Orion fluctuations: New material 2015-10

W. J. Henney, C. R. O'Dell, G. J. Ferland, M. Peimbert

1. New calibration of the WFC3 filters with MUSE

(Weilbacher et al. 2015)

REFERENCES

Weilbacher, P. M., et al. 2015, ArXiv e-prints

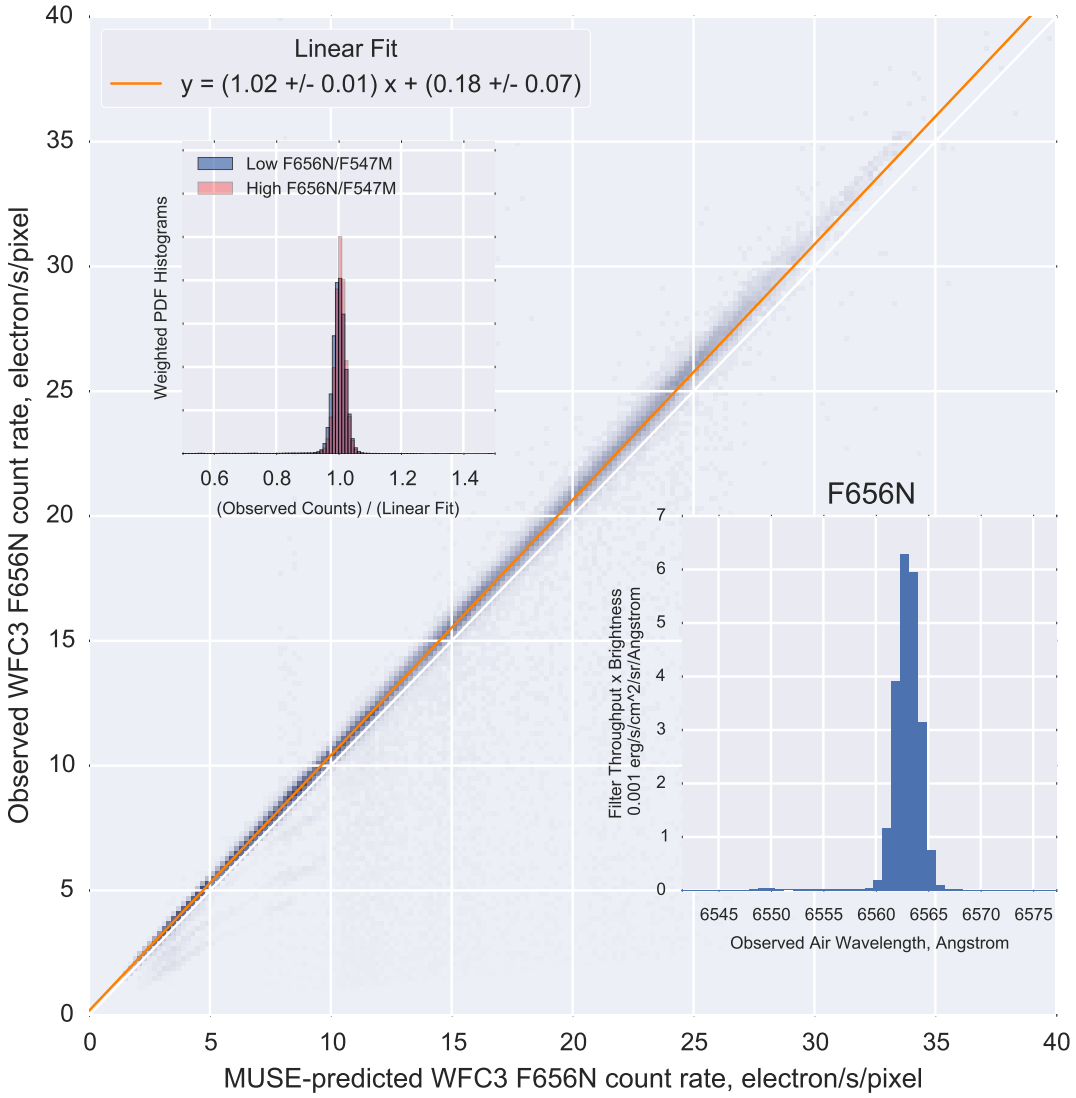

Fig. 1.— Results of spectrophotometric calibration of the WFC3 F656N filter. The vertical axis of the principal plot is the observed WFC3 filter count rate after resampling at the 0.2″ pixel size of the MUSE spectrophotometric observations. The horizontal axis of the principal plot is the predicted count rate calculated by folding the MUSE spectrum through the nominal WFC3 filter throughput profile. The grayscale intensity represents the two-dimensional histogram over the entire usable WFC3 field of these two quantities, weighted by the count rate of each pixel. The red line is the optimum linear fit to the relationship. The lower right inset plot shows the product of the MUSE spectrum (integrated over the entire field) and the filter throughput profile. The upper left inset plot shows the distribution of deviations from the linear fit for two subsamples of pixels: the red histogram shows the subsample with larger than average line/continuum ratio, while the blue histogram shows the subsample with smaller than average line/continuum ratio.

