI Br12	16407.2	16411.7	16410.3	-1.4	16413.2	16414.0	16412.1	16412.7	16411.7

* The effective wavelength of the smoothed blend of 9533.2 [SIII]+9548.6 Pε is 9535.1 in three cases. The air wavelength corresponding to 9535.1 is 9532.5 Å. Lab-Vac wavelengths are from the NIST Atomic Spectra Database (ASD) at http://www.nist.gov/pml/data/asd.cfm.

** Calculated Ritz air and vacuum wavelengths from NIST ASD

3 .2 Emission Lines in G102 and G141

The program wlmeas.pro partially automates the measurement of the X-positions of the lines in Table 2, using the same 50% clipping algorithm as was used for centroiding the IC5117 reference line wavelengths. The He I line at 10833 Å is often saturated (data quality=256) in the +1st order, so that those positions are defined by the zero readout from the _ima.fits files with effective exposure time of 2.91 s. Furthermore, there are many data quality flags of 32 (unstable photometric response) and 512 (bad or uncertain flat field value) that must be accounted in

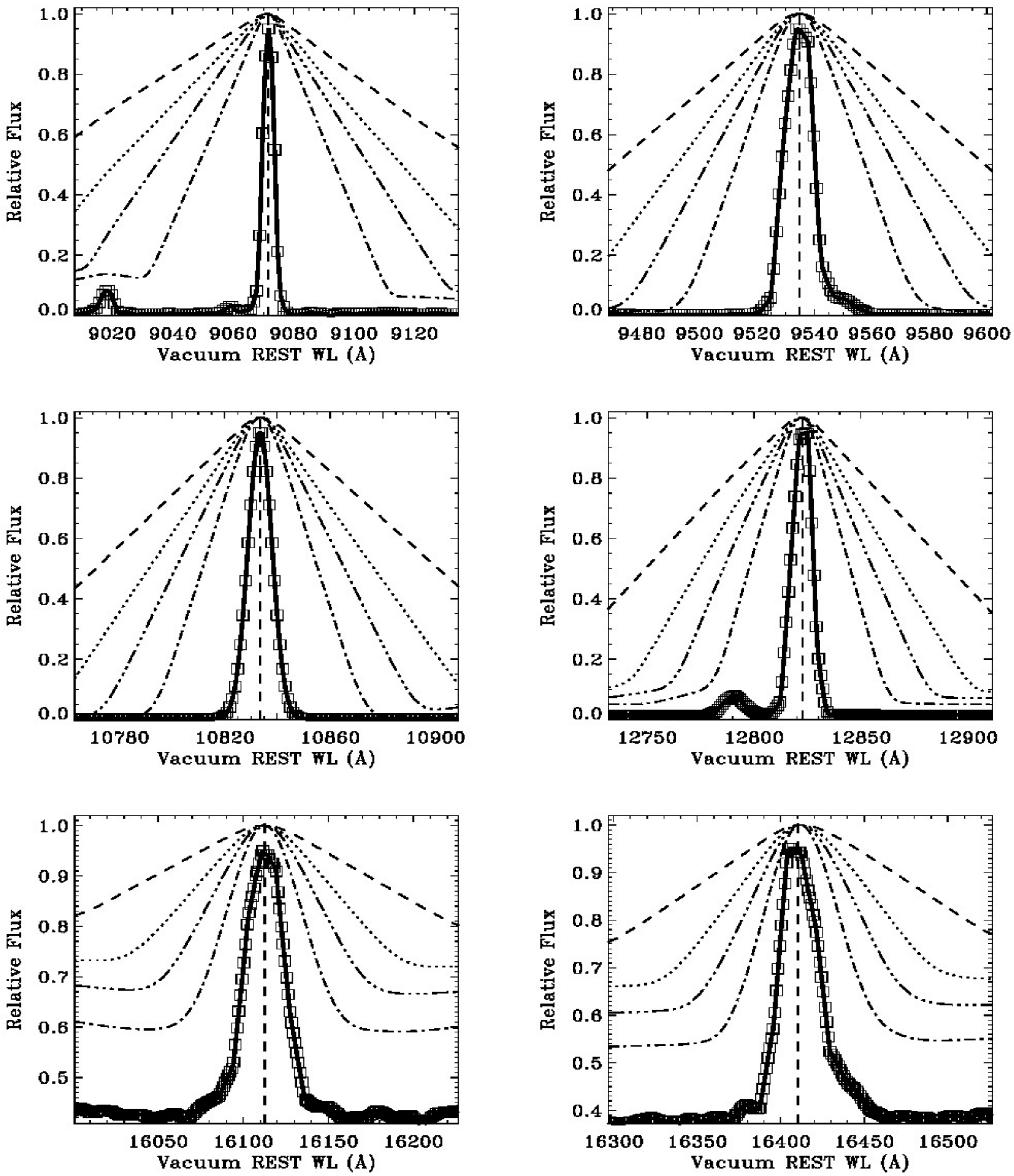

Figure 2. The reference emission lines on a vacuum wavelength scale corrected only for the IC5117 radial velocity of -26.1 km/s. Squares: original data from Rudy with the line centroids indicated by the fiducial dashed lines. The reference profiles are also shown after smoothing to the approximate WFC3 resolution of 120, 80, 60, and 40 Å in order of broadest (dash) to narrowest (dash-dot) convolved profile.

measuring line centroids in the WFC3 grism data. Centroids for the zero order and each of the spectral lines in Table 2 are measured and visually verified in a total of 135 orders (-1, +1, or +2) for a set of 72 G102 and G141 PN spectra of Vy2-2 and Hb12. These X,Y locations cover the entire field of view normally used for the grism spectra. In the second order of G141, lines longward of 16000 Å are not measurable because of confusion with the strong HeI 10833 and Pγ 10941 Å lines in third order.

3.3 Global Wavelength Solution

Following Pirzkal et al. (2009) and Kuntschner et al. (2009a, 2009b), the wavelength λ is a linear function of the distance from the zero order position x_z.

$$\boldsymbol{\lambda = b + m\,(x - x_z)}\ ,$$

where *b* is a constant offset in Å and *x* is the pixel location along the spectral trace. The line pairs 9071 & 10833 Å for G102 and 10833 & 16412 Å for G141 establish the dispersion *m* in Å/pixel. In the second order of G141, 12822 Å must be used instead of 16412 Å. The offset *b* and the dispersion *m* values computed for each observation are fit with a two dimensional solution over the field, as a function of the 0-order position (x_z ,y_z):

$$\mathbf{b = b_0 + b_1\, x_z + b_2\, y_z}$$

$$\mathbf{m = m_0 + m_1\, x_z + m_2\, y_z}\ .$$

The IDL program *wlmake.pro* organizes the line centroid measurements and evaluates the results after computing the coefficients b_i and m_i for each of the orders -1, +1, and +2 with the surface fitting program sfit.pro. These coefficients appear in Table 3 for each of the two grisms and three orders.

Table 3. Coefficients defining the field dependence of the wavelength solution for each grism and the grating orders -1, +1, and +2.

Grism	Order	b_0	b_1	b_2	m_0	m_1	m_2
G102	-1	205.229	-0.015426	-0.019207	24.7007	0.000047	0.001478
G102	+1	148.538	0.145605	-0.008558	23.8796	-0.000332	0.001489
G102	+2	213.571	0.561877	-0.040419	23.9983	-0.000797	0.001532
G141	-1	165.764	0.055688	0.016568	46.4521	0.000382	0.002960
G141	+1	156.339	0.111342	-0.010926	45.3203	-0.000408	0.002818
G141	+2	193.093	0.164508	-0.017031	45.6062	-0.000499	0.002840

4. Results

4.1 Precision

For each measured line position, the wavelength is computed according to the above prescription and compared to its effective wavelength from Table 2. The *rms* standard deviations (*not* errors in the mean) of these differences of predicted-minus-reference wavelengths appear in Table 4 and are less than ~0.2 pixels (4.9 Å & 9.3 Å) for the nominal dispersions of 24.5 and 46.5 Å/pixel for G102 and G141, respectively. For example, in +1st order, where there are 27 measurements, the largest error of ~2σ is 15.5 Å for the G141 16412 Å line in *ic6906bzq*. In first order, these spectra have a range of dispersion in Å/pixel of 23.9-25.2 for G102 and 45.4-47.9 for G141.

The average offset for the longest and shortest wavelength lines in each mode is zero by definition, because those two lines define the least square fits for b and m. As the 9535 and 12822 Å lines are not used to define the wavelength solutions, the mean offsets of these lines provide an independent check for any systematic error in our method, as tabulated in Table 5. These errors do not exceed 0.1 pixel in the 5 cases, so that there is no evidence for non-linearity in the WFC3 grism wavelength scales.

Table 4. rms standard deviation of the errors in Å for three measured lines for each grism. N is the number of measurements.

Grism	Order	9072 Å	9535Å	10833Å	12822Å	16412Å	N
G102	-1	2.2	2.3	2.6	...	...	6
G102	+1	5.3	5.0	4.6	...	...	27
G102	+2	5.0	4.1	3.1	...	...	16
G141	-1	...	...	5.1	3.0	7.0	15
G141	+1	...	...	6.5	7.6	7.9	27
G141	+2	...	...	5.5	6.3	...	20

Table 5 Mean offset in Å of the two emission lines used as an independent verification**.**

Grism	Order	Line Å	Mean Å	N
G102	-1	9535	2.4	6
G102	+1	9535	-1.2	27
G102	+2	9535	-2.2	16
G141	-1	12822	5.2	15
G141	+1	12822	-1.3	27

4.2 Comparison with Direct Image Extraction Method

Figures 3 and 4 are made by *wlpub.pro* and compare our ZOE results with the direct image aXe solution and dispersion constants of Kuntschner. Our DIM results are from an IDL code that defines the wavelengths from the stellar position on the direct image and Kuntschner dispersion constants. The two IDL methods, ZOE and DIM, achieve generally comparable repeatability for the illustrated emission lines of Vy2-2 from the program IDs 11937 and 13093, where direct images are obtained for every grism exposure. A few spectral images that are not included in Figures 3-4 have large negative X *POSTARGs* of more than about -30 for G102 and -40 for G141, so that the zero order falls off the image and makes the ZOE wavelengths less accurate, because the predicted ZO location must be used. However, the predicted ZO location can be updated from the astrometric error found for the direct image, when available. Even then, the wavelength solution must be extrapolated outside the constrained region and can be inaccurate, because the fitted solution is only for cases with a measured ZO position. For G102, the minimum X pixel values of ZOs that constrain the fit for the +1st order is ~80 for the Y-range of 174-922. Correspondingly for G141, the minimum X is ~150 for the Y-range of 178-925. In

