EMVA 1288 Datasheet

This datasheet describes the specification according to the standard 1288 Standard for Characterization and Presentation of Specification Data for Image Sensors and Cameras of European Machine Vision Association (EMVA) (See www.standard1288.org).

Vendor	KAYA Instruments	Sensor diagonal	16.1mm
Model	Iron253C	Sensor	IMX253
Camera type	Color	Sensor type	CMOS
Date	25-Aug-2022 13:45:39	Shutter type	Global
Data type	Single	Overlap capabilities	Overlapping
Sensor type	CMOS	Frame rate	28 Hz
Lens category	C-Mount	Exposure control	by irradiance
Resolution	4096 x 3000 ,12 bits	Exposure time	8997.172 μs
Pixel size	3.45μm x 3.45μm	Illumination	Variable with constant exposure time
Maximum readout rate	28 fps	Irradiation Steps	50
Dark current compensation	No	Irradiation calibration accuracy	-
Interface type	CXP-12	Irradiation measurement error	-
Serial number	1320066	Standart version	4.0 Linear
Firmware version	4.1.3-2021.10.27	Light source	Integrating Sphere

International Distributor

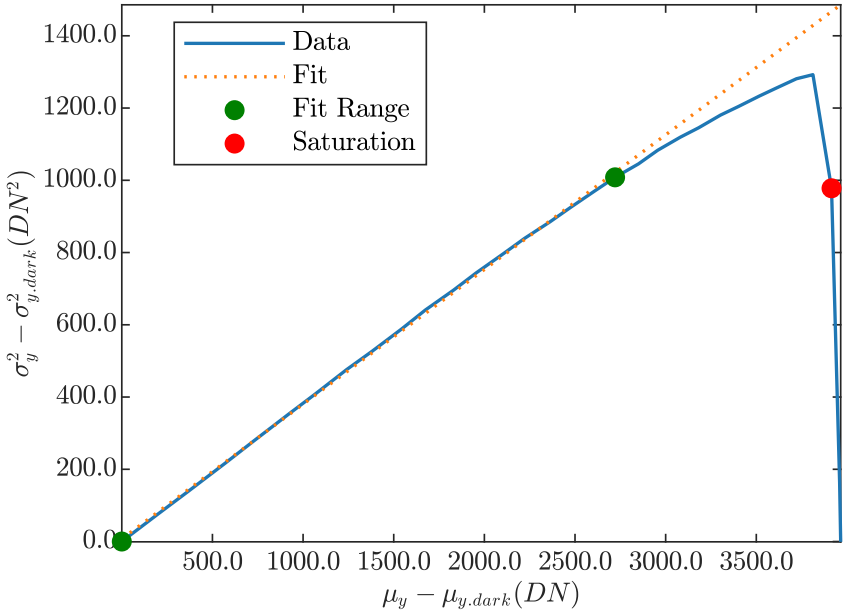
sky blue microsystems

Sky Blue Microsystems GmbH
Geisenhausenerstr. 18
81379 Munich, Germany
+49 89 780 2970, info@skyblue.de
www.skyblue.de

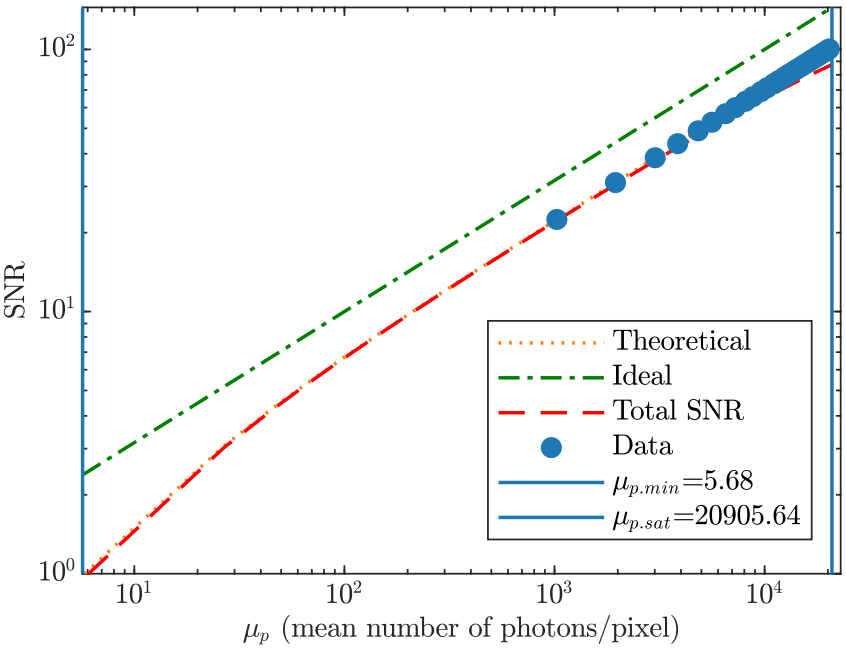
Summary Sheet for Operation Point 1 at a Wavelength of 520 nm

Camera setting		Operation point parameters	
Gain	GainLevelx1	Environmental temperature	24.25
Black level	128	Camera body temperature	35.5
		Sensor temperature	38.68
		Processor temperature	42