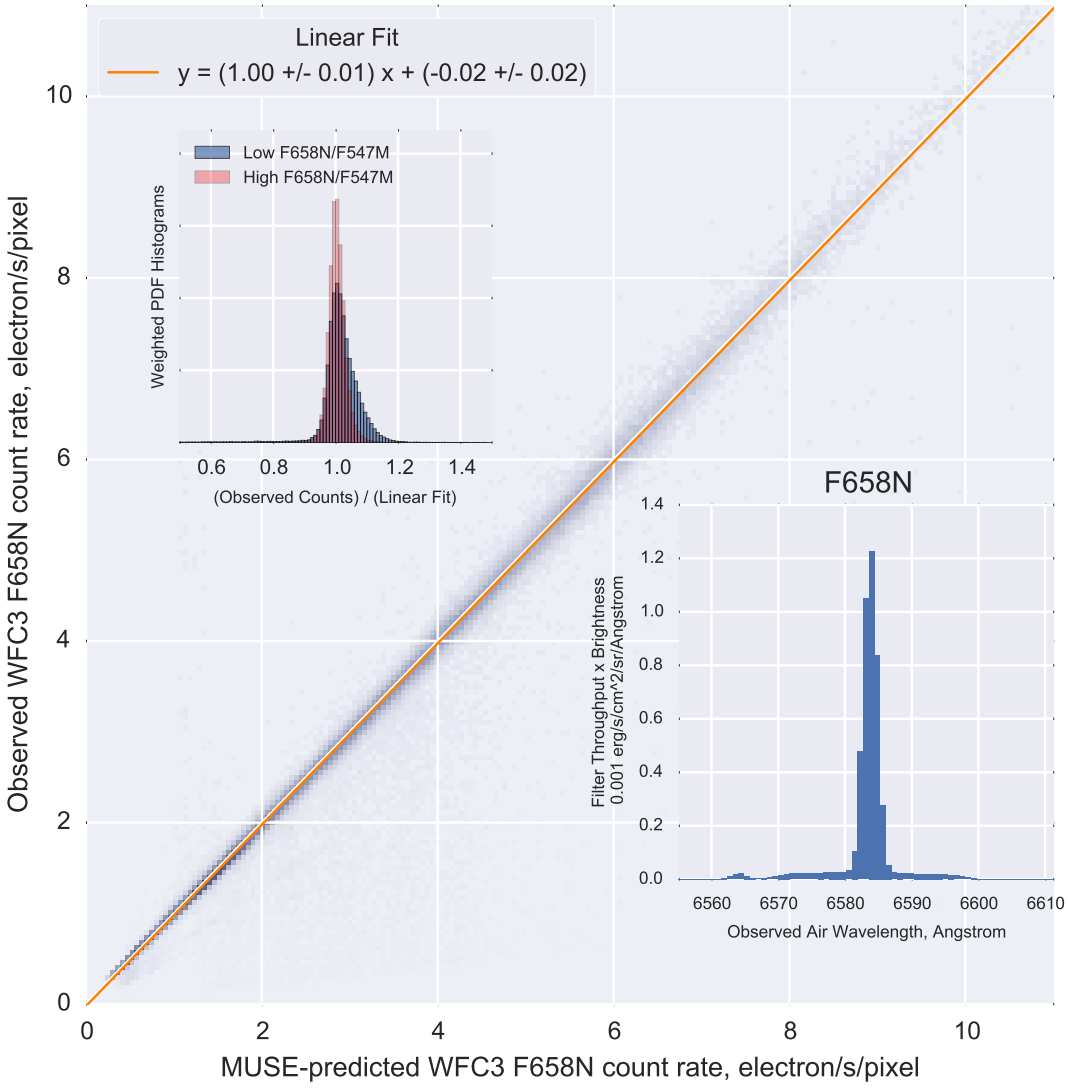
Linear Fit
y = (1.00 +/- 0.01) x + (-0.02 +/- 0.02)
Low F658N/F547M
High F658N/F547M
Weighted PDF Histograms
0.6
0.8
1.0
1.2
1.4
(Observed Counts) / (Linear Fit)
F658N
Filter Throughput x Brightness
0.001 erg/s/cm^2/sr/Angstrom
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
6560
6570
6580
6590
6600
6610
Observed Air Wavelength, Angstrom
Observed WFC3 F658N count rate, electron/s/pixel
0
2
4
6
8
10
MUSE-predicted WFC3 F658N count rate, electron/s/pixel