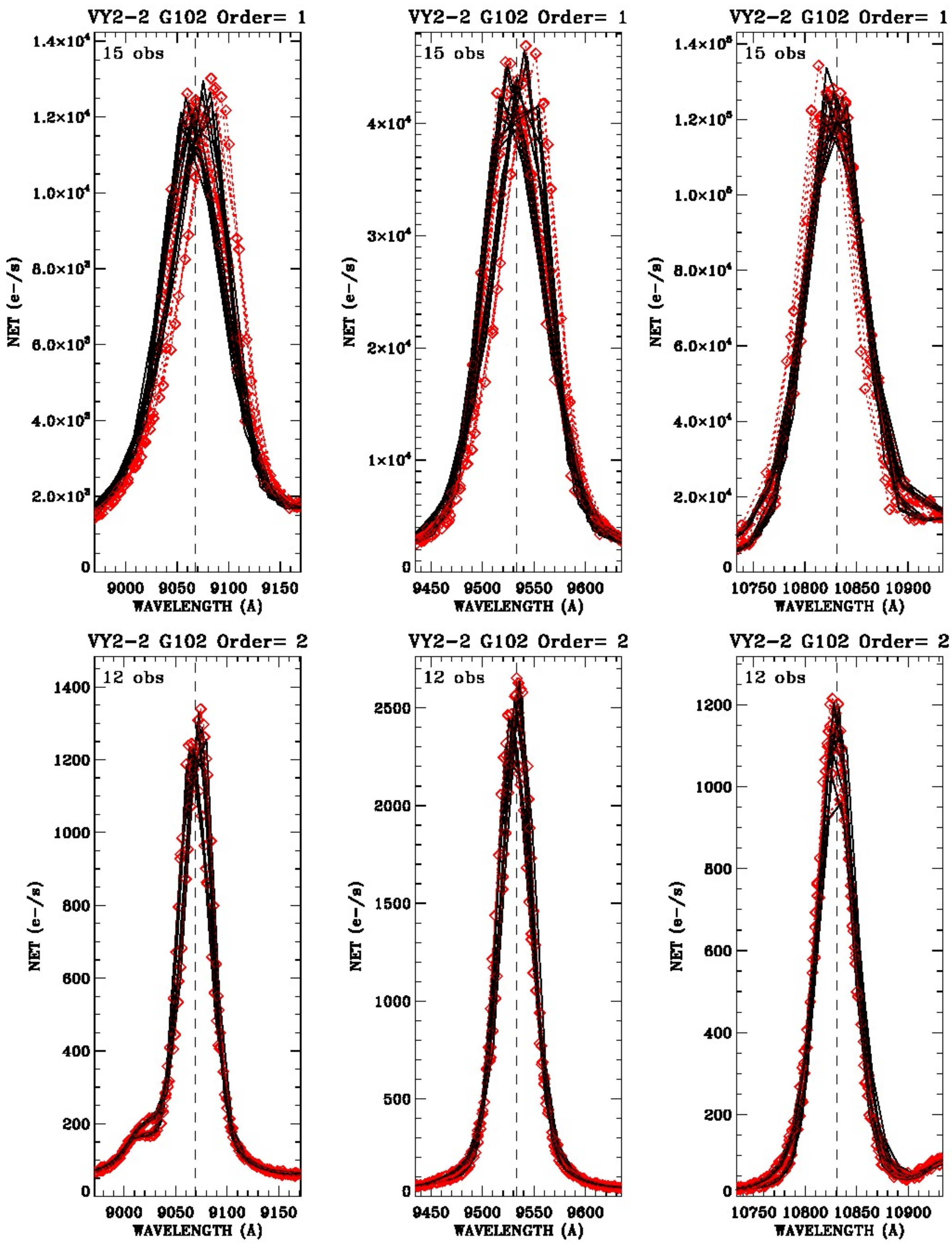

Figure 3. The G102 WFC3 reference emission line profiles of Vy2-2 on a vacuum wavelength scale. All the spectra from programs 11937 and 13093 with both ZOE (black) and aXe (red) wavelength solutions are overplotted with the number of observation indicated. The vertical dashed lines are at the reference wavelengths for the -71 km/s radial velocity of Vy2-2

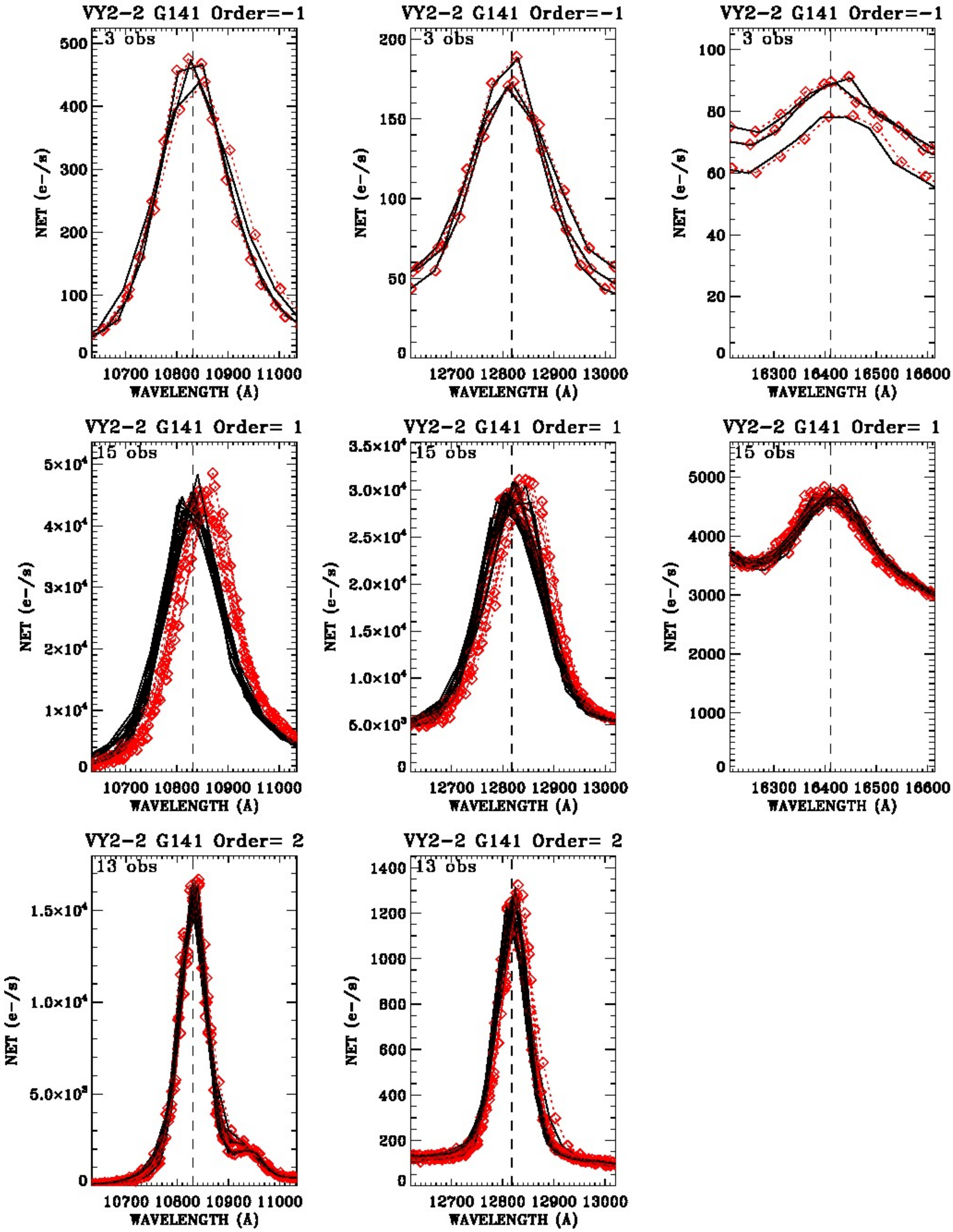

Figure 4. The G141 WFC3 reference emission line profiles of Vy2-2 on a vacuum wavelength scale as in Figure 3. The weak second-order 16412 Å line falls on top of the strong 10833 Å line in third order and is not shown.

case the ZO falls off the image, DIM should be used, because anchoring the wavelengths to a measurement is better than anchoring to positions predicted from the astrometry.

For spectra with measured ZO positions, the main differences between the ZOE and our DIM results, using the aXe dispersion constants, are small positive offsets in the mean wavelengths of the emission features, especially in first order. For example, our rest wavelength for G141 is 10834.6 Å from Table 2, i.e. 10832.0 Å at the -71 km/s of Vy2-2, while the red features in Figure 4 are centered ~30 Å longward.

Some programs do not always pair a grism image with a direct image and/or may also use large *POSTARG*s. In principle, the (X,Y) pixel coordinates of the grism orders should be predictable from the available direct images. The publicly available aXe code relies on a user created catalog to determine the locations of the grism orders. In the typical reduction process, the direct images are processed with AstroDrizzle to create a master image; then a source catalog with sky coordinates, pixel position, brightness, and shape information is made from the master using SEXTRACTOR (or other source finding software). This catalog is the basis of the subsequent aXe spectral extractions. For example, Figure 5 compares the ZOE and aXe results for IC 5117 from program 13582 with four POSTARG2 near 0, one at -45, and one at +45 arcsec, where there is a direct image at each position. The wavelength errors are small regardless of POSTARG. For program 13094, the postargs in the 13094 headers are the same in the data headers; but the "IR" reference point is used, which triggers an extra hidden POSTARG1 of ~64 arcsec when moving from the direct to the grism image. Fortunately, the astrometric solution for these grism images properly accounts for the hidden postarg to an accuracy of few pixels, so that the ZOE succeeds by searching for the ZO in the neighborhood of the astrometry predictions. Alternatively, DIM works well, if the position of the direct image that is predicted by the grism astrometry is corrected by the actual astrometric error found on the direct image.

Figure 6 shows the separation in pixels between the direct image and the ZO image for GD71 and GD153 at different POSTARGs, where the offsets between the direct image and ZO are measured from paired image/grism observations. The values shown are relative to the Petro (2010) x,y offsets of (-252,-4) for G102 and (-188,0) for G141 that are made at POSTARG1=0, POSTARG2=0. The change in separation is least near POSTARG2=0, regardless of POSTARG1 and largest for G102 in X for sources near the bottom of the detector. Even when sources are placed using the same or very similar POSTARGs, the separation varies by up to 0.5 pixels in both x and y directions, corresponding to an uncertainty of about ~12Å (G102) and ~23Å (G141).

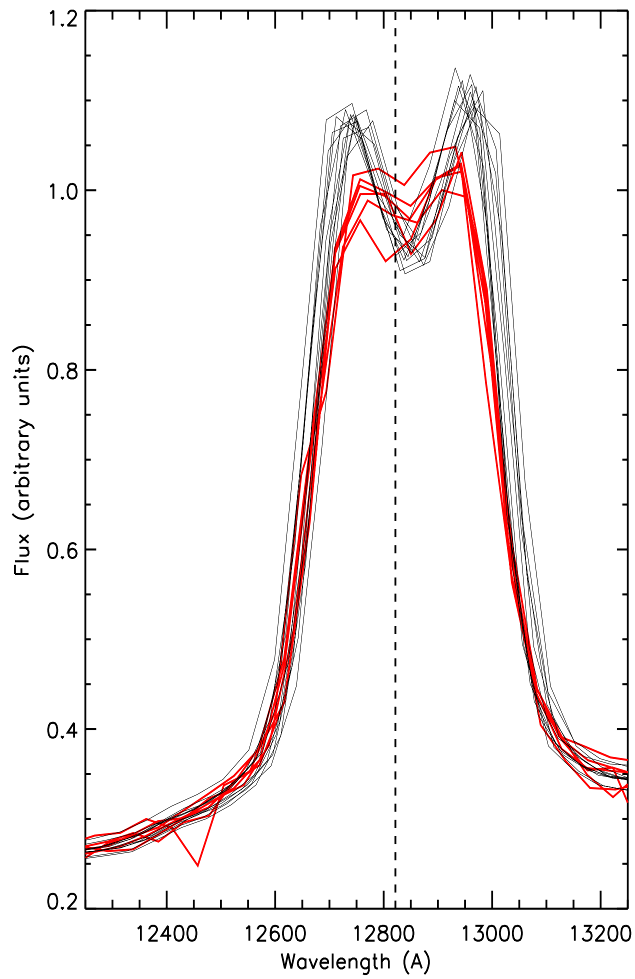

Figure 5. The 12821 Å line in the +1st order of G141 for the planetary nebula IC 5117 from program 13582 reduced using the ZOE method (black) and DIM (red) at six positions on the IR array. The Y-axis scale is arbitrary as IC 5117 is an extended source; and our extraction heights of 10 pixels for aXe and 6 pixels for the IDL ZOE do not contain all of this resolved object**.**