Photon Transfer



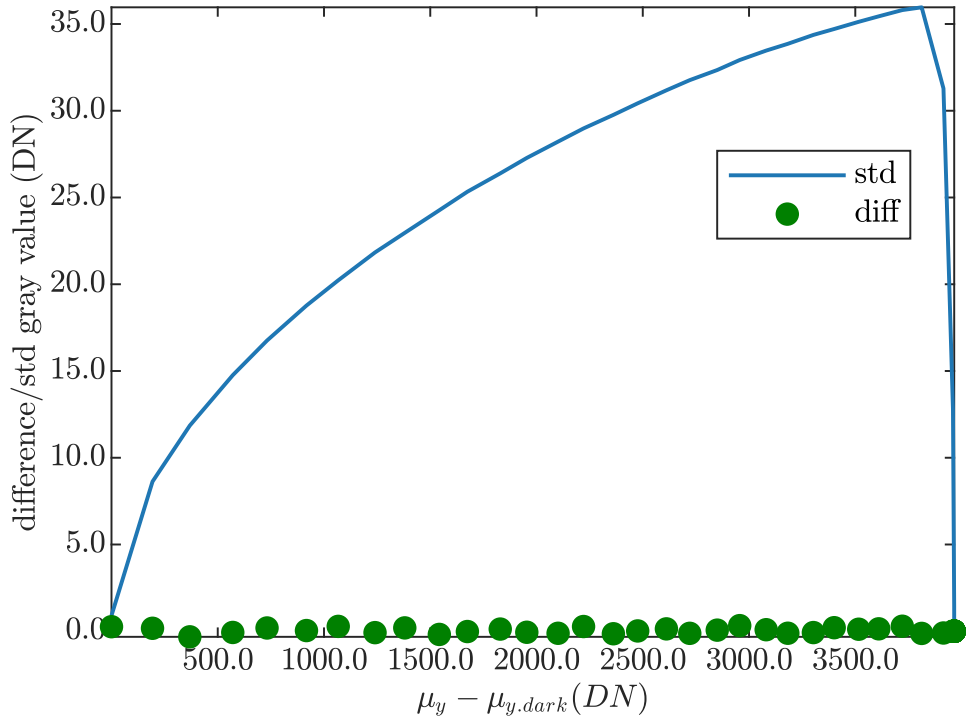
Signal-to-Noise Ratio



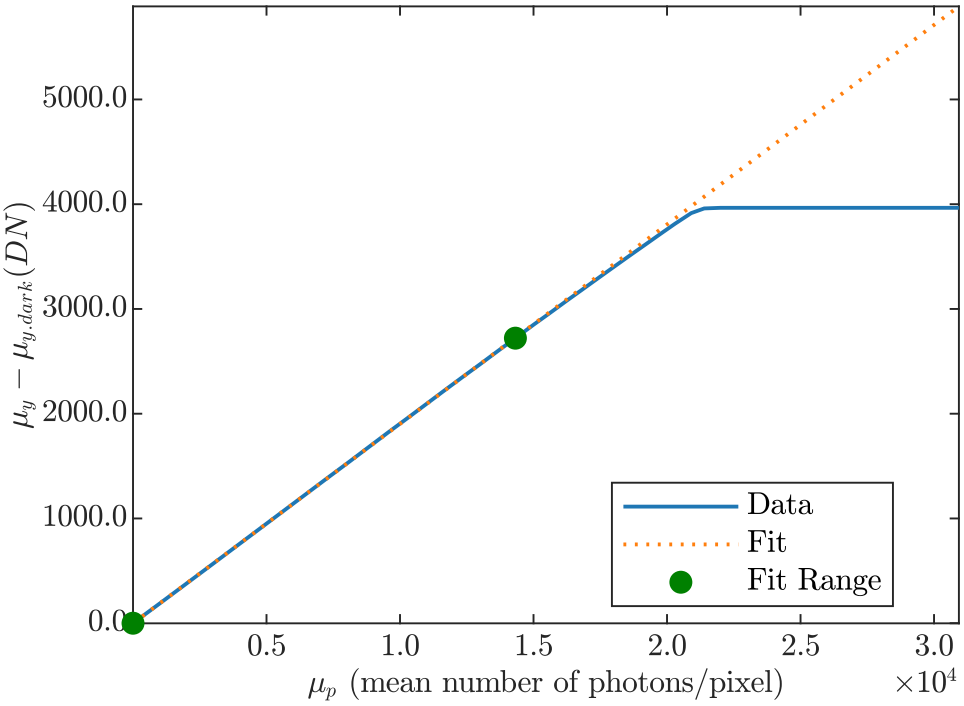
Performance

Quantum efficiency		
η	49.6714	%
System gain		
K	0.38316	DN/e$^-$
1/K	2.6099	e$^-$/DN
Temporal dark noise		
σ_d	2.1933	e$^-$
$\sigma_{y.dark}$	0.88857	DN
Signal-to-noise ratio		
SNR_{max}	101.9025	
	40.1637	dB
	6.671	bit
$1/SNR_{max}$	0.98133	%
Absolute sensitivity threshold		
$\mu_{e.min}$	2.8191	e$^-$
$\mu_{e.min.area}$	0.23685	e$^-/\mu m^2$
Saturation capacity		
$\mu_{e.sat}$	10384.1177	e$^-$
$\mu_{e.sat.area}$	872.4317	e$^-/\mu m^2$
Dynamic range		
DR	3683.5316	
	71.3253	dB
	11.8469	bit
Spatial nonuniformities		
$DSNU_{1288}$	0.75435	e$^-$
$DSNU_{1288.col}$	0.15108	e$^-$
$DSNU_{1288.row}$	0.093051	e$^-$
$DSNU_{1288.pix}$	0.73318	e$^-$
$PRNU_{1288}$	0.58654	%
$PRNU_{1288.col}$	0.19838	%
$PRNU_{1288.row}$	0.013394	%
$PRNU_{1288.pix}$	0.55181	%
Linearity error		
LE	0.0022186	%
Dark current		
$\mu_{I.mean}$	19.2116	e$^-$/s
$\mu_{I.var}$	1.3214	e$^-$/s

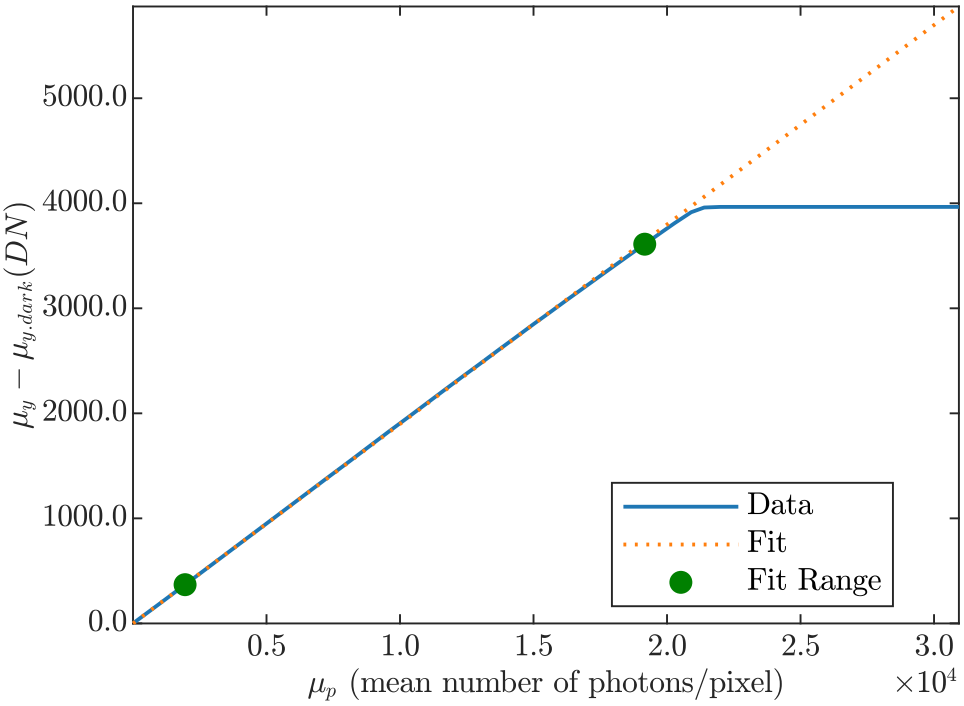
Stability check



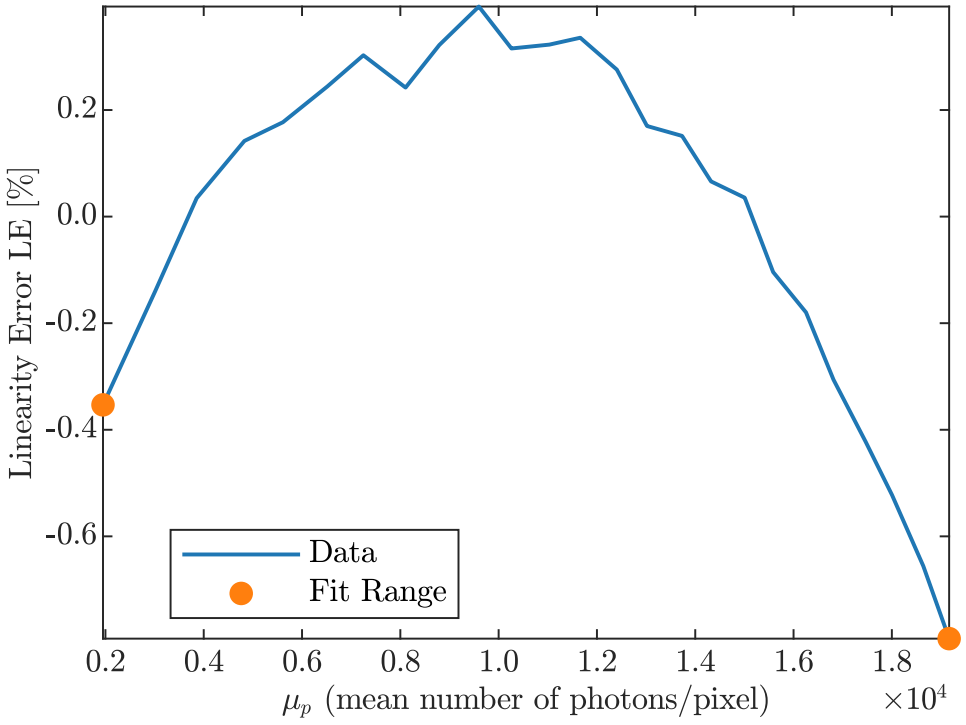
Sensitivity



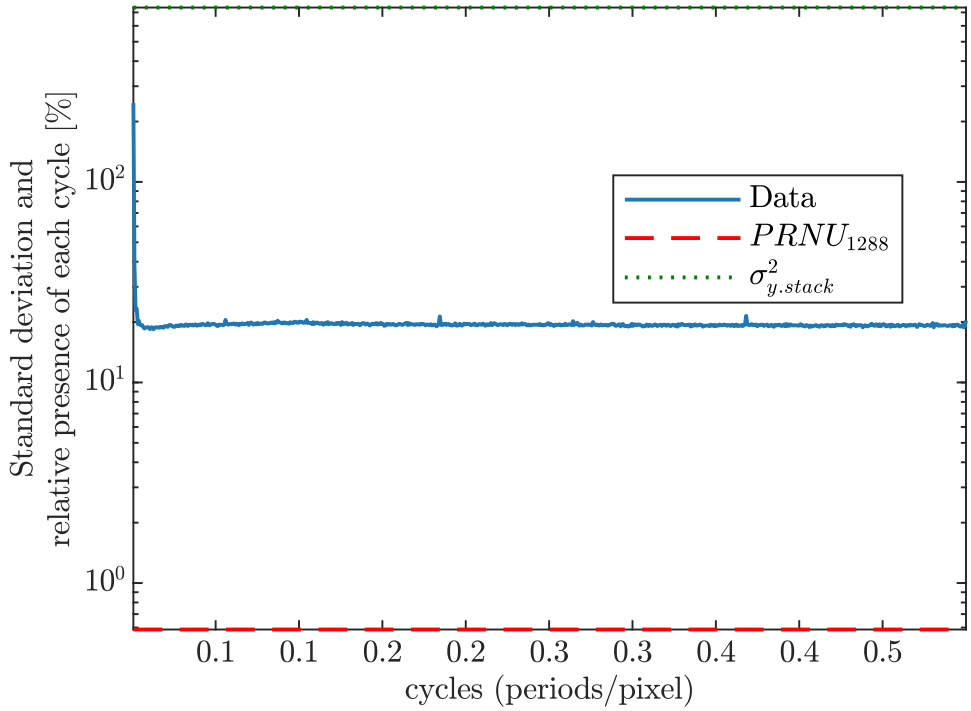
Linearity


5000.0
4000.0
3000.0
2000.0
1000.0
0.0
$\mu_y - \mu_{y.dark}(DN)$
0.5
1.0
1.5
2.0
2.5
3.0
μ_p (mean number of photons/pixel)
$\times 10^4$
Data
Fit
Fit Range