Fig. 2.— F658N

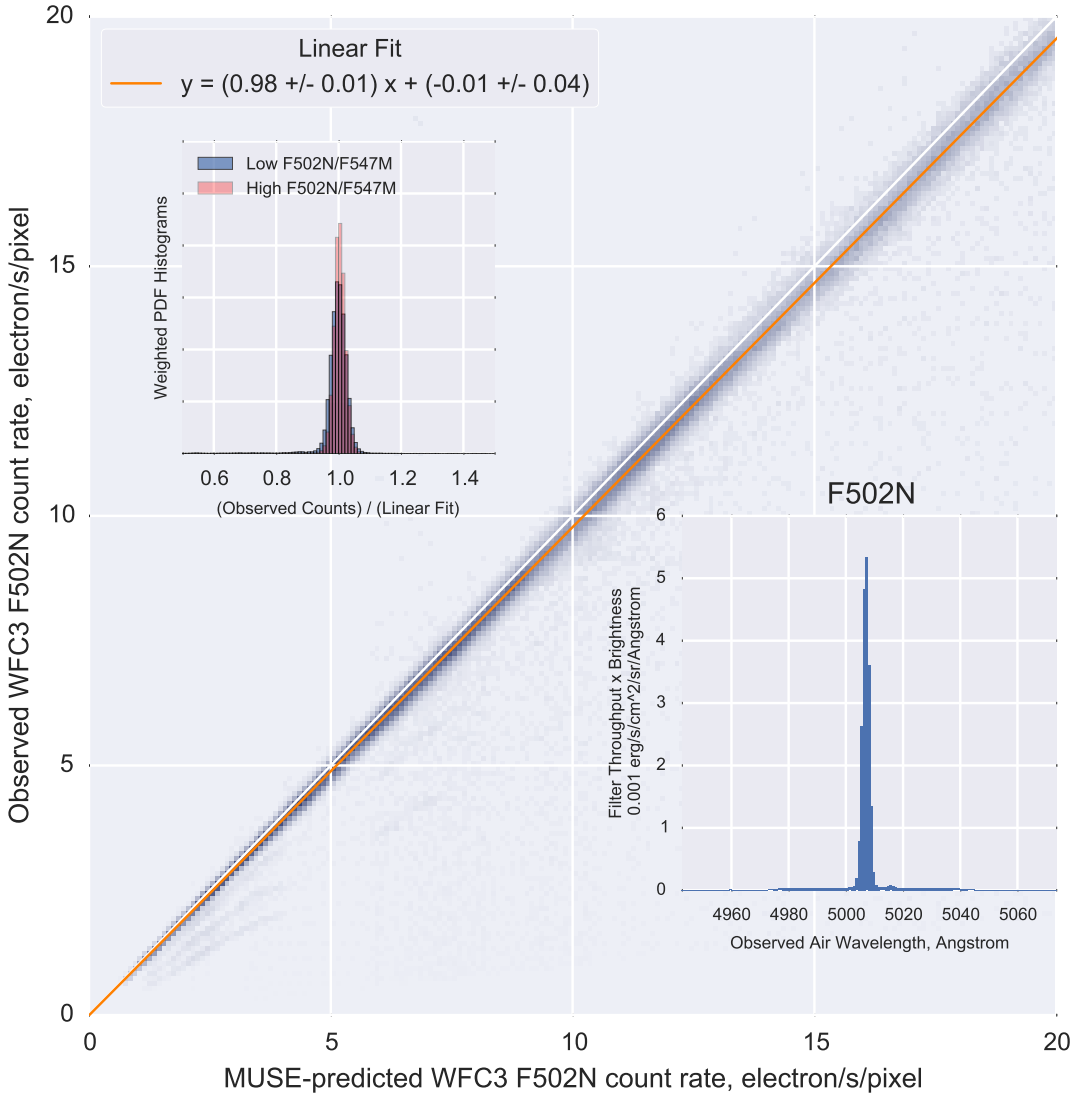
Linear Fit
y = (0.98 +/- 0.01) x + (-0.01 +/- 0.04)
Low F502N/F547M
High F502N/F547M
Weighted PDF Histograms
0.6
0.8
1.0
1.2
1.4
(Observed Counts) / (Linear Fit)
F502N
Filter Throughput x Brightness
0.001 erg/s/cm^2/sr/Angstrom
4960
4980
5000
5020
5040
5060
Observed Air Wavelength, Angstrom
Observed WFC3 F502N count rate, electron/s/pixel
MUSE-predicted WFC3 F502N count rate, electron/s/pixel
0
5
10
15
20

Fig. 3.— F502N

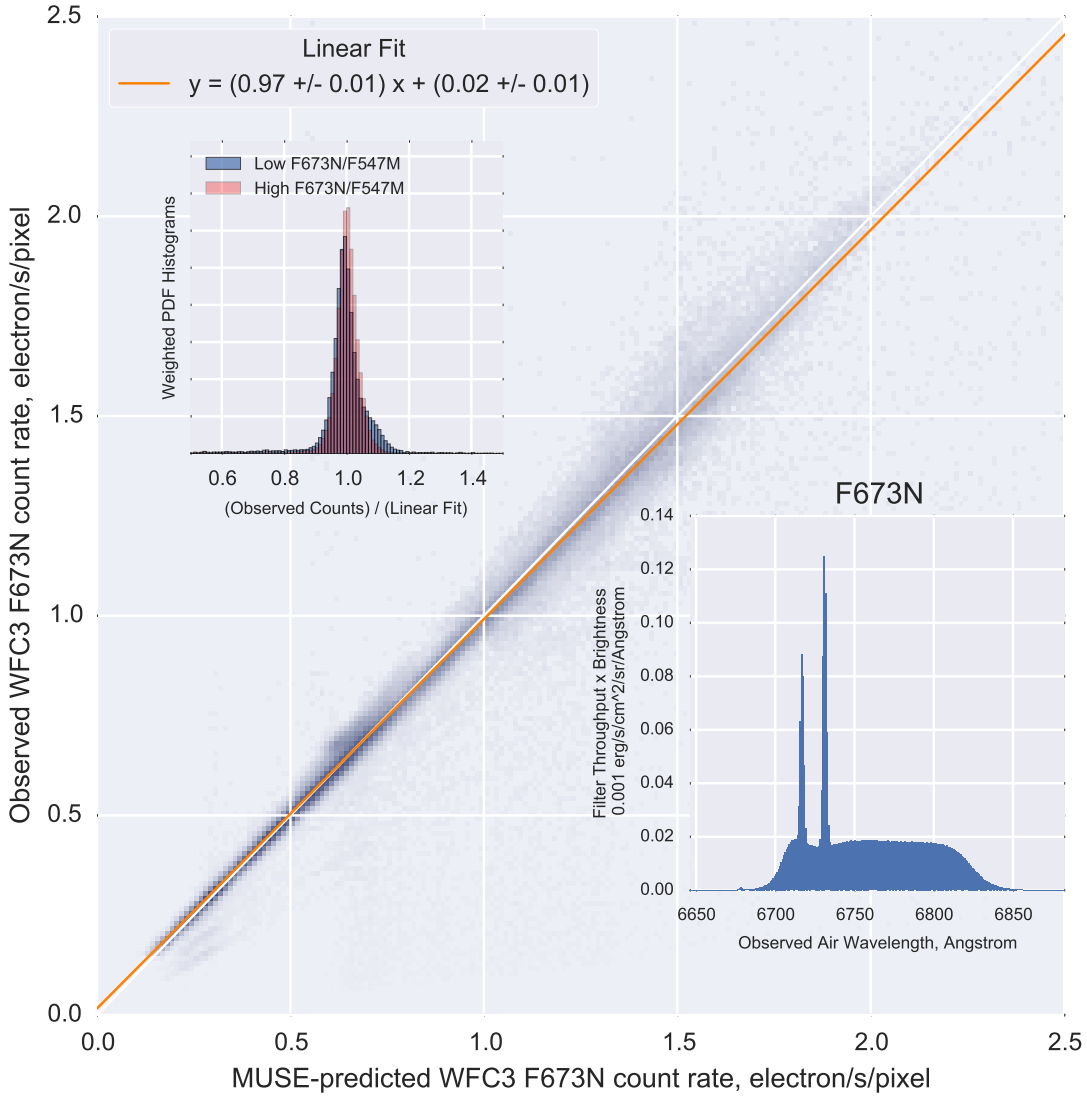
Linear Fit
y = (0.97 +/- 0.01) x + (0.02 +/- 0.01)
Low F673N/F547M
High F673N/F547M
Weighted PDF Histograms
0.6
0.8
1.0
1.2
1.4
(Observed Counts) / (Linear Fit)
F673N
Filter Throughput x Brightness
0.001 erg/s/cm^2/sr/Angstrom
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
6650
6700
6750
6800
6850
Observed Air Wavelength, Angstrom
Observed WFC3 F673N count rate, electron/s/pixel
MUSE-predicted WFC3 F673N count rate, electron/s/pixel
0.0
0.5
1.0
1.5
2.0
2.5