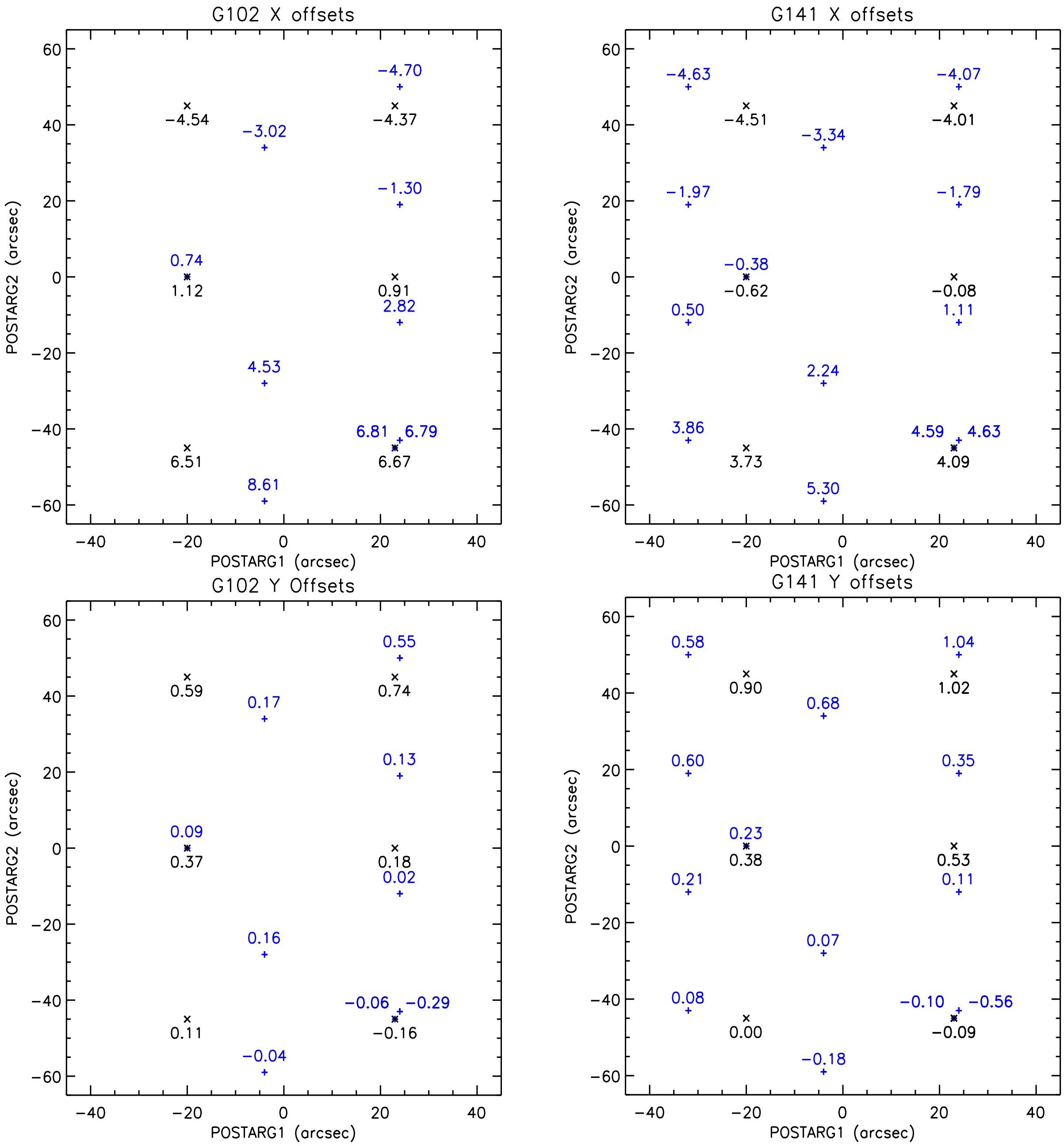

Figure 6. Variation in pixel units of the grism (ZO – direct image separation) with POSTARG location for the two WFC3/IR grisms relative to the values in Petro (2010). Data are for two of the WD standard stars, GD71 (black x) and GD153 (blue +) and are measured for matched pairs of direct and grism images. The deviations from the Petro values are smallest in X offset near detector center at POSTARG2=0.

REFERENCES

Bohlin, R. C., Riess, A., & de Jong, R. 2006, Instrument Science Report, NICMOS 2006-002, (Baltimore:STScI)

Gonzaga, S., Hack, W., Fruchter, A., Mack, J., eds. 2012, The DrizzlePac Handbook. (Baltimore:STScI)

Hora, J. L., Latter, W. B., & Deutsch, L. K. 1999, ApJS, 124, 195

Kuntschner, H. Bushouse, H., Kümmel, M., Walsh, J. R. 2009a, ST-ECF Instrument Science Report, WFC3 2009-17, (Baltimore:STScI)

Kuntschner, H. Bushouse, H., Kümmel, M., Walsh, J. R. 2009b, ST-ECF Instrument Science Report, WFC3-2009-18, (Baltimore:STScI)

Petro, L. 2010, Technical Instrument Report, WFC3 2010-03, (Baltimore:STScI)

Pirzkal, N., Bohlin, R. C., & Thatte, D. 2009, Instrument Science Report, NICMOS 2009-06, (Baltimore:STScI)

Rudy, R. J., Lynch, D. K., Mazuk, S., Puetter, R. C., & Dearborn, D. S. P. 2001, AJ, 121, 362

Rudy, R.J. 2013, private communication

Appendix: Data files used in this study

Table A: aXe calibration files

	G102	G141
configuration file	WFC3.IR.G102.V2.0.conf	WFC3.IR.G141.V2.5.conf
sensitivity 1st order	WFC3.IR.G102.1st.sens.2.fits	WFC3.IR.G141.1st.sens.2.fits
sensitivity 0th order	WFC3.IR.G102.0th.sens.1.fits	WFC3.IR.G141.0th.sens.1.fits
sensitivity 2nd order	WFC3.IR.G102.2nd.sens.2.fits	WFC3.IR.G141.2nd.sens.2.fits
sensitivity 3rd order	WFC3.IR.G102.3rd.sens.2.fits	WFC3.IR.G141.3rd.sens.2.fits
sensitivity -1st order	WFC3.IR.G102.m1st.sens.2.fits	WFC3.IR.G141.m1st.sens.2.5.fits
flat-field cube	WFC3.IR.**G102**.flat.2.fits	WFC3.IR.G141.flat.2.fits
master sky image	WFC3.IR.G101.sky.V.1.0.fits	WFC3.IR.G141.sky.V1.0.fits

Table B: Datasets used in this study, along with target names, filter, and POSTARGs. Vy2-2 and IC5117 are planetary nebulae, the remaining targets are stars.

PropID	Root	Target	Alt.Name	Filter	POSTARG1	POSTARG2
11926	ibcf0cvnq	P330E	P330E	G102	0	0
	ibcf0cvoq	P330E	P330E	G141	0	0.5
12699	ibwib6m8q	P330E	P330E	G102	43	-45
	ibwib6m9q	P330E	P330E	G102	43	-25
	ibwib6mbq	P330E	P330E	G102	43	0
	ibwib6mdq	P330E	P330E	G102	43	25
	ibwib6mfq	P330E	P330E	G102	43	50
11552	iab901eiq	GD153		F098M	-20	0
	iab901ejq	GD153		F105W	-20	0
	iab901ekq	GD153		G102	-20	0
	iab901elq	GD153		G102	-20.5	0.5
	iab901emq	GD153		G102	-21	1
	iab901enq	GD153		G102	-21.2	1.2
	iab901eqq	GD153		F098M	23	-45
	iab901erq	GD153		F105W	23	-45
	iab901esq	GD153		G102	23	-45
	iab904meq	GD153		F140W	-20	0
	iab904mfq	GD153		F160W	-20	0
	iab904mgq	GD153		G141	-20	0
	iab904mkq	GD153		G141	-20.5	0.5
	iab904mlq	GD153		G141	-21	1
	iab904mmq	GD153		G141	-21.2	1.2
	iab904moq	GD153		F140W	23	-45
	iab904mpq	GD153		F160W	23	-45
	iab904mqq	GD153		G141	23	-45
	iab9a1ewq	GD153		F098M	-50	45
	iab9a1exq	GD153		F105W	-50	45
	iab9a1eyq	GD153		G102	-50	45
	iab9a4msq	GD153		F140W	-50	45
	iab9a4mtq	GD153		F160W	-50	45
	iab9a4muq	GD153		G141	-50	45
12702	ibwq1asdq	GD153		F098M	-20	0
	ibwq1aseq	GD153		F105W	-20	0
	ibwq1asfq	GD153		G102	-20	0
	ibwq1asgq	GD153		G102	-20	2

ibwq1ashq	GD153	G102	−20	−2
ibwq1asiq	GD153	G102	−20	0.5
ibwq1askq	GD153	F098M	−63	−59
ibwq1aslq	GD153	F105W	−63	−59
ibwq1asmq	GD153	G102	−63	−59
ibwq1asnq	GD153	F098M	−63	−28
ibwq1asoq	GD153	F105W	−63	−28
ibwq1aspq	GD153	G102	−63	−28
ibwq1asqq	GD153	F098M	−63	3
ibwq1asrq	GD153	F105W	−63	3
ibwq1assq	GD153	G102	−63	3
ibwq1asuq	GD153	F098M	−63	34
ibwq1asvq	GD153	F105W	−63	34
ibwq1aswq	GD153	G102	−63	34
ibwq1asxq	GD153	F098M	−32	−43
ibwq1asyq	GD153	F105W	−32	−43
ibwq1aszq	GD153	G102	−32	−43
ibwq1at0q	GD153	F098M	−32	−12
ibwq1at1q	GD153	F105W	−32	−12
ibwq1at2q	GD153	G102	−32	−12
ibwq1at4q	GD153	F098M	−32	19
ibwq1at5q	GD153	F105W	−32	19
ibwq1at6q	GD153	G102	−32	19
ibwq1at7q	GD153	F098M	−32	50
ibwq1at8q	GD153	F105W	−32	50
ibwq1at9q	GD153	G102	−32	50
ibwq1ataq	GD153	F098M	−4	−59
ibwq1atbq	GD153	F105W	−4	−59
ibwq1atcq	GD153	G102	−4	−59
ibwq1ateq	GD153	F098M	−4	−28
ibwq1atfq	GD153	F105W	−4	−28
ibwq1atgq	GD153	G102	−4	−28
ibwq1athq	GD153	F098M	−4	34
ibwq1atiq	GD153	F105W	−4	34
ibwq1atjq	GD153	G102	−4	34
ibwq1atkq	GD153	F098M	24	−43
ibwq1atlq	GD153	F105W	24	−43
ibwq1atmq	GD153	G102	24	−43
ibwq1atoq	GD153	F098M	24	−12
ibwq1atpq	GD153	F105W	24	−12
ibwq1atqq	GD153	G102	24	−12
ibwq1atrq	GD153	F098M	24	19
ibwq1atsq	GD153	F105W	24	19
ibwq1attq	GD153	G102	24	19
ibwq1bl1q	GD153	F140W	−63	−59
ibwq1bl2q	GD153	F160W	−63	−59
ibwq1bl3q	GD153	G141	−63	−59
ibwq1bl4q	GD153	F140W	−63	−28
ibwq1bl5q	GD153	F160W	−63	−28
ibwq1bl6q	GD153	G141	−63	−28
ibwq1bl8q	GD153	F140W	−63	3
ibwq1bl9q	GD153	F160W	−63	3
ibwq1blaq	GD153	G141	−63	3
ibwq1blbq	GD153	F140W	−63	34
ibwq1blcq	GD153	F160W	−63	34
ibwq1bldq	GD153	G141	−63	34
ibwq1blfq	GD153	F140W	−32	−43
ibwq1blgq	GD153	F160W	−32	−43