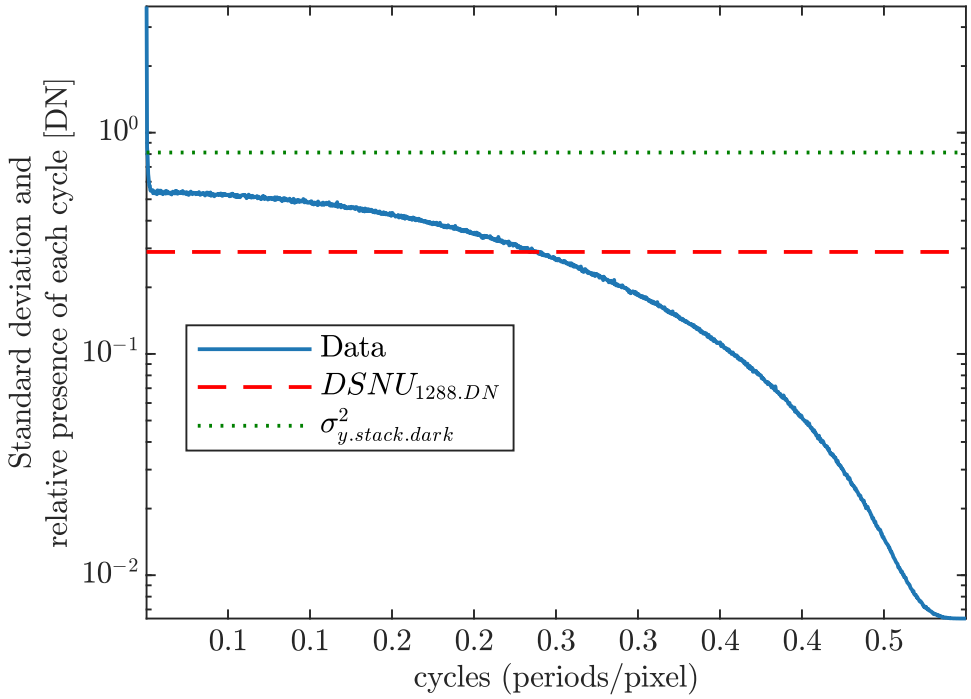
Deviation Linearity



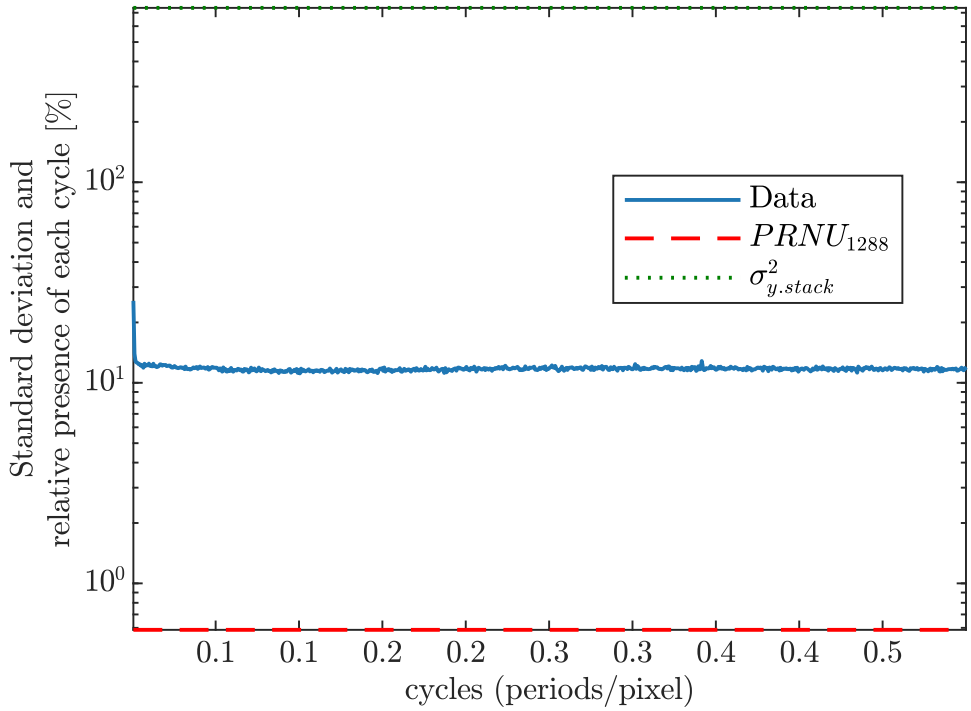
Horizontal Spectrogram PRNU



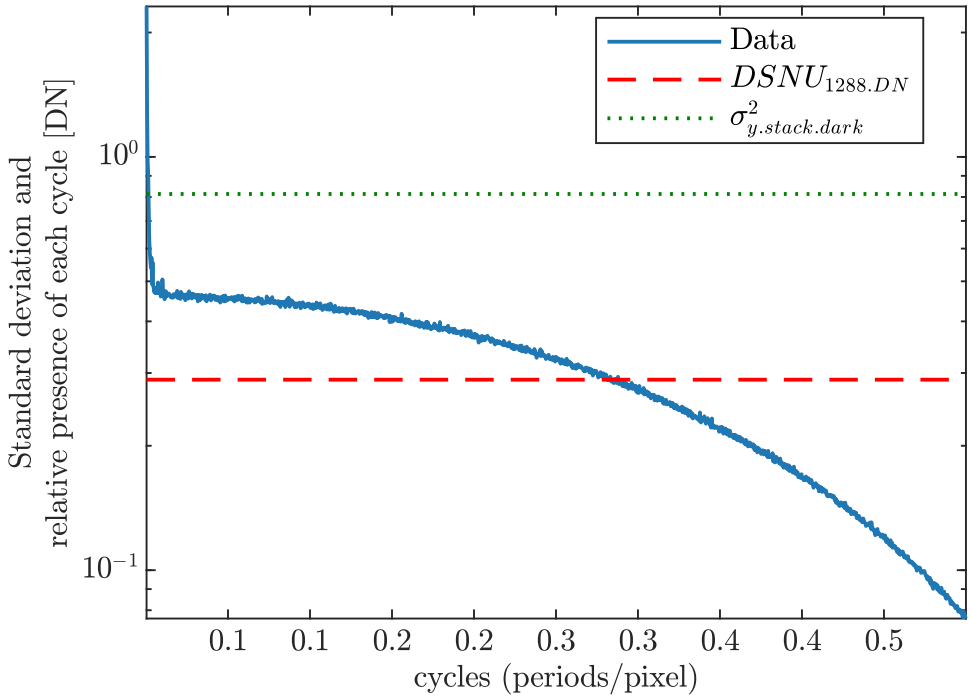
Horizontal Spectrogram DSNU



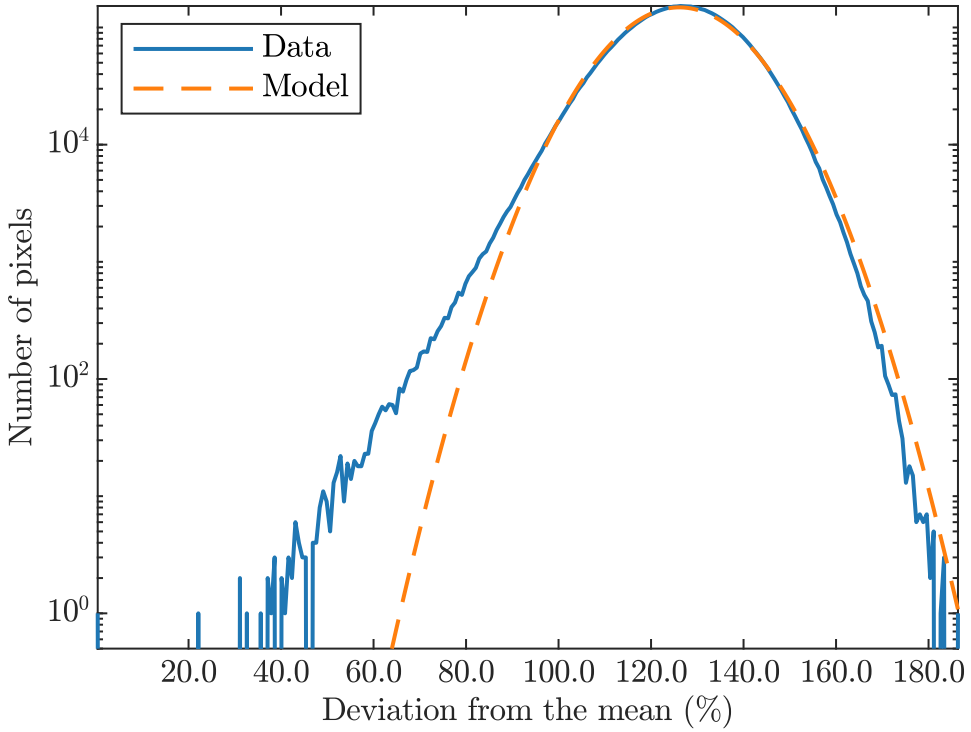
Vertical Spectrogram PRNU



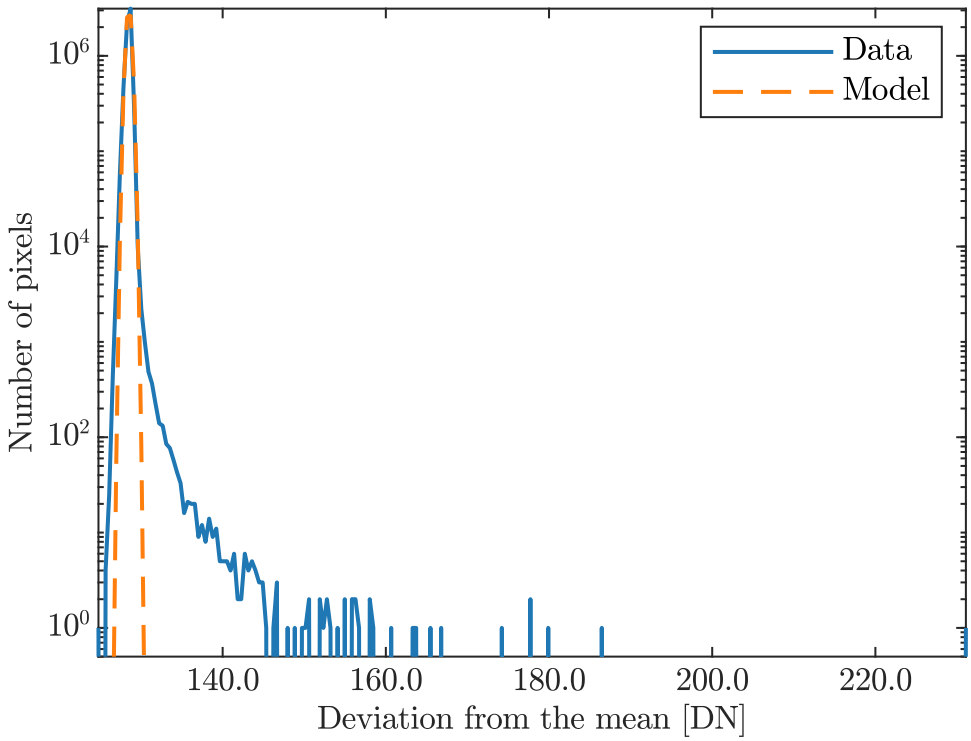
Vertical Spectrogram DSNU