Fig. 4.— F673N

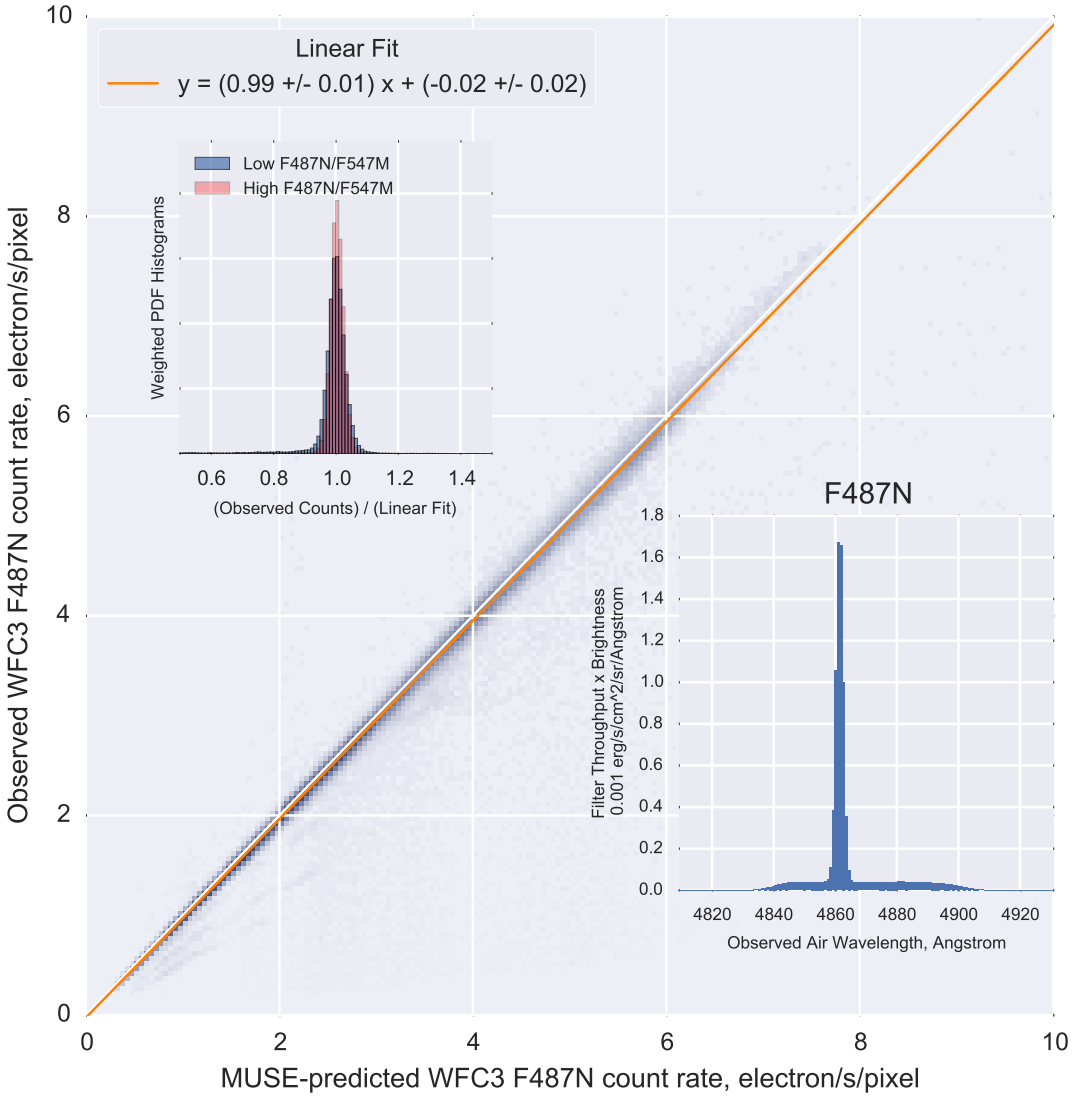
Linear Fit
y = (0.99 +/- 0.01) x + (-0.02 +/- 0.02)
Low F487N/F547M
High F487N/F547M
Weighted PDF Histograms
0.6
0.8
1.0
1.2
1.4
(Observed Counts) / (Linear Fit)
F487N
Filter Throughput x Brightness
0.001 erg/s/cm^2/sr/Angstrom
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
4820
4840
4860
4880
4900
4920
Observed Air Wavelength, Angstrom
Observed WFC3 F487N count rate, electron/s/pixel
MUSE-predicted WFC3 F487N count rate, electron/s/pixel
0
2
4
6
8
10