	ibwq1blhq	GD153	G141	-32	-43
	ibwq1bliq	GD153	F140W	-32	-12
	ibwq1bljq	GD153	F160W	-32	-12
	ibwq1blkq	GD153	G141	-32	-12
	ibwq1blmq	GD153	F140W	-32	19
	ibwq1blnq	GD153	F160W	-32	19
	ibwq1bloq	GD153	G141	-32	19
	ibwq1blpq	GD153	F140W	-32	50
	ibwq1blqq	GD153	F160W	-32	50
	ibwq1blrq	GD153	G141	-32	50
	ibwq1bltq	GD153	F140W	-4	-59
	ibwq1bluq	GD153	F160W	-4	-59
	ibwq1blvq	GD153	G141	-4	-59
	ibwq1blwq	GD153	F140W	-4	-28
	ibwq1blxq	GD153	F160W	-4	-28
	ibwq1blyq	GD153	G141	-4	-28
	ibwq1bm0q	GD153	F140W	-4	34
	ibwq1bm1q	GD153	F160W	-4	34
	ibwq1bm2q	GD153	G141	-4	34
	ibwq1bm3q	GD153	F140W	24	-43
	ibwq1bm4q	GD153	F160W	24	-43
	ibwq1bm5q	GD153	G141	24	-43
	ibwq1bm7q	GD153	F140W	24	-12
	ibwq1bm8q	GD153	F160W	24	-12
	ibwq1bm9q	GD153	G141	24	-12
	ibwq1bmaq	GD153	F140W	24	19
	ibwq1bmbq	GD153	F160W	24	19
	ibwq1bmcq	GD153	G141	24	19
	ibwqaatuq	GD153	F098M	24	50
	ibwqaatvq	GD153	F105W	24	50
	ibwqaatwq	GD153	G102	24	50
	ibwqaatyq	GD153	F140W	-20	0
	ibwqaatzq	GD153	F160W	-20	0
	ibwqaau0q	GD153	G141	-20	0
	ibwqaau1q	GD153	G141	-20	2
	ibwqaau2q	GD153	G141	-20	-2
	ibwqaau3q	GD153	G141	-20	0.5
	ibwqabmeq	GD153	F140W	24	50
	ibwqabmfq	GD153	F160W	24	50
	ibwqabmgq	GD153	G141	24	50
13092	ic461aghq	GD153	F098M	-20	0
	ic461agiq	GD153	F105W	-20	0
	ic461agjq	GD153	G102	-20	0
	ic461aglq	GD153	G102	-20	2
	ic461agmq	GD153	G102	-20	-2
	ic461agnq	GD153	G102	-20	0.5
	ic461agpq	GD153	F098M	-4	-28
	ic461agqq	GD153	F105W	-4	-28
	ic461agrq	GD153	G102	-4	-28
	ic461agsq	GD153	G102	-4	-26
	ic461agtq	GD153	F098M	-4	34
	ic461aguq	GD153	F105W	-4	34
	ic461agvq	GD153	G102	-4	34
	ic461agwq	GD153	G102	-4	36
	ic461ah4q	GD153	F140W	-20	0
	ic461ah5q	GD153	F160W	-20	0
	ic461ah6q	GD153	G141	-20	0
	ic461ah7q	GD153	G141	-20	2

	ic461ah8q	GD153	G141	-20	-2
	ic461ah9q	GD153	G141	-20	0.5
	ic461ahbq	GD153	F140W	-4	-28
	ic461ahcq	GD153	F160W	-4	-28
	ic461ahdq	GD153	G141	-4	-28
	ic461aheq	GD153	G141	-4	-26
	ic461ahfq	GD153	F140W	-4	34
	ic461ahgq	GD153	F160W	-4	34
	ic461ahhq	GD153	G141	-4	34
	ic461ahjq	GD153	G141	-4	36
13575	ich318brq	GD153	F127M	0	0
	ich318bsq	GD153	G102	0	0
	ich318btq	GD153	F127M	0	0
	ich318buq	GD153	G141	0	0
11936	ibbt01ozq	GD71	F105W	-20	0
	ibbt01p0q	GD71	G102	-20	0
	ibbt01p1q	GD71	G102	-20.5	0.5
	ibbt01p2q	GD71	G102	-21	1
	ibbt01p3q	GD71	G102	-21.2	1.2
	ibbt01p6q	GD71	F098M	-50	45
	ibbt01p7q	GD71	F105W	-50	45
	ibbt01p8q	GD71	G102	-50	45
	ibbt01p9q	GD71	F098M	-20	45
	ibbt01paq	GD71	F105W	-20	45
	ibbt01pbq	GD71	G102	-20	45
	ibbt01pcq	GD71	F098M	23	45
	ibbt01pdq	GD71	F105W	23	45
	ibbt01peq	GD71	G102	23	45
	ibbt01pgq	GD71	F098M	-50	0
	ibbt01phq	GD71	F105W	-50	0
	ibbt01piq	GD71	G102	-50	0
	ibbt01pjq	GD71	F098M	23	0
	ibbt01pkq	GD71	F105W	23	0
	ibbt01plq	GD71	G102	23	0
	ibbt01pmq	GD71	F098M	-50	-45
	ibbt01pnq	GD71	F105W	-50	-45
	ibbt01poq	GD71	G102	-50	-45
	ibbt01pqq	GD71	F098M	-20	-45
	ibbt01prq	GD71	F105W	-20	-45
	ibbt01psq	GD71	G102	-20	-45
	ibbt01ptq	GD71	F098M	23	-45
	ibbt01puq	GD71	F105W	23	-45
	ibbt01pvq	GD71	G102	23	-45
	ibbt02atq	GD71	F140W	-20	0
	ibbt02auq	GD71	F160W	-20	0
	ibbt02avq	GD71	G141	-20	0
	ibbt02awq	GD71	G141	-20.5	0.5
	ibbt02ayq	GD71	G141	-21	1
	ibbt02azq	GD71	G141	-21.2	1.2
	ibbt02b5q	GD71	F140W	-50	45
	ibbt02b6q	GD71	F160W	-50	45
	ibbt02b7q	GD71	G141	-50	45
	ibbt02b8q	GD71	F140W	-20	45
	ibbt02b9q	GD71	F160W	-20	45
	ibbt02baq	GD71	G141	-20	45
	ibbt02bfq	GD71	F140W	23	45
	ibbt02bgq	GD71	F160W	23	45
	ibbt02bhq	GD71	G141	23	45

ibbt02biq	GD71	F140W	-50	0
ibbt02bjq	GD71	F160W	-50	0
ibbt02bkq	GD71	G141	-50	0
ibbt02btq	GD71	F140W	23	0
ibbt02buq	GD71	F160W	23	0
ibbt02bvq	GD71	G141	23	0
ibbt02bwq	GD71	F140W	-50	-45
ibbt02bxq	GD71	F160W	-50	-45
ibbt02byq	GD71	G141	-50	-45
ibbt02c0q	GD71	F140W	-20	-45
ibbt02c1q	GD71	F160W	-20	-45
ibbt02c2q	GD71	G141	-20	-45
ibbt02c3q	GD71	F140W	23	-45
ibbt02c4q	GD71	F160W	23	-45
ibbt02c5q	GD71	G141	23	-45
ibbt03edq	GD71	F098M	-20	0
ibbt03eeq	GD71	F105W	-20	0
ibbt03efq	GD71	G102	-20	0
ibbt03egq	GD71	G102	-20.5	0.5
ibbt03ehq	GD71	G102	-21	1
ibbt03eiq	GD71	G102	-21.2	1.2
ibbt03ekq	GD71	F098M	-50	45
ibbt03elq	GD71	F105W	-50	45
ibbt03emq	GD71	G102	-50	45
ibbt03enq	GD71	F098M	-20	45
ibbt03eoq	GD71	F105W	-20	45
ibbt03epq	GD71	G102	-20	45
ibbt03eqq	GD71	F098M	23	45
ibbt03esq	GD71	G102	23	45
ibbt03euq	GD71	F098M	-50	0
ibbt03evq	GD71	F105W	-50	0
ibbt03ewq	GD71	G102	-50	0
ibbt03exq	GD71	F098M	23	0
ibbt03eyq	GD71	F105W	23	0
ibbt03ezq	GD71	G102	23	0
ibbt03f0q	GD71	F098M	-50	-45
ibbt03f1q	GD71	F105W	-50	-45
ibbt03f2q	GD71	G102	-50	-45
ibbt03f4q	GD71	F098M	-20	-45
ibbt03f5q	GD71	F105W	-20	-45
ibbt03f6q	GD71	G102	-20	-45
ibbt03f7q	GD71	F098M	23	-45
ibbt03f8q	GD71	F105W	23	-45
ibbt03f9q	GD71	G102	23	-45
ibbt04g5q	GD71	F140W	-20	0
ibbt04g6q	GD71	F160W	-20	0
ibbt04g7q	GD71	G141	-20	0
ibbt04g8q	GD71	G141	-20.5	0.5
ibbt04gaq	GD71	G141	-21	1
ibbt04gbq	GD71	G141	-21.2	1.2
ibbt04gdq	GD71	F140W	-50	45
ibbt04geq	GD71	F160W	-50	45
ibbt04gfq	GD71	G141	-50	45
ibbt04ggq	GD71	F140W	-20	45
ibbt04ghq	GD71	F160W	-20	45
ibbt04giq	GD71	G141	-20	45
ibbt04hdq	GD71	F140W	23	45
ibbt04heq	GD71	F160W	23	45

	ibbt04hfq	GD71	G141	23	45
	ibbt04hgq	GD71	F140W	-50	0
	ibbt04hhq	GD71	F160W	-50	0
	ibbt04hiq	GD71	G141	-50	0
	ibbt04hlq	GD71	F140W	23	0
	ibbt04hmq	GD71	F160W	23	0
	ibbt04hnq	GD71	G141	23	0
	ibbt04hoq	GD71	F140W	-50	-45
	ibbt04hpq	GD71	F160W	-50	-45
	ibbt04hqq	GD71	G141	-50	-45
	ibbt04huq	GD71	F140W	-20	-45
	ibbt04hvq	GD71	F160W	-20	-45
	ibbt04hwq	GD71	G141	-20	-45
	ibbt04hxq	GD71	F140W	23	-45
	ibbt04hyq	GD71	F160W	23	-45
	ibbt04hzq	GD71	G141	23	-45
11926	ibcf04ebq	GD71	G141	30	30
	ibcf05b9q	GD71	G141	30	30
	ibcf06kbq	GD71	G141	30	30
	ibcf29qmq	GD71	G141	30	30
	ibcf30m3q	GD71	G141	30	30
12357	iblf01cgq	GD71	F098M	-20	0
	iblf01chq	GD71	F105W	-20	0
	iblf01ciq	GD71	G102	-20	0
	iblf01cjq	GD71	G102	-20.5	0.5
	iblf01ckq	GD71	G102	-21	1
	iblf01clq	GD71	G102	-21.2	1.2
	iblf01cnq	GD71	F098M	-50	45
	iblf01coq	GD71	F105W	-50	45
	iblf01cpq	GD71	G102	-50	45
	iblf01cqq	GD71	F098M	-20	45
	iblf01crq	GD71	F105W	-20	45
	iblf01csq	GD71	G102	-20	45
	iblf01ctq	GD71	F098M	23	45
	iblf01cuq	GD71	F105W	23	45
	iblf01cvq	GD71	G102	23	45
	iblf01cxq	GD71	F098M	-50	0
	iblf01cyq	GD71	F105W	-50	0
	iblf01czq	GD71	G102	-50	0
	iblf01d0q	GD71	F098M	23	0
	iblf01d1q	GD71	F105W	23	0
	iblf01d2q	GD71	G102	23	0
	iblf01d3q	GD71	F098M	-50	-45
	iblf01d4q	GD71	F105W	-50	-45
	iblf01d5q	GD71	G102	-50	-45
	iblf01d7q	GD71	F098M	-20	-45
	iblf01d8q	GD71	F105W	-20	-45
	iblf01d9q	GD71	G102	-20	-45
	iblf01daq	GD71	F098M	23	-45
	iblf01dbq	GD71	F105W	23	-45
	iblf01dcq	GD71	G102	23	-45
	iblf02bvq	GD71	F140W	-20	0
	iblf02bwq	GD71	F160W	-20	0
	iblf02bxq	GD71	G141	-20	0
	iblf02byq	GD71	G141	-20.5	0.5
	iblf02bzq	GD71	G141	-21	1
	iblf02c0q	GD71	G141	-21.2	1.2
	iblf02c5q	GD71	F140W	-50	45