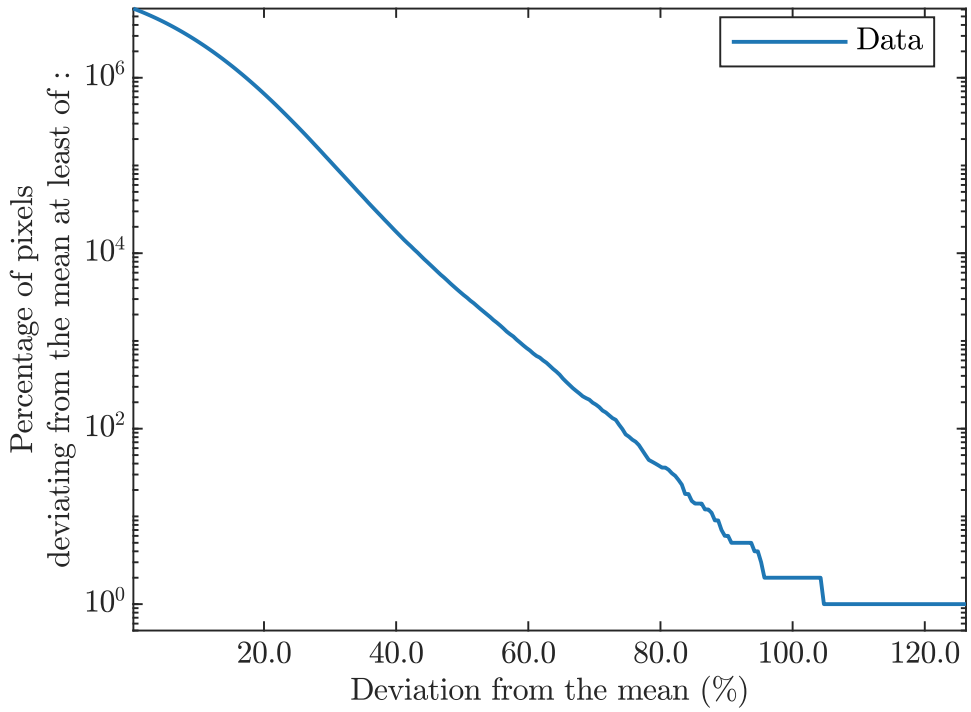
Logarithmic Histogram PRNU



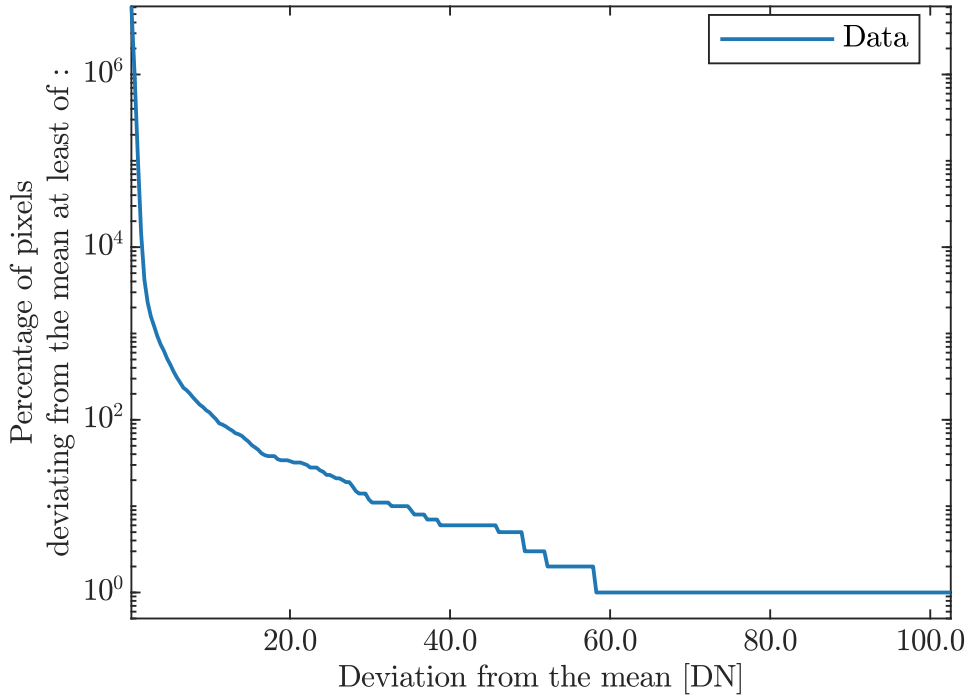
Logarithmic Histogram DSNU



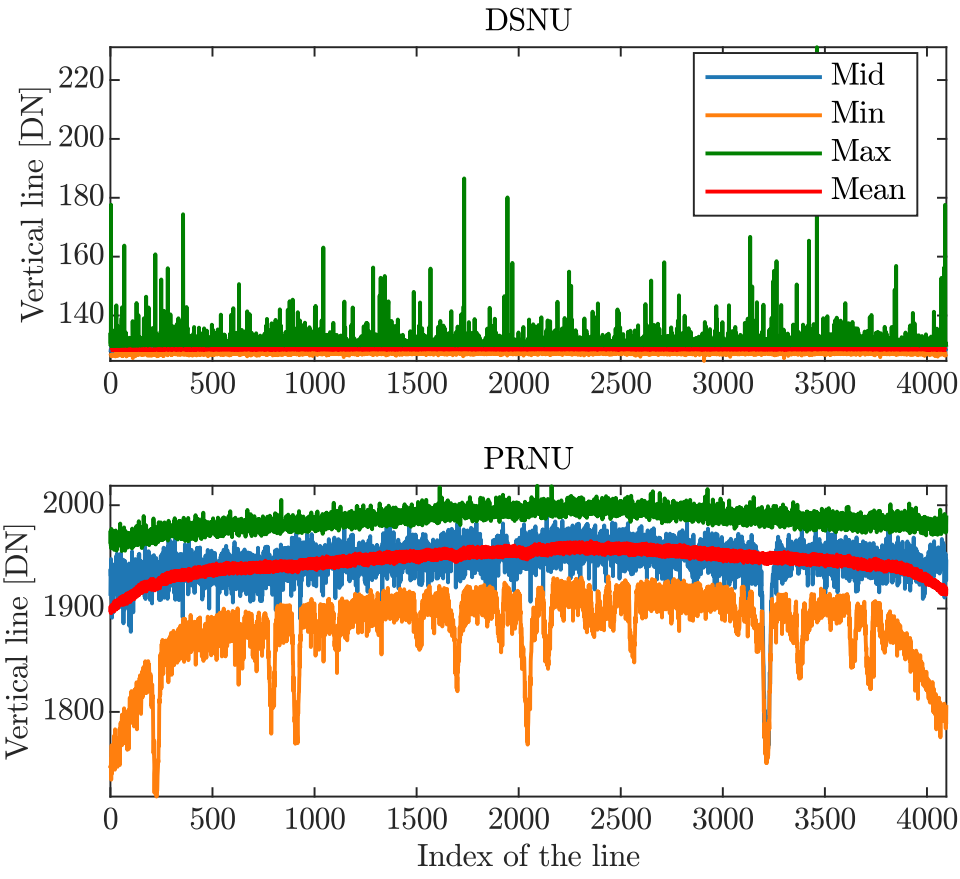
Accumulated Log Histogram PRNU



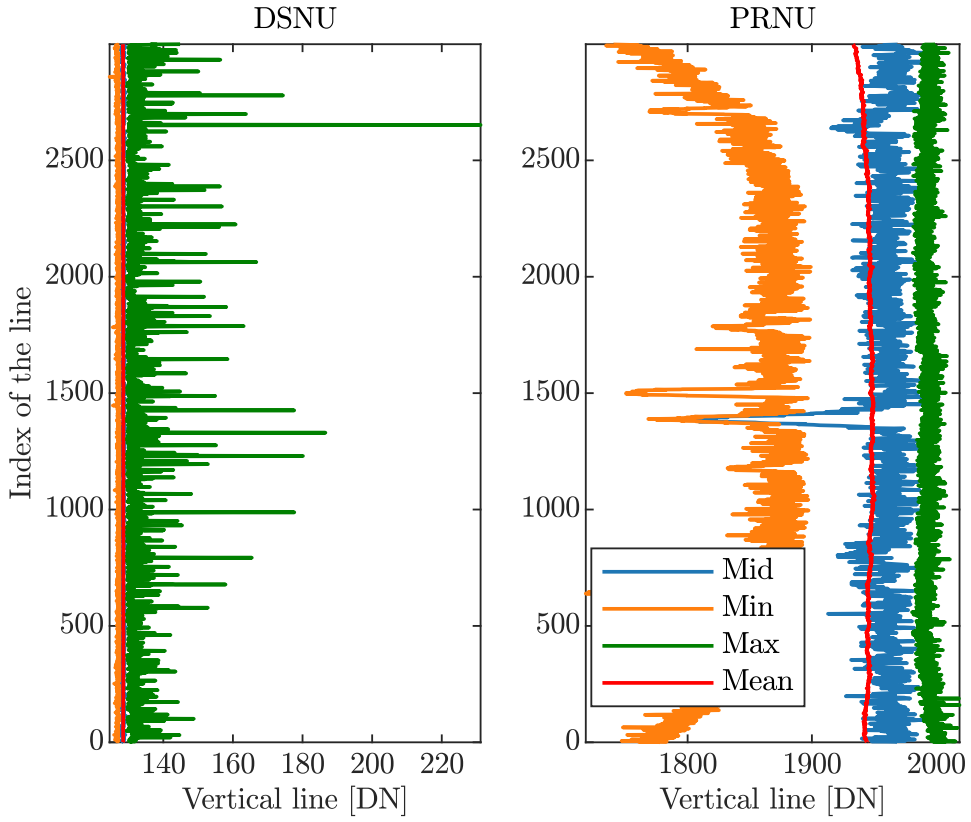
Accumulated Log Histogram DSNU



Horizontal Profile