Fig. 5.— F487N

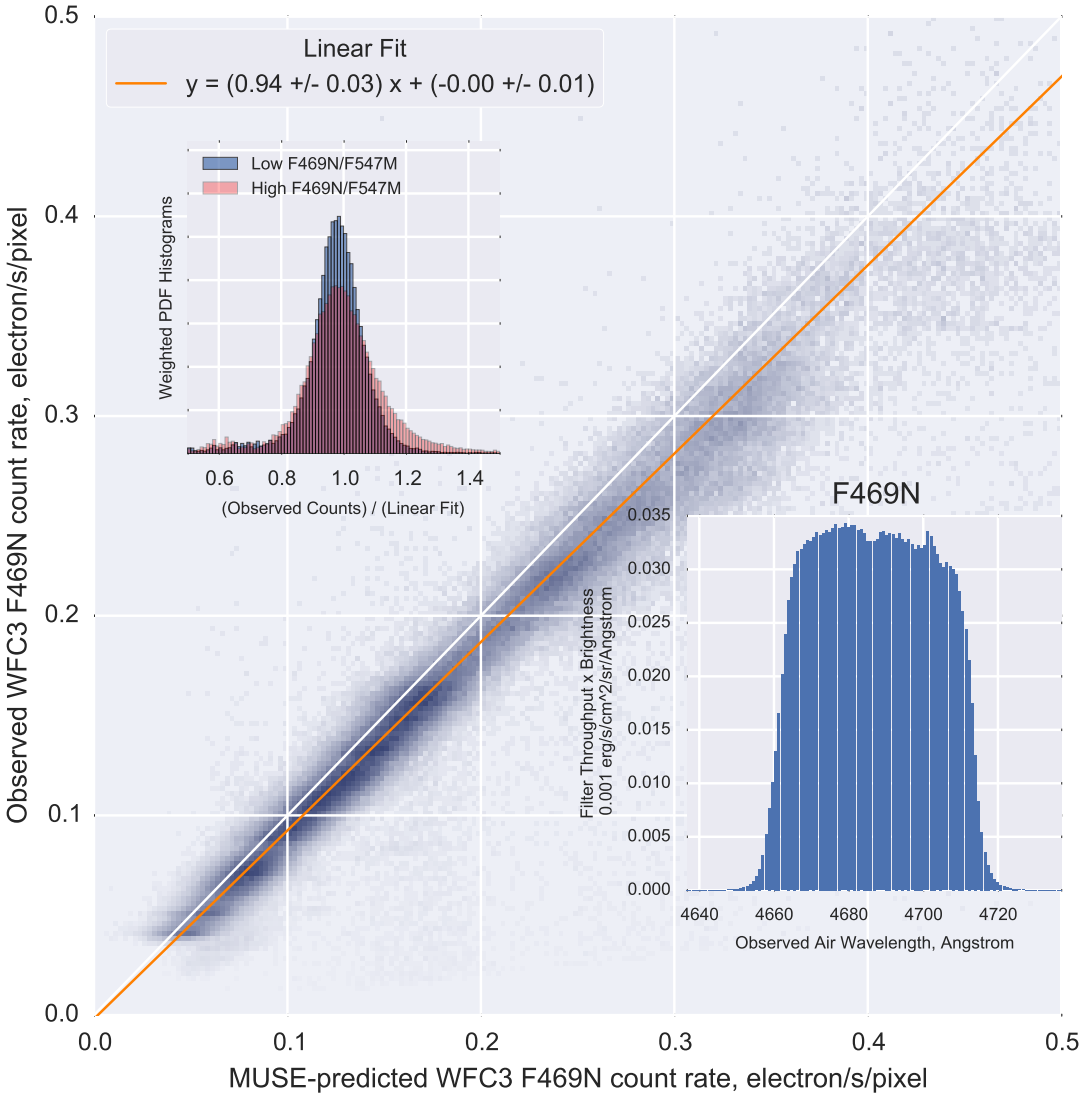
Linear Fit
y = (0.94 +/- 0.03) x + (-0.00 +/- 0.01)
Low F469N/F547M
High F469N/F547M
Weighted PDF Histograms
0.6
0.8
1.0
1.2
1.4
(Observed Counts) / (Linear Fit)
F469N
Filter Throughput x Brightness
0.001 erg/s/cm^2/sr/Angstrom
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
4640
4660
4680
4700
4720
Observed Air Wavelength, Angstrom
Observed WFC3 F469N count rate, electron/s/pixel
0.0
0.1
0.2
0.3
0.4
0.5
MUSE-predicted WFC3 F469N count rate, electron/s/pixel