	iblf02c6q	GD71	F160W	-50	45
	iblf02c7q	GD71	G141	-50	45
	iblf02c8q	GD71	F140W	-20	45
	iblf02c9q	GD71	F160W	-20	45
	iblf02caq	GD71	G141	-20	45
	iblf02ccq	GD71	F140W	23	45
	iblf02cdq	GD71	F160W	23	45
	iblf02ceq	GD71	G141	23	45
	iblf02cgq	GD71	F140W	-50	0
	iblf02chq	GD71	F160W	-50	0
	iblf02ciq	GD71	G141	-50	0
	iblf02cnq	GD71	F140W	23	0
	iblf02coq	GD71	F160W	23	0
	iblf02cpq	GD71	G141	23	0
	iblf02cqq	GD71	F140W	-50	-45
	iblf02crq	GD71	F160W	-50	-45
	iblf02csq	GD71	G141	-50	-45
	iblf02cuq	GD71	F140W	-20	-45
	iblf02cvq	GD71	F160W	-20	-45
	iblf02cwq	GD71	G141	-20	-45
	iblf02cyq	GD71	F140W	23	-45
	iblf02czq	GD71	F160W	23	-45
	iblf02d0q	GD71	G141	23	-45
12333	ibll14tdq	GD71	F098M	-20	0
	ibll14teq	GD71	G102	-20	0
	ibll14tgq	GD71	G102	-20.5	0.5
	ibll14thq	GD71	G102	-21	1
	ibll14tiq	GD71	G102	-21.2	1.2
	ibll14tjq	GD71	F098M	-50	45
	ibll14tkq	GD71	G102	-50	45
	ibll14tmq	GD71	F140W	-20	0
	ibll14tnq	GD71	G141	-20	0
	ibll14tpq	GD71	G141	-20.5	0.5
	ibll14tqq	GD71	G141	-21	1
	ibll14trq	GD71	G141	-21.2	1.2
	ibll14tsq	GD71	F140W	-50	45
	ibll14ttq	GD71	G141	-50	45
12702	ibwq02jlq	GD71	F098M	-20	0
	ibwq02jmq	GD71	F105W	-20	0
	ibwq02jnq	GD71	G102	-20	0
	ibwq02joq	GD71	G102	-20	2
	ibwq02jpq	GD71	G102	-20	-2
	ibwq02jqq	GD71	G102	-20	0.5
	ibwq02jsq	GD71	F140W	-20	0
	ibwq02jtq	GD71	F160W	-20	0
	ibwq02juq	GD71	G141	-20	0
	ibwq02jvq	GD71	G141	-20	2
	ibwq02jwq	GD71	G141	-20	-2
	ibwq02jxq	GD71	G141	-20	0.5

Table C. Planetary Nebulae data as per Table B.

PropID	Root	TARGET	Alt. Name	FILTER	POSTARG1	POSTARG2
13582	ich901aaq	IC5117		F098M	-20.0	0
	ich901abq	IC5117		F127M	-20.0	0
	ich901acq	IC5117		F105W	-20.0	0
	ich901adq	IC5117		G102	-20.0	0
	ich901aeq	IC5117		G102	-20.5	0.5
	ich901afq	IC5117		G102	-21.0	1
	ich901agq	IC5117		G102	-21.2	1.2
	ich901ajq	IC5117		F098M	-20.0	45
	ich901akq	IC5117		F127M	-20.0	45
	ich901alq	IC5117		F105W	-20.0	45
	ich901amq	IC5117		G102	-20.0	45
	ich901anq	IC5117		F098M	-20.0	-45
	ich901aoq	IC5117		F127M	-20.0	-45
	ich901apq	IC5117		F105W	-20.0	-45
	ich901aqq	IC5117		G102	-20.0	-45
	ich902ccq	IC5117		F140W	-20.0	0
	ich902cdq	IC5117		F167N	-20.0	0
	ich902ceq	IC5117		F160W	-20.0	0
	ich902cfq	IC5117		G141	-20.0	0
	ich902chq	IC5117		G141	-20.5	0.5
	ich902ciq	IC5117		G141	-21.0	1
	ich902cjq	IC5117		G141	-21.2	1.2
	ich902clq	IC5117		F140W	-20.0	45
	ich902cmq	IC5117		F167N	-20.0	45
	ich902cnq	IC5117		F160W	-20.0	45
	ich902coq	IC5117		G141	-20.0	45
	ich902cpq	IC5117		F140W	-20.0	-45
	ich902cqq	IC5117		F167N	-20.0	-45
	ich902crq	IC5117		F160W	-20.0	-45
	ich902csq	IC5117		G141	-20.0	-45
11552	iab907j5q	PN-G111.8-02.8	PN Hb 12	F098M	-20.0	0
	iab907j6q	PN-G111.8-02.8	PN Hb 12	G102	-20.0	0
	iab907j9q	PN-G111.8-02.8	PN Hb 12	F098M	-50.0	45
	iab907jaq	PN-G111.8-02.8	PN Hb 12	G102	-50.0	45
	iab907jbq	PN-G111.8-02.8	PN Hb 12	F098M	-20.0	45
	iab907jcq	PN-G111.8-02.8	PN Hb 12	G102	-20.0	45
	iab907jeq	PN-G111.8-02.8	PN Hb 12	G102	-23.0	-45
	iab907jfq	PN-G111.8-02.8	PN Hb 12	F098M	-50.0	0
	iab907jgq	PN-G111.8-02.8	PN Hb 12	G102	-50.0	0
	iab907jhq	PN-G111.8-02.8	PN Hb 12	F098M	23.0	0
	iab907jiq	PN-G111.8-02.8	PN Hb 12	G102	23.0	0
	iab907jkq	PN-G111.8-02.8	PN Hb 12	F098M	-50.0	-45
	iab907jlq	PN-G111.8-02.8	PN Hb 12	G102	-50.0	-45
	iab907jmq	PN-G111.8-02.8	PN Hb 12	F098M	-20.0	-45
	iab907jnq	PN-G111.8-02.8	PN Hb 12	G102	-20.0	-45
	iab907joq	PN-G111.8-02.8	PN Hb 12	F098M	23.0	-45
	iab907jpq	PN-G111.8-02.8	PN Hb 12	G102	23.0	-45
	iab908s3q	PN-G111.8-02.8	PN Hb 12	F140W	-20.0	0
	iab908s4q	PN-G111.8-02.8	PN Hb 12	G141	-20.0	0
	iab908s8q	PN-G111.8-02.8	PN Hb 12	F140W	-50.0	45
	iab908s9q	PN-G111.8-02.8	PN Hb 12	G141	-50.0	45
	iab908sdq	PN-G111.8-02.8	PN Hb 12	F140W	-20.0	45
	iab908seq	PN-G111.8-02.8	PN Hb 12	G141	-20.0	45
	iab908shq	PN-G111.8-02.8	PN Hb 12	F140W	23.0	45
	iab908siq	PN-G111.8-02.8	PN Hb 12	G141	23.0	45

	iab908slq	PN-G111.8-02.8	PN Hb 12	F140W	-50.0	0
	iab908smq	PN-G111.8-02.8	PN Hb 12	G141	-50.0	0
	iab908spq	PN-G111.8-02.8	PN Hb 12	F140W	23.0	0
	iab908sqq	PN-G111.8-02.8	PN Hb 12	G141	23.0	0
	iab908t9q	PN-G111.8-02.8	PN Hb 12	F140W	-50.0	-45
	iab908taq	PN-G111.8-02.8	PN Hb 12	G141	-50.0	-45
	iab908tdq	PN-G111.8-02.8	PN Hb 12	F140W	-20.0	-45
	iab908teq	PN-G111.8-02.8	PN Hb 12	G141	-20.0	-45
	iab908thq	PN-G111.8-02.8	PN Hb 12	F140W	23.0	-45
	iab908tiq	PN-G111.8-02.8	PN Hb 12	G141	23.0	-45
11937	ibbu01a1q	VY2-2	PN-G045.4-02.7	F098M	-20.0	0
	ibbu01a2q	VY2-2	PN-G045.4-02.7	F105W	-20.0	0
	ibbu01a3q	VY2-2	PN-G045.4-02.7	G102	-20.0	0
	ibbu01a4q	VY2-2	PN-G045.4-02.7	G102	-20.5	0.5
	ibbu01a5q	VY2-2	PN-G045.4-02.7	G102	-21.0	1
	ibbu01a6q	VY2-2	PN-G045.4-02.7	G102	-21.2	1.2
	ibbu01a8q	VY2-2	PN-G045.4-02.7	F098M	-50.0	45
	ibbu01a9q	VY2-2	PN-G045.4-02.7	F105W	-50.0	45
	ibbu01aaq	VY2-2	PN-G045.4-02.7	G102	-50.0	45
	ibbu01abq	VY2-2	PN-G045.4-02.7	F098M	-20.0	45
	ibbu01acq	VY2-2	PN-G045.4-02.7	F105W	-20.0	45
	ibbu01adq	VY2-2	PN-G045.4-02.7	G102	-20.0	45
	ibbu01aeq	VY2-2	PN-G045.4-02.7	F098M	23.0	45
	ibbu01afq	VY2-2	PN-G045.4-02.7	F105W	23.0	45
	ibbu01agq	VY2-2	PN-G045.4-02.7	G102	23.0	45
	ibbu01aiq	VY2-2	PN-G045.4-02.7	F098M	-50.0	0
	ibbu01ajq	VY2-2	PN-G045.4-02.7	F105W	-50.0	0
	ibbu01akq	VY2-2	PN-G045.4-02.7	G102	-50.0	0
	ibbu01alq	VY2-2	PN-G045.4-02.7	F098M	23.0	0
	ibbu01amq	VY2-2	PN-G045.4-02.7	F105W	23.0	0
	ibbu01anq	VY2-2	PN-G045.4-02.7	G102	23.0	0
	ibbu01aoq	VY2-2	PN-G045.4-02.7	F098M	-50.0	-45
	ibbu01apq	VY2-2	PN-G045.4-02.7	F105W	-50.0	-45
	ibbu01aqq	VY2-2	PN-G045.4-02.7	G102	-50.0	-45
	ibbu01asq	VY2-2	PN-G045.4-02.7	F098M	-20.0	-45
	ibbu01atq	VY2-2	PN-G045.4-02.7	F105W	-20.0	-45
	ibbu01auq	VY2-2	PN-G045.4-02.7	G102	-20.0	-45
	ibbu01avq	VY2-2	PN-G045.4-02.7	F098M	23.0	-45
	ibbu01awq	VY2-2	PN-G045.4-02.7	F105W	23.0	-45
	ibbu01axq	VY2-2	PN-G045.4-02.7	G102	23.0	-45
	ibbu02twq	VY2-2	PN-G045.4-02.7	F140W	-20.0	0
	ibbu02txq	VY2-2	PN-G045.4-02.7	F160W	-20.0	0
	ibbu02tyq	VY2-2	PN-G045.4-02.7	G141	-20.0	0
	ibbu02tzq	VY2-2	PN-G045.4-02.7	G141	-20.5	0.5
	ibbu02u0q	VY2-2	PN-G045.4-02.7	G141	-21.0	1
	ibbu02u1q	VY2-2	PN-G045.4-02.7	G141	-21.2	1.2
	ibbu02u3q	VY2-2	PN-G045.4-02.7	F140W	-50.0	45
	ibbu02u4q	VY2-2	PN-G045.4-02.7	F160W	-50.0	45
	ibbu02u5q	VY2-2	PN-G045.4-02.7	G141	-50.0	45
	ibbu02uwq	VY2-2	PN-G045.4-02.7	F140W	-20.0	45
	ibbu02uxq	VY2-2	PN-G045.4-02.7	F160W	-20.0	45
	ibbu02uyq	VY2-2	PN-G045.4-02.7	G141	-20.0	45
	ibbu02v0q	VY2-2	PN-G045.4-02.7	F140W	23.0	45
	ibbu02v1q	VY2-2	PN-G045.4-02.7	F160W	23.0	45
	ibbu02v2q	VY2-2	PN-G045.4-02.7	G141	23.0	45
	ibbu02v3q	VY2-2	PN-G045.4-02.7	F140W	-50.0	0
	ibbu02v4q	VY2-2	PN-G045.4-02.7	F160W	-50.0	0
	ibbu02v5q	VY2-2	PN-G045.4-02.7	G141	-50.0	0