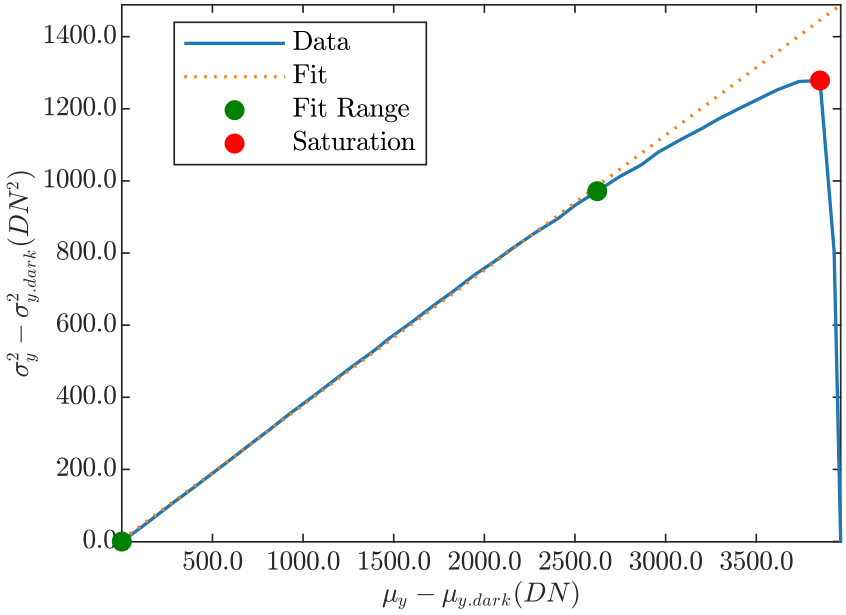
Vertical Profile



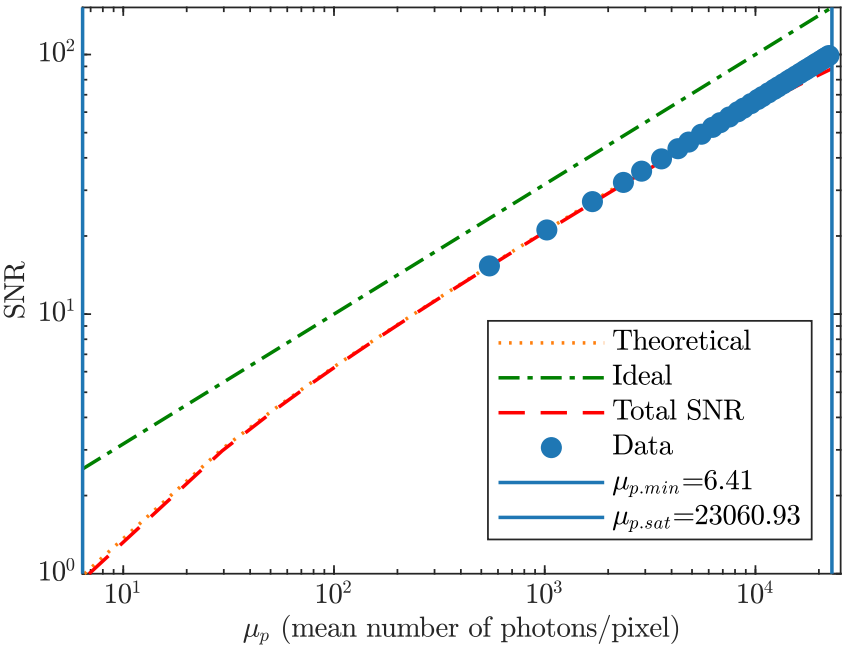
Summary Sheet for Operation Point 2 at a Wavelength of 632 nm

Camera setting		Operation point parameters	
Gain	GainLevelx1	Environmental temperature	24.43
Black level	128	Camera body temperature	35.81
		Sensor temperature	38.68
		Processor temperature	40