Fig. 6.— F469N

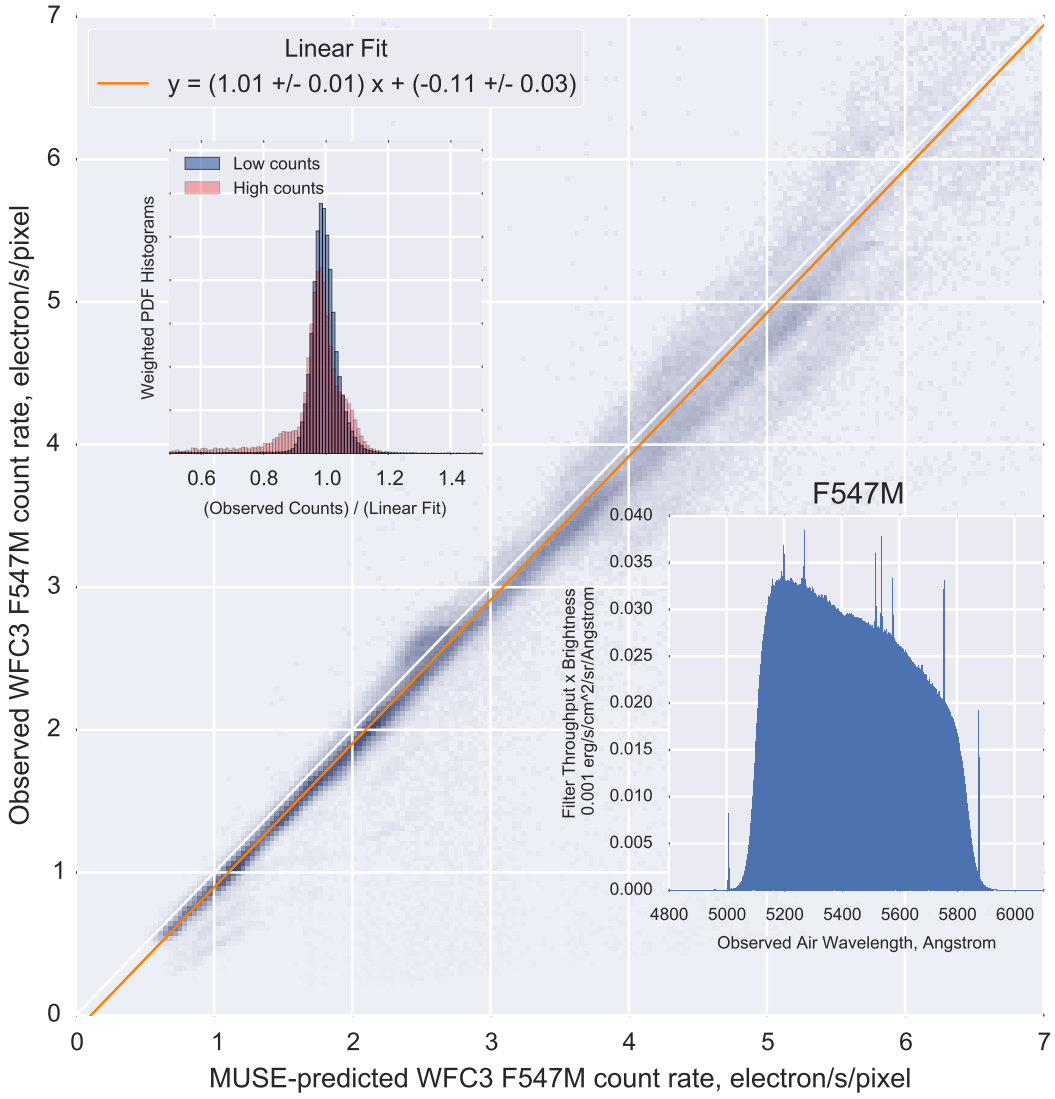
Linear Fit
y = (1.01 +/- 0.01) x + (-0.11 +/- 0.03)
Low counts
High counts
Weighted PDF Histograms
0.6
0.8
1.0
1.2
1.4
(Observed Counts) / (Linear Fit)
F547M
Filter Throughput x Brightness
0.001 erg/s/cm^2/sr/Angstrom
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
4800
5000
5200
5400
5600
5800
6000
Observed Air Wavelength, Angstrom
Observed WFC3 F547M count rate, electron/s/pixel
MUSE-predicted WFC3 F547M count rate, electron/s/pixel
0
1
2
3
4
5
6
7