	ibbu02v7q	VY2-2	PN-G045.4-02.7	F140W	23.0	0
	ibbu02v8q	VY2-2	PN-G045.4-02.7	F160W	23.0	0
	ibbu02v9q	VY2-2	PN-G045.4-02.7	G141	23.0	0
	ibbu02vaq	VY2-2	PN-G045.4-02.7	F140W	-50.0	-45
	ibbu02vbq	VY2-2	PN-G045.4-02.7	F160W	-50.0	-45
	ibbu02vcq	VY2-2	PN-G045.4-02.7	G141	-50.0	-45
	ibbu02veq	VY2-2	PN-G045.4-02.7	F140W	-20.0	-45
	ibbu02vfq	VY2-2	PN-G045.4-02.7	F160W	-20.0	-45
	ibbu02vgq	VY2-2	PN-G045.4-02.7	G141	-20.0	-45
	ibbu02vhq	VY2-2	PN-G045.4-02.7	F140W	23.0	-45
	ibbu02viq	VY2-2	PN-G045.4-02.7	F160W	23.0	-45
	ibbu02vjq	VY2-2	PN-G045.4-02.7	G141	23.0	-45
12356	ibmq01bpq	VY2-2	PN-G045.4-02.7	F098M	-20.0	0
	ibmq01bqq	VY2-2	PN-G045.4-02.7	F105W	-20.0	0
	ibmq01brq	VY2-2	PN-G045.4-02.7	G102	-20.0	0
	ibmq01bsq	VY2-2	PN-G045.4-02.7	G102	-20.5	0.5
	ibmq01btq	VY2-2	PN-G045.4-02.7	G102	-21.0	1
	ibmq01buq	VY2-2	PN-G045.4-02.7	G102	-21.2	1.2
	ibmq01bwq	VY2-2	PN-G045.4-02.7	F098M	-50.0	45
	ibmq01bxq	VY2-2	PN-G045.4-02.7	F105W	-50.0	45
	ibmq01byq	VY2-2	PN-G045.4-02.7	G102	-50.0	45
	ibmq01c1q	VY2-2	PN-G045.4-02.7	F098M	-20.0	45
	ibmq01c2q	VY2-2	PN-G045.4-02.7	F105W	-20.0	45
	ibmq01c3q	VY2-2	PN-G045.4-02.7	G102	-20.0	45
	ibmq01c4q	VY2-2	PN-G045.4-02.7	F098M	23.0	45
	ibmq01c5q	VY2-2	PN-G045.4-02.7	F105W	23.0	45
	ibmq01c6q	VY2-2	PN-G045.4-02.7	G102	23.0	45
	ibmq02hjq	VY2-2	PN-G045.4-02.7	F140W	-20.0	0
	ibmq02hkq	VY2-2	PN-G045.4-02.7	F160W	-20.0	0
	ibmq02hlq	VY2-2	PN-G045.4-02.7	G141	-20.0	0
	ibmq02hmq	VY2-2	PN-G045.4-02.7	G141	-20.5	0.5
	ibmq02hnq	VY2-2	PN-G045.4-02.7	G141	-21.0	1
	ibmq02hoq	VY2-2	PN-G045.4-02.7	G141	-21.2	1.2
	ibmq02hrq	VY2-2	PN-G045.4-02.7	F140W	-50.0	45
	ibmq02hsq	VY2-2	PN-G045.4-02.7	F160W	-50.0	45
	ibmq02htq	VY2-2	PN-G045.4-02.7	G141	-50.0	45
	ibmq02huq	VY2-2	PN-G045.4-02.7	F140W	-20.0	45
	ibmq02hvq	VY2-2	PN-G045.4-02.7	F160W	-20.0	45
	ibmq02hwq	VY2-2	PN-G045.4-02.7	G141	-20.0	45
	ibmq02hyq	VY2-2	PN-G045.4-02.7	F140W	23.0	45
	ibmq02hzq	VY2-2	PN-G045.4-02.7	F160W	23.0	45
	ibmq02i0q	VY2-2	PN-G045.4-02.7	G141	23.0	45
	ibmq02i1q	VY2-2	PN-G045.4-02.7	F140W	-50.0	0
	ibmq02i2q	VY2-2	PN-G045.4-02.7	F160W	-50.0	0
	ibmq02i3q	VY2-2	PN-G045.4-02.7	G141	-50.0	0
	ibmq02i5q	VY2-2	PN-G045.4-02.7	F140W	23.0	0
	ibmq02i6q	VY2-2	PN-G045.4-02.7	F160W	23.0	0
	ibmq02i7q	VY2-2	PN-G045.4-02.7	G141	23.0	0
	ibmq02i8q	VY2-2	PN-G045.4-02.7	F140W	-50.0	-45
	ibmq02i9q	VY2-2	PN-G045.4-02.7	F160W	-50.0	-45
	ibmq02iaq	VY2-2	PN-G045.4-02.7	G141	-50.0	-45
	ibmq02icq	VY2-2	PN-G045.4-02.7	F140W	-20.0	-45
	ibmq02idq	VY2-2	PN-G045.4-02.7	F160W	-20.0	-45
	ibmq02ieq	VY2-2	PN-G045.4-02.7	G141	-20.0	-45
	ibmq02ifq	VY2-2	PN-G045.4-02.7	F140W	23.0	-45
	ibmq02igq	VY2-2	PN-G045.4-02.7	F160W	23.0	-45
	ibmq02ihq	VY2-2	PN-G045.4-02.7	G141	23.0	-45
	ibmq51a1q	VY2-2	PN-G045.4-02.7	G102	-50.0	0

	ibmq51a3q	VY2-2	PN-G045.4-02.7	F098M	23.0	0
	ibmq51a4q	VY2-2	PN-G045.4-02.7	F105W	23.0	0
	ibmq51a5q	VY2-2	PN-G045.4-02.7	G102	23.0	0
	ibmq51a6q	VY2-2	PN-G045.4-02.7	F098M	-50.0	-45
	ibmq51a7q	VY2-2	PN-G045.4-02.7	F105W	-50.0	-45
	ibmq51a8q	VY2-2	PN-G045.4-02.7	G102	-50.0	-45
	ibmq51aaq	VY2-2	PN-G045.4-02.7	F098M	-20.0	-45
	ibmq51abq	VY2-2	PN-G045.4-02.7	F105W	-20.0	-45
	ibmq51acq	VY2-2	PN-G045.4-02.7	G102	-20.0	-45
	ibmq51adq	VY2-2	PN-G045.4-02.7	F098M	23.0	-45
	ibmq51aeq	VY2-2	PN-G045.4-02.7	F105W	23.0	-45
	ibmq51afq	VY2-2	PN-G045.4-02.7	G102	23.0	-45
	ibmq53mnq	VY2-2	PN-G045.4-02.7	F140W	-20.0	0
	ibmq53moq	VY2-2	PN-G045.4-02.7	F160W	-20.0	0
	ibmq53mpq	VY2-2	PN-G045.4-02.7	G141	-20.0	0
	ibmq53mqq	VY2-2	PN-G045.4-02.7	G141	-20.5	0.5
	ibmq53mrq	VY2-2	PN-G045.4-02.7	G141	-21.0	1
	ibmq53msq	VY2-2	PN-G045.4-02.7	G141	-21.2	1.2
	ibmq53muq	VY2-2	PN-G045.4-02.7	F140W	-50.0	45
	ibmq53mvq	VY2-2	PN-G045.4-02.7	F160W	-50.0	45
	ibmq53mwq	VY2-2	PN-G045.4-02.7	G141	-50.0	45
	ibmq53mxq	VY2-2	PN-G045.4-02.7	F140W	-20.0	45
	ibmq53myq	VY2-2	PN-G045.4-02.7	F160W	-20.0	45
	ibmq53mzq	VY2-2	PN-G045.4-02.7	G141	-20.0	45
	ibmq53n1q	VY2-2	PN-G045.4-02.7	F140W	23.0	45
	ibmq53n2q	VY2-2	PN-G045.4-02.7	F160W	23.0	45
	ibmq53n3q	VY2-2	PN-G045.4-02.7	G141	23.0	45
	ibmq53n4q	VY2-2	PN-G045.4-02.7	F140W	-50.0	0
	ibmq53n5q	VY2-2	PN-G045.4-02.7	F160W	-50.0	0
	ibmq53n6q	VY2-2	PN-G045.4-02.7	G141	-50.0	0
	ibmq53n8q	VY2-2	PN-G045.4-02.7	F140W	23.0	0
	ibmq53n9q	VY2-2	PN-G045.4-02.7	F160W	23.0	0
	ibmq53naq	VY2-2	PN-G045.4-02.7	G141	23.0	0
	ibmq53nbq	VY2-2	PN-G045.4-02.7	F140W	-50.0	-45
	ibmq53ncq	VY2-2	PN-G045.4-02.7	F160W	-50.0	-45
	ibmq53ndq	VY2-2	PN-G045.4-02.7	G141	-50.0	-45
	ibmq53nfq	VY2-2	PN-G045.4-02.7	F140W	-20.0	-45
	ibmq53ngq	VY2-2	PN-G045.4-02.7	F160W	-20.0	-45
	ibmq53nhq	VY2-2	PN-G045.4-02.7	G141	-20.0	-45
	ibmq53niq	VY2-2	PN-G045.4-02.7	F140W	23.0	-45
	ibmq53njq	VY2-2	PN-G045.4-02.7	F160W	23.0	-45
	ibmq53nkq	VY2-2	PN-G045.4-02.7	G141	23.0	-45
12699	ibwib7r4q	VY2-2	PN-G045.4-02.7	G102	43.0	-1
	ibwib7r5q	VY2-2	PN-G045.4-02.7	G141	23.0	1
	ibwib7r7q	VY2-2	PN-G045.4-02.7	G102	43.0	50
	ibwib7r9q	VY2-2	PN-G045.4-02.7	G141	23.0	48
	ibwib7rbq	VY2-2	PN-G045.4-02.7	G102	43.0	-45
	ibwib7rdq	VY2-2	PN-G045.4-02.7	G141	23.0	-43
12703	ibwt01rvq	VY2-2	PN-G045.4-02.7	F098M	-50.0	45
	ibwt01rwq	VY2-2	PN-G045.4-02.7	F105W	-50.0	45
	ibwt01rxq	VY2-2	PN-G045.4-02.7	G102	-50.0	45
	ibwt01ryq	VY2-2	PN-G045.4-02.7	F098M	-50.0	22
	ibwt01rzq	VY2-2	PN-G045.4-02.7	F105W	-50.0	22
	ibwt01s0q	VY2-2	PN-G045.4-02.7	G102	-50.0	22
	ibwt01smq	VY2-2	PN-G045.4-02.7	F098M	-50.0	15
	ibwt01snq	VY2-2	PN-G045.4-02.7	F105W	-50.0	15
	ibwt01soq	VY2-2	PN-G045.4-02.7	G102	-50.0	15
	ibwt01sqq	VY2-2	PN-G045.4-02.7	F098M	-50.0	0