Photon Transfer



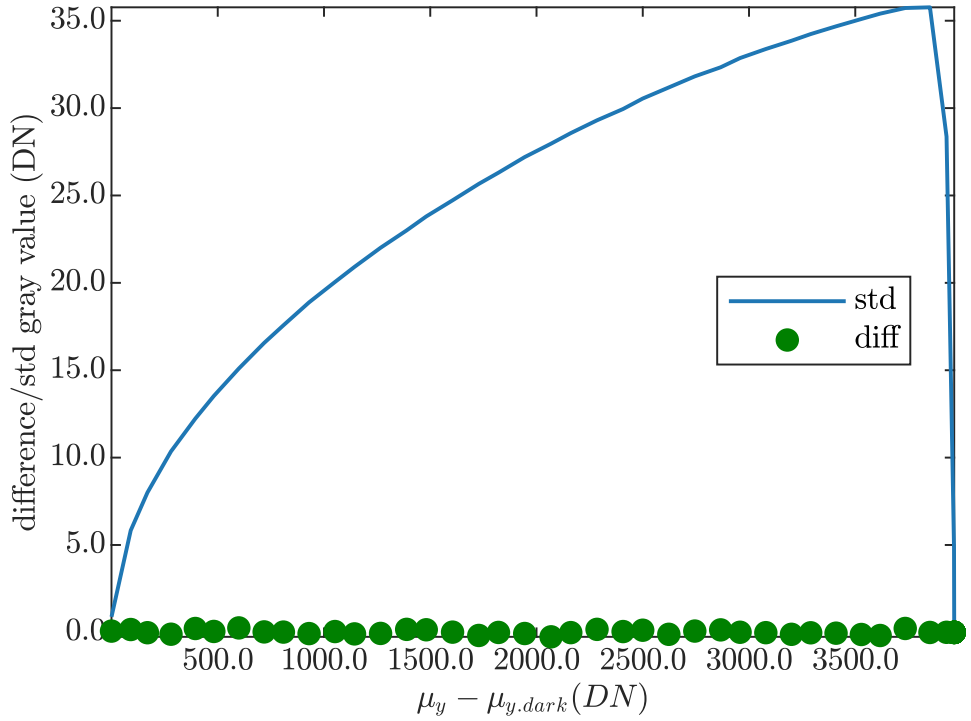
Signal-to-Noise Ratio



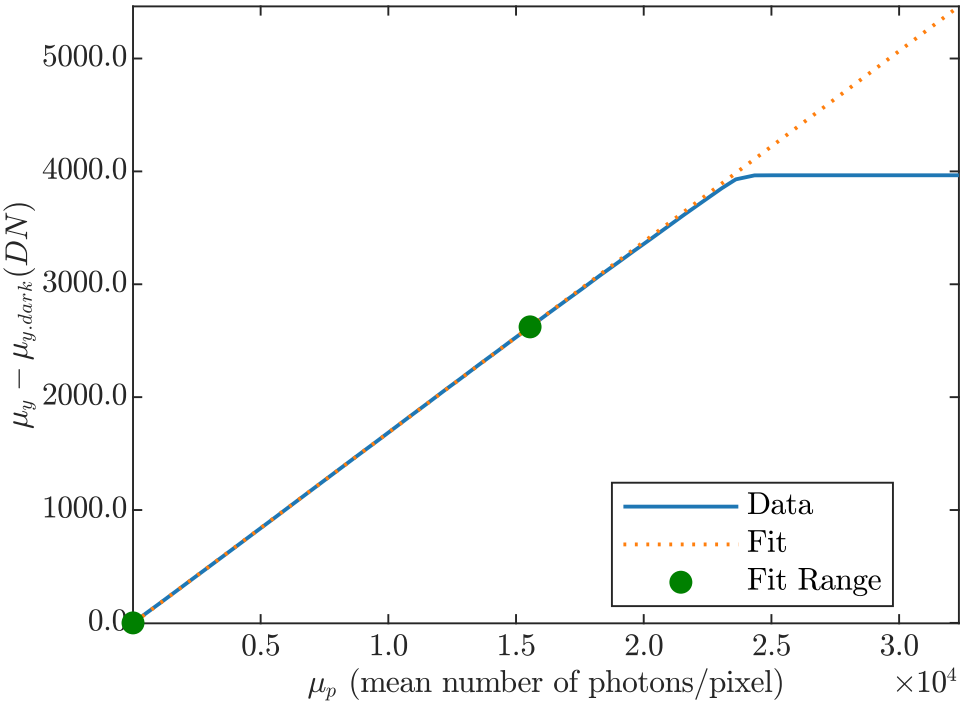
Performance

Quantum efficiency		
η	44.0064	%
System gain		
K	0.38267	DN/e$^-$
1/K	2.6132	e$^-$/DN
Temporal dark noise		
σ_d	2.1961	e$^-$
$\sigma_{y.dark}$	0.88857	DN
Signal-to-noise ratio		
SNR_{max}	100.7387	
	40.0639	dB
	6.6545	bit
$1/SNR_{max}$	0.99267	%
Absolute sensitivity threshold		
$\mu_{e.min}$	2.822	e$^-$
$\mu_{e.min.area}$	0.23709	e$^-/\mu m^2$
Saturation capacity		
$\mu_{e.sat}$	10148.278	e$^-$
$\mu_{e.sat.area}$	852.6174	e$^-/\mu m^2$
Dynamic range		
DR	3596.1052	
	71.1166	dB
	11.8122	bit
Spatial nonuniformities		
$DSNU_{1288}$	0.80673	e$^-$
$DSNU_{1288.col}$	0.14967	e$^-$
$DSNU_{1288.row}$	0.096741	e$^-$
$DSNU_{1288.pix}$	0.7868	e$^-$
$PRNU_{1288}$	0.54728	%
$PRNU_{1288.col}$	0.040187	%
$PRNU_{1288.row}$	0.024404	%
$PRNU_{1288.pix}$	0.54526	%
Linearity error		
LE	0.00098167	%
Dark current		
$\mu_{l.mean}$	19.2116	e$^-$/s
$\mu_{l.var}$	1.3214	e$^-$/s