Fig. 7.— F547M

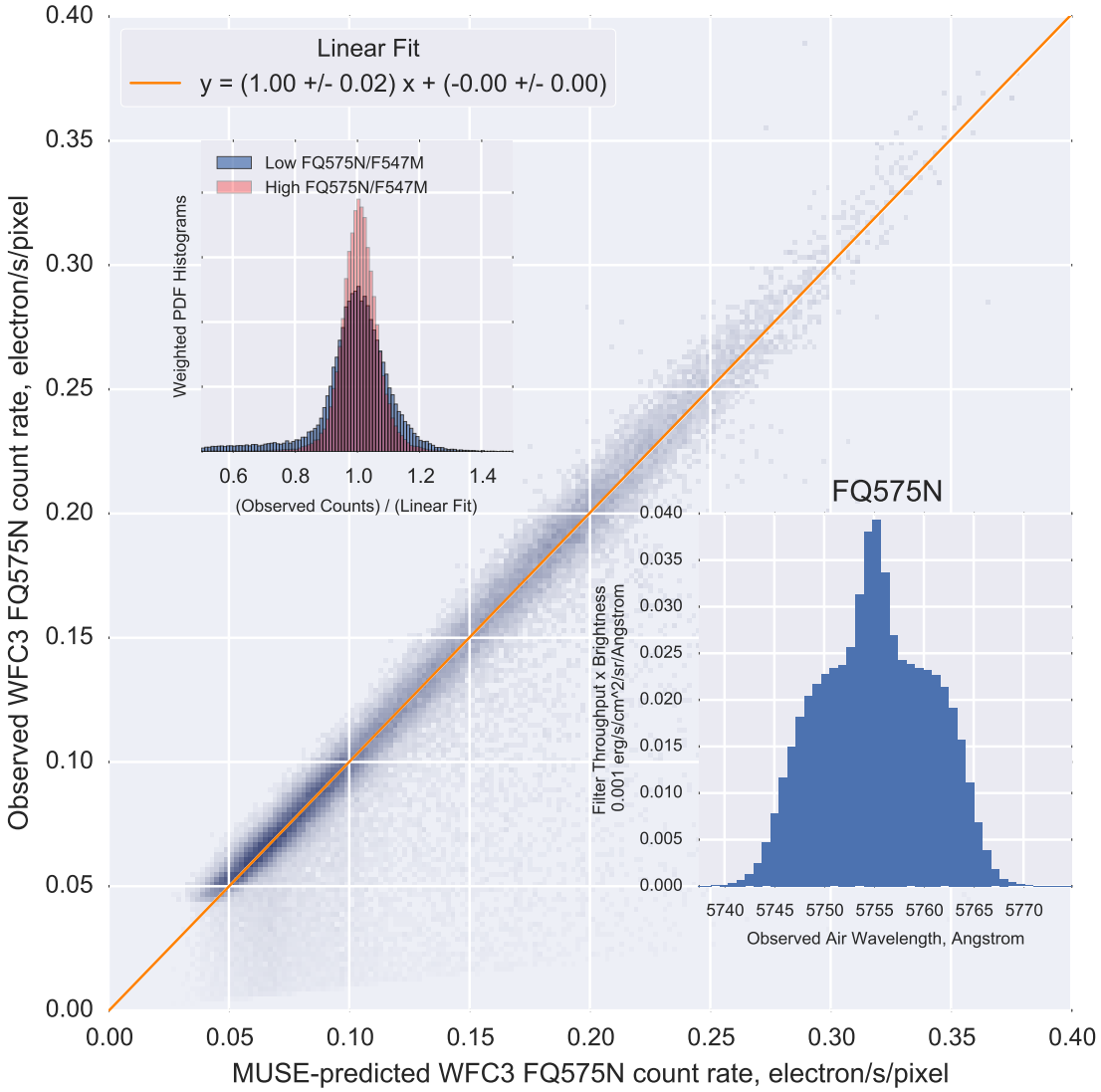
Linear Fit
y = (1.00 +/- 0.02) x + (-0.00 +/- 0.00)
Low FQ575N/F547M
High FQ575N/F547M
Weighted PDF Histograms
0.6 0.8 1.0 1.2 1.4
(Observed Counts) / (Linear Fit)
FQ575N
Filter Throughput x Brightness
0.001 erg/s/cm^2/sr/Angstrom
0.040 0.035 0.030 0.025 0.020 0.015 0.010 0.005 0.000
5740 5745 5750 5755 5760 5765 5770
Observed Air Wavelength, Angstrom
Observed WFC3 FQ575N count rate, electron/s/pixel
0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40
MUSE-predicted WFC3 FQ575N count rate, electron/s/pixel
0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40

Fig. 8.— FQ575N

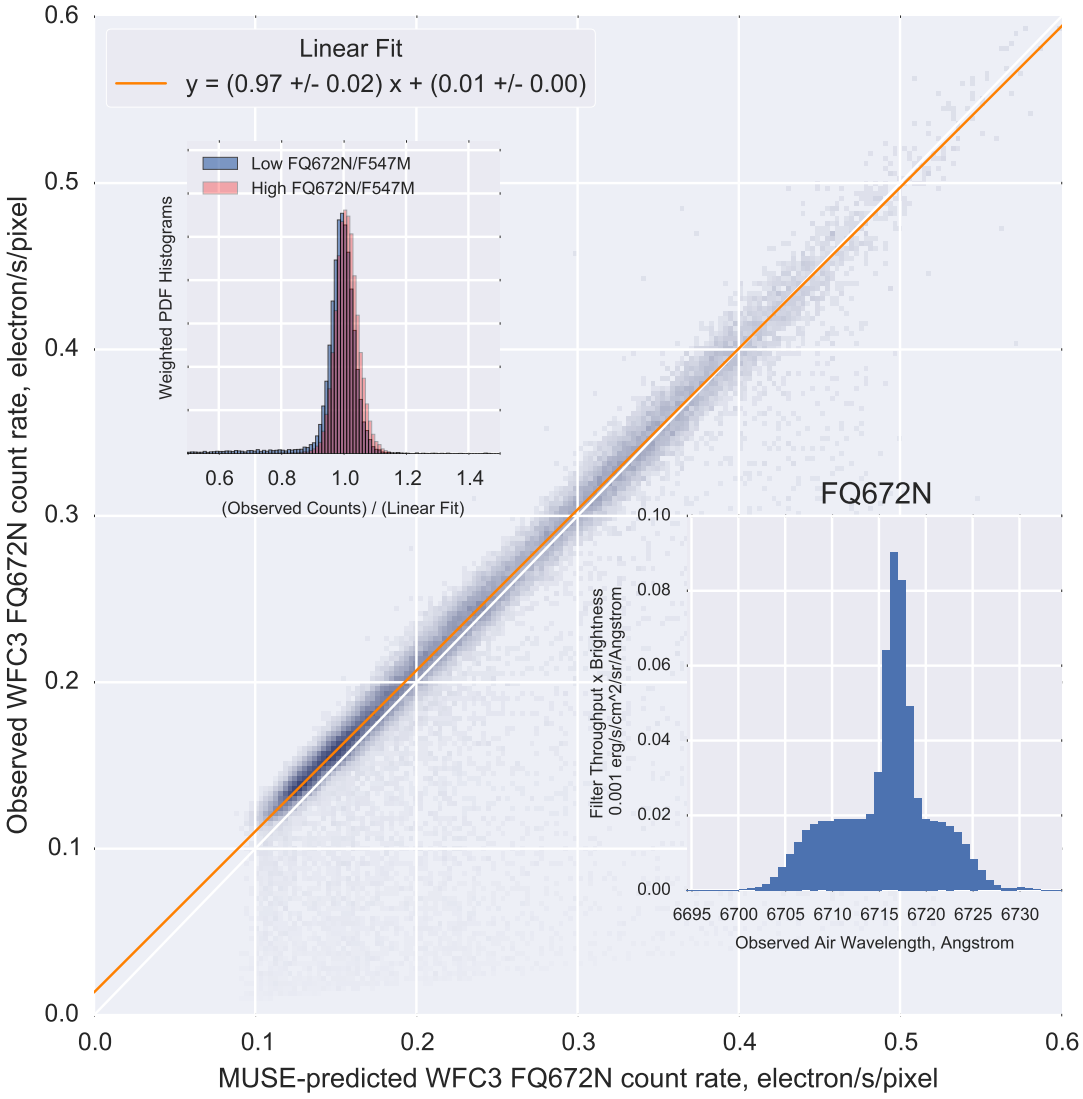
Linear Fit
y = (0.97 +/- 0.02) x + (0.01 +/- 0.00)
Low FQ672N/F547M
High FQ672N/F547M
Weighted PDF Histograms
0.6 0.8 1.0 1.2 1.4
(Observed Counts) / (Linear Fit)
FQ672N
Filter Throughput x Brightness
0.001 erg/s/cm^2/sr/Angstrom
0.00 0.02 0.04 0.06 0.08 0.10
6695 6700 6705 6710 6715 6720 6725 6730
Observed Air Wavelength, Angstrom
Observed WFC3 FQ672N count rate, electron/s/pixel
0.0 0.1 0.2 0.3 0.4 0.5 0.6
MUSE-predicted WFC3 FQ672N count rate, electron/s/pixel
0.0 0.1 0.2 0.3 0.4 0.5 0.6