ibwt01srq	VY2-2	PN-G045.4-02.7	F105W	-50.0	0
ibwt01ssq	VY2-2	PN-G045.4-02.7	G102	-50.0	0
ibwt01stq	VY2-2	PN-G045.4-02.7	F098M	-50.0	-15
ibwt01suq	VY2-2	PN-G045.4-02.7	F105W	-50.0	-15
ibwt01svq	VY2-2	PN-G045.4-02.7	G102	-50.0	-15
ibwt01swq	VY2-2	PN-G045.4-02.7	F098M	-50.0	-22
ibwt01sxq	VY2-2	PN-G045.4-02.7	F105W	-50.0	-22
ibwt01syq	VY2-2	PN-G045.4-02.7	G102	-50.0	-22
ibwt01t0q	VY2-2	PN-G045.4-02.7	F098M	-50.0	-45
ibwt01t1q	VY2-2	PN-G045.4-02.7	F105W	-50.0	-45
ibwt01t2q	VY2-2	PN-G045.4-02.7	G102	-50.0	-45
ibwt01t3q	VY2-2	PN-G045.4-02.7	F098M	23.0	45
ibwt01t4q	VY2-2	PN-G045.4-02.7	F105W	23.0	45
ibwt01t5q	VY2-2	PN-G045.4-02.7	G102	23.0	45
ibwt01t6q	VY2-2	PN-G045.4-02.7	F098M	23.0	22
ibwt01t7q	VY2-2	PN-G045.4-02.7	F105W	23.0	22
ibwt01t8q	VY2-2	PN-G045.4-02.7	G102	23.0	22
ibwt01taq	VY2-2	PN-G045.4-02.7	F098M	23.0	15
ibwt01tbq	VY2-2	PN-G045.4-02.7	F105W	23.0	15
ibwt01tcq	VY2-2	PN-G045.4-02.7	G102	23.0	15
ibwt01tdq	VY2-2	PN-G045.4-02.7	F098M	23.0	0
ibwt01teq	VY2-2	PN-G045.4-02.7	F105W	23.0	0
ibwt01tfq	VY2-2	PN-G045.4-02.7	G102	23.0	0
ibwt01tgq	VY2-2	PN-G045.4-02.7	F098M	23.0	-15
ibwt01thq	VY2-2	PN-G045.4-02.7	F105W	23.0	-15
ibwt01tiq	VY2-2	PN-G045.4-02.7	G102	23.0	-15
ibwt01tkq	VY2-2	PN-G045.4-02.7	F098M	23.0	-22
ibwt01tlq	VY2-2	PN-G045.4-02.7	F105W	23.0	-22
ibwt01tmq	VY2-2	PN-G045.4-02.7	G102	23.0	-22
ibwt01tnq	VY2-2	PN-G045.4-02.7	F098M	23.0	-45
ibwt01toq	VY2-2	PN-G045.4-02.7	F105W	23.0	-45
ibwt01tpq	VY2-2	PN-G045.4-02.7	G102	23.0	-45
ibwt01tqq	VY2-2	PN-G045.4-02.7	F098M	-30.0	45
ibwt01trq	VY2-2	PN-G045.4-02.7	F105W	-30.0	45
ibwt01tsq	VY2-2	PN-G045.4-02.7	G102	-30.0	45
ibwt01tuq	VY2-2	PN-G045.4-02.7	F098M	-30.0	22
ibwt01tvq	VY2-2	PN-G045.4-02.7	F105W	-30.0	22
ibwt01twq	VY2-2	PN-G045.4-02.7	G102	-30.0	22
ibwt01txq	VY2-2	PN-G045.4-02.7	F098M	-30.0	15
ibwt01tyq	VY2-2	PN-G045.4-02.7	F105W	-30.0	15
ibwt01tzq	VY2-2	PN-G045.4-02.7	G102	-30.0	15
ibwt01u0q	VY2-2	PN-G045.4-02.7	F098M	-30.0	0
ibwt01u1q	VY2-2	PN-G045.4-02.7	F105W	-30.0	0
ibwt01u2q	VY2-2	PN-G045.4-02.7	G102	-30.0	0
ibwt01u4q	VY2-2	PN-G045.4-02.7	F098M	-30.0	-15
ibwt01u5q	VY2-2	PN-G045.4-02.7	F105W	-30.0	-15
ibwt01u6q	VY2-2	PN-G045.4-02.7	G102	-30.0	-15
ibwt01u7q	VY2-2	PN-G045.4-02.7	F098M	-30.0	-22
ibwt01u8q	VY2-2	PN-G045.4-02.7	F105W	-30.0	-22
ibwt01u9q	VY2-2	PN-G045.4-02.7	G102	-30.0	-22
ibwt01uaq	VY2-2	PN-G045.4-02.7	F098M	-30.0	-45
ibwt01ubq	VY2-2	PN-G045.4-02.7	F105W	-30.0	-45
ibwt01ucq	VY2-2	PN-G045.4-02.7	G102	-30.0	-45
ibwt01ueq	VY2-2	PN-G045.4-02.7	F098M	-10.0	45
ibwt01ufq	VY2-2	PN-G045.4-02.7	F105W	-10.0	45
ibwt01ugq	VY2-2	PN-G045.4-02.7	G102	-10.0	45
ibwt01uhq	VY2-2	PN-G045.4-02.7	F098M	-10.0	15
ibwt01uiq	VY2-2	PN-G045.4-02.7	F105W	-10.0	15

ibwt01ujq	VY2-2	PN-G045.4-02.7	G102	-10.0	15
ibwt01ukq	VY2-2	PN-G045.4-02.7	F098M	-10.0	-15
ibwt01ulq	VY2-2	PN-G045.4-02.7	F105W	-10.0	-15
ibwt01umq	VY2-2	PN-G045.4-02.7	G102	-10.0	-15
ibwt01uoq	VY2-2	PN-G045.4-02.7	F098M	-10.0	-45
ibwt01upq	VY2-2	PN-G045.4-02.7	F105W	-10.0	-45
ibwt01uqq	VY2-2	PN-G045.4-02.7	G102	-10.0	-45
ibwt03usq	VY2-2	PN-G045.4-02.7	F140W	-50.0	45
ibwt03utq	VY2-2	PN-G045.4-02.7	F160W	-50.0	45
ibwt03uuq	VY2-2	PN-G045.4-02.7	G141	-50.0	45
ibwt03uvq	VY2-2	PN-G045.4-02.7	F140W	-50.0	22
ibwt03uwq	VY2-2	PN-G045.4-02.7	F160W	-50.0	22
ibwt03uxq	VY2-2	PN-G045.4-02.7	G141	-50.0	22
ibwt03uzq	VY2-2	PN-G045.4-02.7	F140W	-50.0	15
ibwt03v0q	VY2-2	PN-G045.4-02.7	F160W	-50.0	15
ibwt03v1q	VY2-2	PN-G045.4-02.7	G141	-50.0	15
ibwt03v2q	VY2-2	PN-G045.4-02.7	F140W	-50.0	0
ibwt03v3q	VY2-2	PN-G045.4-02.7	F160W	-50.0	0
ibwt03v4q	VY2-2	PN-G045.4-02.7	G141	-50.0	0
ibwt03v6q	VY2-2	PN-G045.4-02.7	F140W	-50.0	-15
ibwt03v7q	VY2-2	PN-G045.4-02.7	F160W	-50.0	-15
ibwt03v8q	VY2-2	PN-G045.4-02.7	G141	-50.0	-15
ibwt03v9q	VY2-2	PN-G045.4-02.7	F140W	-50.0	-22
ibwt03vaq	VY2-2	PN-G045.4-02.7	F160W	-50.0	-22
ibwt03vbq	VY2-2	PN-G045.4-02.7	G141	-50.0	-22
ibwt03vdq	VY2-2	PN-G045.4-02.7	F140W	-50.0	-45
ibwt03veq	VY2-2	PN-G045.4-02.7	F160W	-50.0	-45
ibwt03vfq	VY2-2	PN-G045.4-02.7	G141	-50.0	-45
ibwt03vgq	VY2-2	PN-G045.4-02.7	F140W	23.0	45
ibwt03vhq	VY2-2	PN-G045.4-02.7	F160W	23.0	45
ibwt03viq	VY2-2	PN-G045.4-02.7	G141	23.0	45
ibwt03vkq	VY2-2	PN-G045.4-02.7	F140W	23.0	22
ibwt03vlq	VY2-2	PN-G045.4-02.7	F160W	23.0	22
ibwt03vmq	VY2-2	PN-G045.4-02.7	G141	23.0	22
ibwt03vnq	VY2-2	PN-G045.4-02.7	F140W	23.0	15
ibwt03voq	VY2-2	PN-G045.4-02.7	F160W	23.0	15
ibwt03vpq	VY2-2	PN-G045.4-02.7	G141	23.0	15
ibwt03vrq	VY2-2	PN-G045.4-02.7	F140W	23.0	0
ibwt03vsq	VY2-2	PN-G045.4-02.7	F160W	23.0	0
ibwt03vtq	VY2-2	PN-G045.4-02.7	G141	23.0	0
ibwt03vuq	VY2-2	PN-G045.4-02.7	F140W	23.0	-15
ibwt03vvq	VY2-2	PN-G045.4-02.7	F160W	23.0	-15
ibwt03vwq	VY2-2	PN-G045.4-02.7	G141	23.0	-15
ibwt03vyq	VY2-2	PN-G045.4-02.7	F140W	23.0	-22
ibwt03vzq	VY2-2	PN-G045.4-02.7	F160W	23.0	-22
ibwt03w0q	VY2-2	PN-G045.4-02.7	G141	23.0	-22
ibwt03w1q	VY2-2	PN-G045.4-02.7	F140W	23.0	-45
ibwt03w2q	VY2-2	PN-G045.4-02.7	F160W	23.0	-45
ibwt03w3q	VY2-2	PN-G045.4-02.7	G141	23.0	-45
ibwt03w5q	VY2-2	PN-G045.4-02.7	F140W	-30.0	45
ibwt03w6q	VY2-2	PN-G045.4-02.7	F160W	-30.0	45
ibwt03w7q	VY2-2	PN-G045.4-02.7	G141	-30.0	45
ibwt03w8q	VY2-2	PN-G045.4-02.7	F140W	-30.0	22
ibwt03w9q	VY2-2	PN-G045.4-02.7	F160W	-30.0	22
ibwt03waq	VY2-2	PN-G045.4-02.7	G141	-30.0	22
ibwt03wcq	VY2-2	PN-G045.4-02.7	F140W	-30.0	15
ibwt03wdq	VY2-2	PN-G045.4-02.7	F160W	-30.0	15
ibwt03weq	VY2-2	PN-G045.4-02.7	G141	-30.0	15