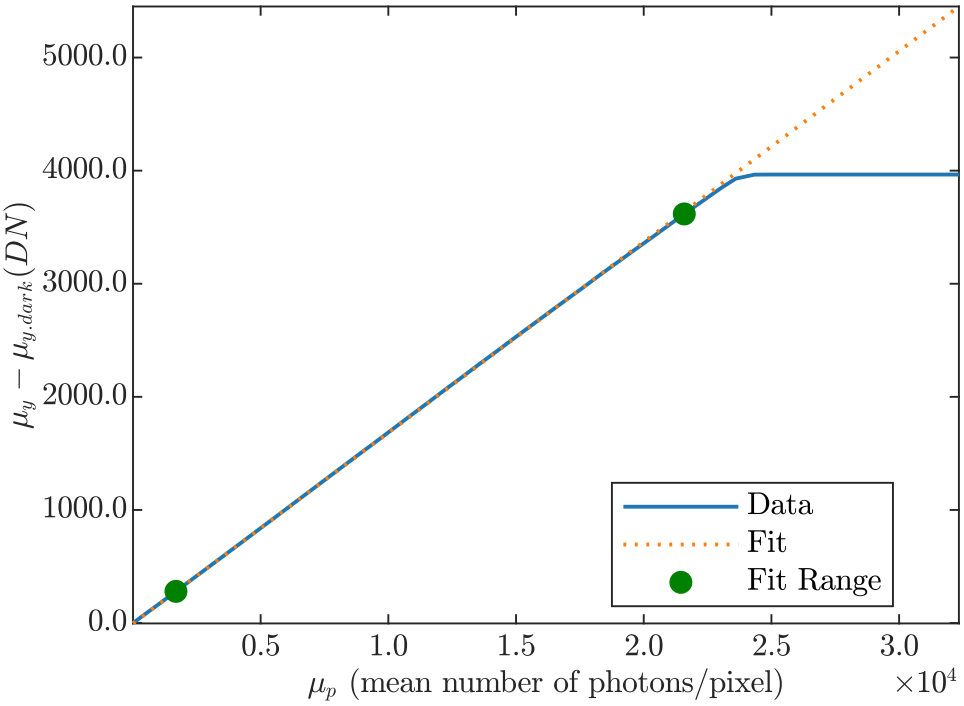
Stability check



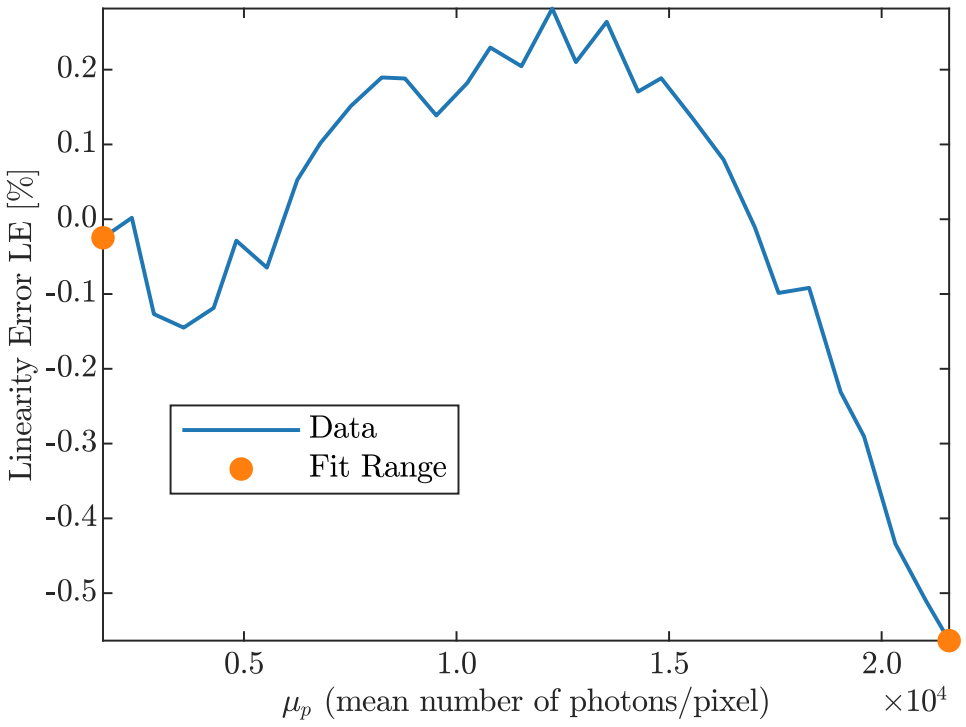
Sensitivity



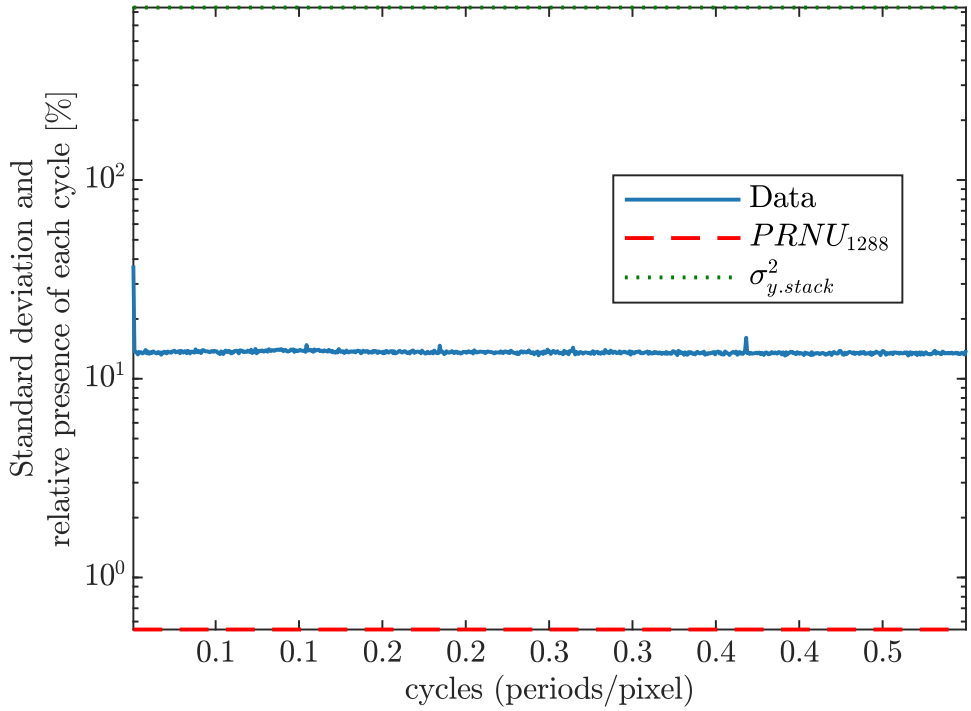
Linearity


5000.0
4000.0
3000.0
2000.0
1000.0
0.0
$\mu_y - \mu_{y,dark}(DN)$
0.5
1.0
1.5
2.0
2.5
3.0
μ_p (mean number of photons/pixel)
$\times 10^4$
Data
Fit
Fit Range