Fig. 9.— FQ672N

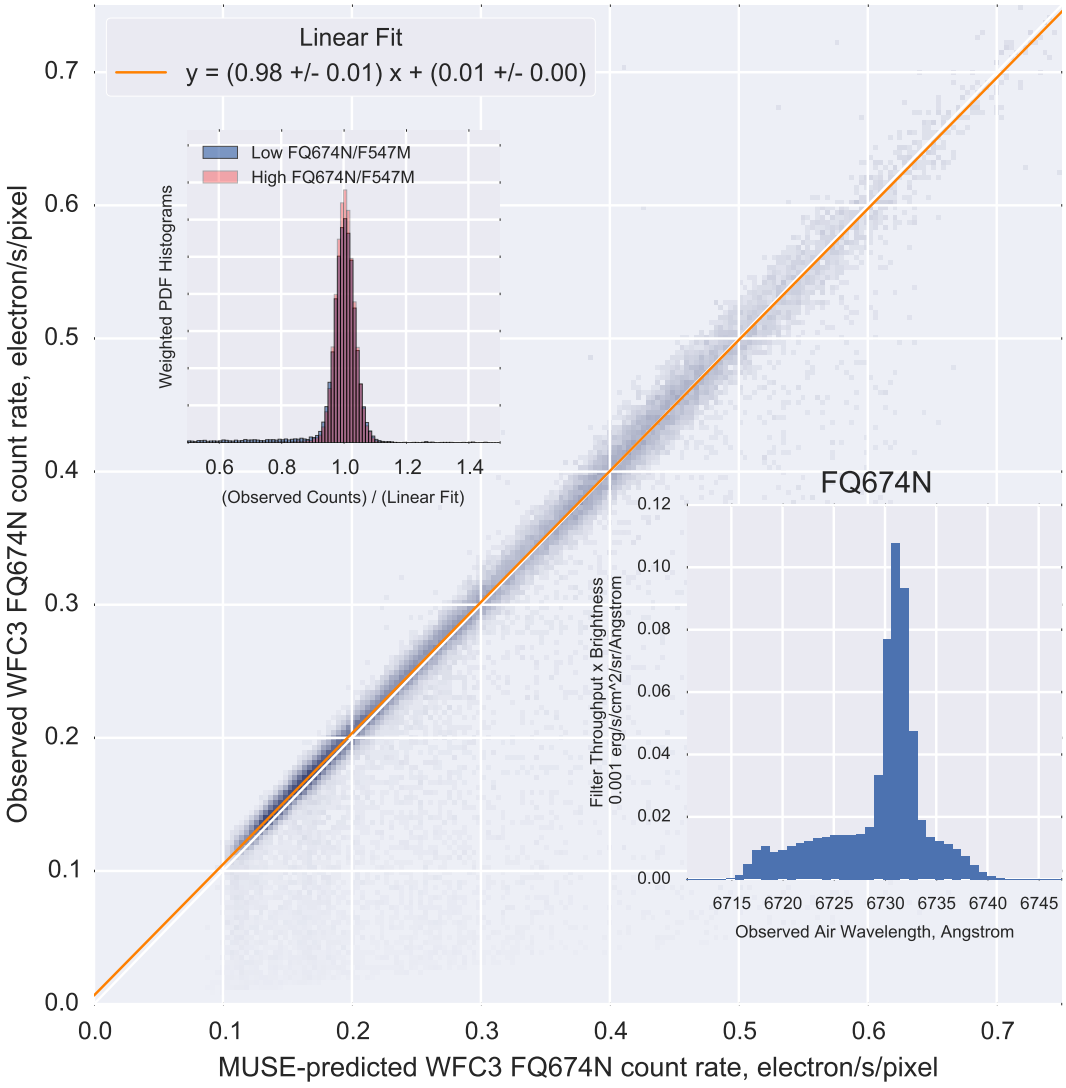

Fig. 10.— FQ674N