	ibwt03wfq	VY2-2	PN-G045.4-02.7	F140W	-30.0	0
	ibwt03wgq	VY2-2	PN-G045.4-02.7	F160W	-30.0	0
	ibwt03whq	VY2-2	PN-G045.4-02.7	G141	-30.0	0
	ibwt03wjq	VY2-2	PN-G045.4-02.7	F140W	-30.0	-15
	ibwt03wkq	VY2-2	PN-G045.4-02.7	F160W	-30.0	-15
	ibwt03wlq	VY2-2	PN-G045.4-02.7	G141	-30.0	-15
	ibwt03wmq	VY2-2	PN-G045.4-02.7	F140W	-30.0	-22
	ibwt03wnq	VY2-2	PN-G045.4-02.7	F160W	-30.0	-22
	ibwt03woq	VY2-2	PN-G045.4-02.7	G141	-30.0	-22
	ibwt03wqq	VY2-2	PN-G045.4-02.7	F140W	-30.0	-45
	ibwt03wrq	VY2-2	PN-G045.4-02.7	F160W	-30.0	-45
	ibwt03wsq	VY2-2	PN-G045.4-02.7	G141	-30.0	-45
	ibwt03wtq	VY2-2	PN-G045.4-02.7	F140W	-10.0	45
	ibwt03wuq	VY2-2	PN-G045.4-02.7	F160W	-10.0	45
	ibwt03wvq	VY2-2	PN-G045.4-02.7	G141	-10.0	45
	ibwt03wxq	VY2-2	PN-G045.4-02.7	F140W	-10.0	15
	ibwt03wyq	VY2-2	PN-G045.4-02.7	F160W	-10.0	15
	ibwt03wzq	VY2-2	PN-G045.4-02.7	G141	-10.0	15
	ibwt03x0q	VY2-2	PN-G045.4-02.7	F140W	-10.0	-15
	ibwt03x1q	VY2-2	PN-G045.4-02.7	F160W	-10.0	-15
	ibwt03x2q	VY2-2	PN-G045.4-02.7	G141	-10.0	-15
13093	ic5v02a8q	VY2-2	PN-G045.4-02.7	F098M	-20.0	0
	ic5v02a9q	VY2-2	PN-G045.4-02.7	F105W	-20.0	0
	ic5v02aaq	VY2-2	PN-G045.4-02.7	G102	-20.0	0
	ic5v02abq	VY2-2	PN-G045.4-02.7	G102	-20.5	0.5
	ic5v02acq	VY2-2	PN-G045.4-02.7	G102	-21.0	1
	ic5v02adq	VY2-2	PN-G045.4-02.7	G102	-21.2	1.2
	ic5v02afq	VY2-2	PN-G045.4-02.7	F098M	-20.0	45
	ic5v02agq	VY2-2	PN-G045.4-02.7	F105W	-20.0	45
	ic5v02ahq	VY2-2	PN-G045.4-02.7	G102	-20.0	45
	ic5v02aiq	VY2-2	PN-G045.4-02.7	F098M	-20.0	-45
	ic5v02ajq	VY2-2	PN-G045.4-02.7	F105W	-20.0	-45
	ic5v02akq	VY2-2	PN-G045.4-02.7	G102	-20.0	-45
	ic5v41awq	VY2-2	PN-G045.4-02.7	F140W	-20.0	0
	ic5v41axq	VY2-2	PN-G045.4-02.7	F160W	-20.0	0
	ic5v41ayq	VY2-2	PN-G045.4-02.7	G141	-20.0	0
	ic5v41azq	VY2-2	PN-G045.4-02.7	G141	-20.5	0.5
	ic5v41b0q	VY2-2	PN-G045.4-02.7	G141	-21.0	1
	ic5v41b1q	VY2-2	PN-G045.4-02.7	G141	-21.2	1.2
	ic5v41b3q	VY2-2	PN-G045.4-02.7	F140W	-20.0	45
	ic5v41b4q	VY2-2	PN-G045.4-02.7	F160W	-20.0	45
	ic5v41b5q	VY2-2	PN-G045.4-02.7	G141	-20.0	45
	ic5v41b6q	VY2-2	PN-G045.4-02.7	F140W	-20.0	-45
	ic5v41b7q	VY2-2	PN-G045.4-02.7	F160W	-20.0	-45
	ic5v41b8q	VY2-2	PN-G045.4-02.7	G141	-20.0	-45
13094	ic6905bcq	VY2-2	PN-G045.4-02.7	F139M	62.0	-50
	ic6905bhq	VY2-2	PN-G045.4-02.7	G141	62.0	-50
	ic6905biq	VY2-2	PN-G045.4-02.7	G102	62.0	-50
	ic6905bkq	VY2-2	PN-G045.4-02.7	G141	62.0	-20
	ic6905bmq	VY2-2	PN-G045.4-02.7	G102	62.0	-20
	ic6905boq	VY2-2	PN-G045.4-02.7	G141	62.0	50
	ic6905bqq	VY2-2	PN-G045.4-02.7	G102	62.0	50
	ic6906byq	VY2-2	PN-G045.4-02.7	F139M	42.0	50
	ic6906bzq	VY2-2	PN-G045.4-02.7	G141	42.0	50
	ic6906c0q	VY2-2	PN-G045.4-02.7	G102	42.0	50
	ic6906c2q	VY2-2	PN-G045.4-02.7	G141	42.0	20
	ic6906c4q	VY2-2	PN-G045.4-02.7	G102	42.0	20
	ic6906c6q	VY2-2	PN-G045.4-02.7	G141	42.0	-50

	ic6906c8q	VY2-2	PN-G045.4-02.7	G102	42.0	-50
	ic6907ceq	VY2-2	PN-G045.4-02.7	F139M	15.0	-50
	ic6907cfq	VY2-2	PN-G045.4-02.7	G141	15.0	-50
	ic6907cgq	VY2-2	PN-G045.4-02.7	G102	15.0	-50
	ic6907ciq	VY2-2	PN-G045.4-02.7	G141	15.0	-20
	ic6907ckq	VY2-2	PN-G045.4-02.7	G102	15.0	-20
	ic6907cmq	VY2-2	PN-G045.4-02.7	G141	15.0	50
	ic6907coq	VY2-2	PN-G045.4-02.7	G102	15.0	50
14023	icqv01agq	VY2-2	PN-G045.4-02.7	F098M	-20.0	0
	icqv01ahq	VY2-2	PN-G045.4-02.7	F105W	-20.0	0
	icqv01aiq	VY2-2	PN-G045.4-02.7	G102	-20.0	0
	icqv01ajq	VY2-2	PN-G045.4-02.7	F098M	-90.0	0
	icqv01akq	VY2-2	PN-G045.4-02.7	F105W	-90.0	0
	icqv01alq	VY2-2	PN-G045.4-02.7	G102	-90.0	0
	icqv01amq	VY2-2	PN-G045.4-02.7	F098M	-71.0	-50
	icqv01anq	VY2-2	PN-G045.4-02.7	F105W	-71.0	-50
	icqv01aoq	VY2-2	PN-G045.4-02.7	G102	-71.0	-50
	icqv01b9q	VY2-2	PN-G045.4-02.7	F098M	-71.0	-35
	icqv01baq	VY2-2	PN-G045.4-02.7	F105W	-71.0	-35
	icqv01bbq	VY2-2	PN-G045.4-02.7	G102	-71.0	-35
	icqv01bcq	VY2-2	PN-G045.4-02.7	F098M	-71.0	-10
	icqv01bdq	VY2-2	PN-G045.4-02.7	F105W	-71.0	-10
	icqv01beq	VY2-2	PN-G045.4-02.7	G102	-71.0	-10
	icqv01bfq	VY2-2	PN-G045.4-02.7	F098M	-71.0	0
	icqv01bgq	VY2-2	PN-G045.4-02.7	F105W	-71.0	0
	icqv01bhq	VY2-2	PN-G045.4-02.7	G102	-71.0	0
	icqv01bkq	VY2-2	PN-G045.4-02.7	F098M	-71.0	10
	icqv01blq	VY2-2	PN-G045.4-02.7	F105W	-71.0	10
	icqv01bmq	VY2-2	PN-G045.4-02.7	G102	-71.0	10
	icqv01bnq	VY2-2	PN-G045.4-02.7	F098M	-71.0	35
	icqv01boq	VY2-2	PN-G045.4-02.7	F105W	-71.0	35
	icqv01bpq	VY2-2	PN-G045.4-02.7	G102	-71.0	35
	icqv01bqq	VY2-2	PN-G045.4-02.7	F098M	-71.0	50
	icqv01brq	VY2-2	PN-G045.4-02.7	F105W	-71.0	50
	icqv01bsq	VY2-2	PN-G045.4-02.7	G102	-71.0	50
	icqv01byq	VY2-2	PN-G045.4-02.7	F098M	-55.0	-50
	icqv01bzq	VY2-2	PN-G045.4-02.7	F105W	-55.0	-50
	icqv01c0q	VY2-2	PN-G045.4-02.7	G102	-55.0	-50
	icqv01c1q	VY2-2	PN-G045.4-02.7	F098M	-55.0	0
	icqv01c2q	VY2-2	PN-G045.4-02.7	F105W	-55.0	0
	icqv01c3q	VY2-2	PN-G045.4-02.7	G102	-55.0	0
	icqv01c4q	VY2-2	PN-G045.4-02.7	F098M	-55.0	50
	icqv01c5q	VY2-2	PN-G045.4-02.7	F105W	-55.0	50
	icqv01c6q	VY2-2	PN-G045.4-02.7	G102	-55.0	50
	icqv02gaq	VY2-2	PN-G045.4-02.7	F140W	-20.0	0
	icqv02gbq	VY2-2	PN-G045.4-02.7	F160W	-20.0	0
	icqv02gcq	VY2-2	PN-G045.4-02.7	G141	-20.0	0
	icqv02ghq	VY2-2	PN-G045.4-02.7	F140W	-71.0	-50
	icqv02giq	VY2-2	PN-G045.4-02.7	F160W	-71.0	-50
	icqv02gjq	VY2-2	PN-G045.4-02.7	G141	-71.0	-50
	icqv02glq	VY2-2	PN-G045.4-02.7	F140W	-71.0	-35
	icqv02gmq	VY2-2	PN-G045.4-02.7	F160W	-71.0	-35

icqv02gnq	VY2-2	PN-G045.4-02.7	G141	-71.0	-35
icqv02gsq	VY2-2	PN-G045.4-02.7	F140W	-71.0	-10
icqv02gtq	VY2-2	PN-G045.4-02.7	F160W	-71.0	-10
icqv02guq	VY2-2	PN-G045.4-02.7	G141	-71.0	-10
icqv02gvq	VY2-2	PN-G045.4-02.7	F140W	-71.0	0
icqv02gwq	VY2-2	PN-G045.4-02.7	F160W	-71.0	0
icqv02gxq	VY2-2	PN-G045.4-02.7	G141	-71.0	0
icqv02hjq	VY2-2	PN-G045.4-02.7	F140W	-71.0	10
icqv02hkq	VY2-2	PN-G045.4-02.7	F160W	-71.0	10
icqv02hlq	VY2-2	PN-G045.4-02.7	G141	-71.0	10
icqv02hmq	VY2-2	PN-G045.4-02.7	F140W	-71.0	35
icqv02hnq	VY2-2	PN-G045.4-02.7	F160W	-71.0	35
icqv02hoq	VY2-2	PN-G045.4-02.7	G141	-71.0	35
icqv02hrq	VY2-2	PN-G045.4-02.7	F140W	-71.0	50
icqv02hsq	VY2-2	PN-G045.4-02.7	F160W	-71.0	50
icqv02htq	VY2-2	PN-G045.4-02.7	G141	-71.0	50
icqv02huq	VY2-2	PN-G045.4-02.7	F140W	-55.0	-50
icqv02hvq	VY2-2	PN-G045.4-02.7	F160W	-55.0	-50
icqv02hwq	VY2-2	PN-G045.4-02.7	G141	-55.0	-50
icqv02hyq	VY2-2	PN-G045.4-02.7	F140W	-55.0	0
icqv02hzq	VY2-2	PN-G045.4-02.7	F160W	-55.0	0
icqv02i0q	VY2-2	PN-G045.4-02.7	G141	-55.0	0
icqv02i1q	VY2-2	PN-G045.4-02.7	F140W	-55.0	50
icqv02i2q	VY2-2	PN-G045.4-02.7	F160W	-55.0	50
icqv02i3q	VY2-2	PN-G045.4-02.7	G141	-55.0	50