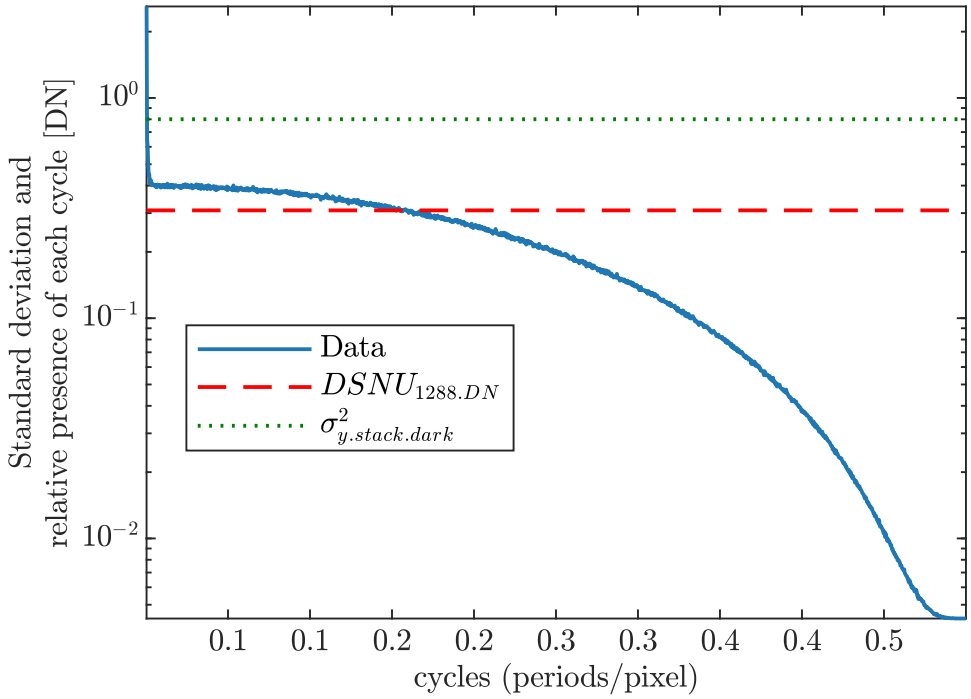
Deviation Linearity



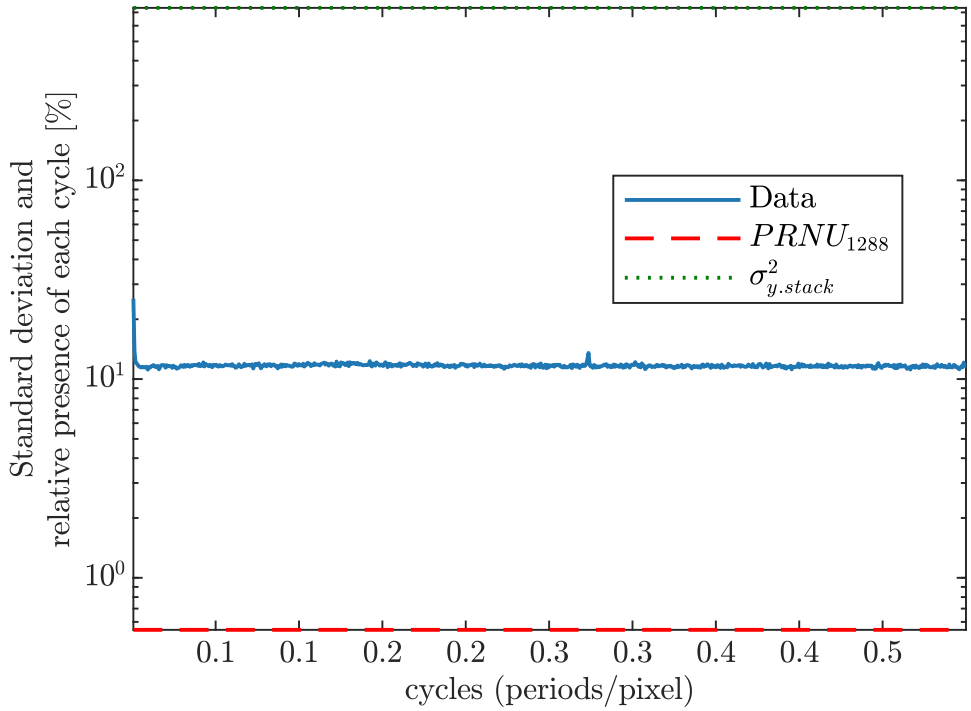
Horizontal Spectrogram PRNU



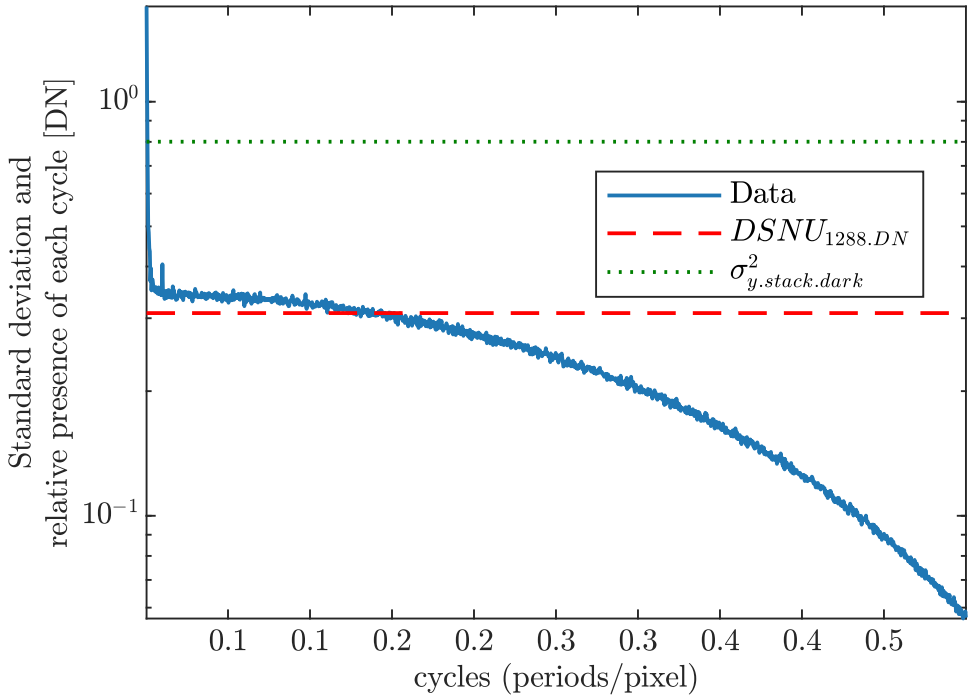
Horizontal Spectrogram DSNU



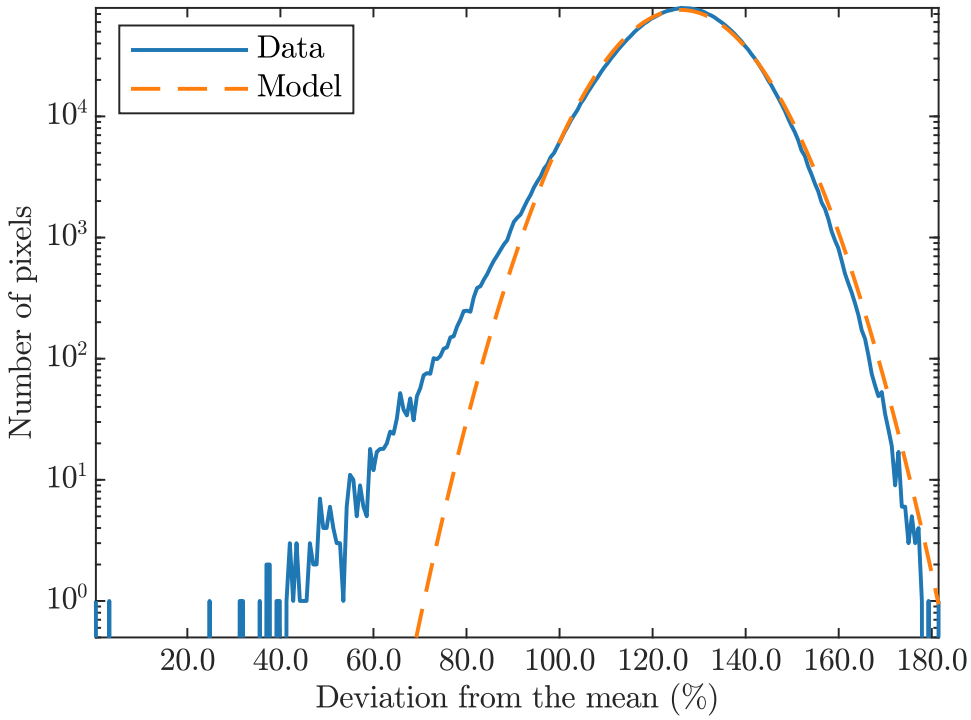
Vertical Spectrogram PRNU



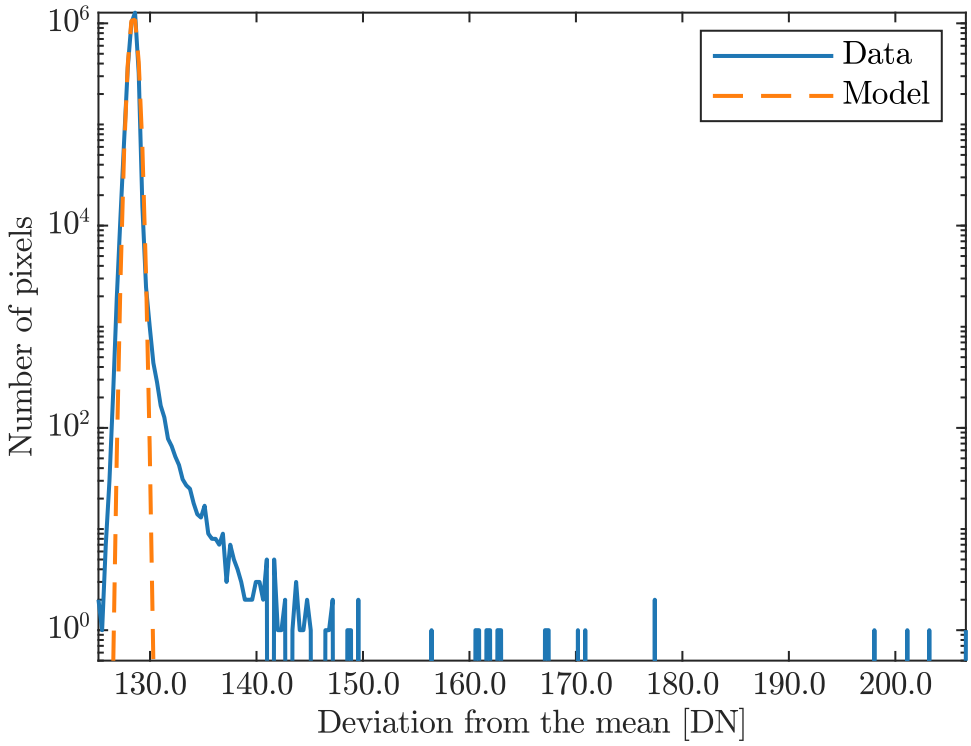
Vertical Spectrogram DSNU



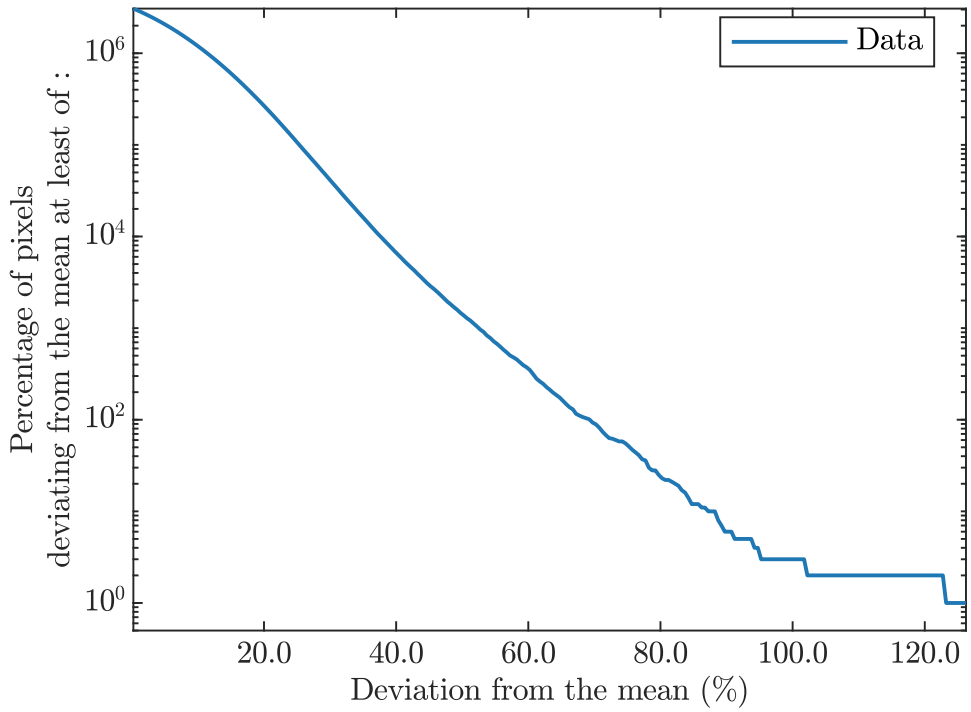
Logarithmic Histogram PRNU



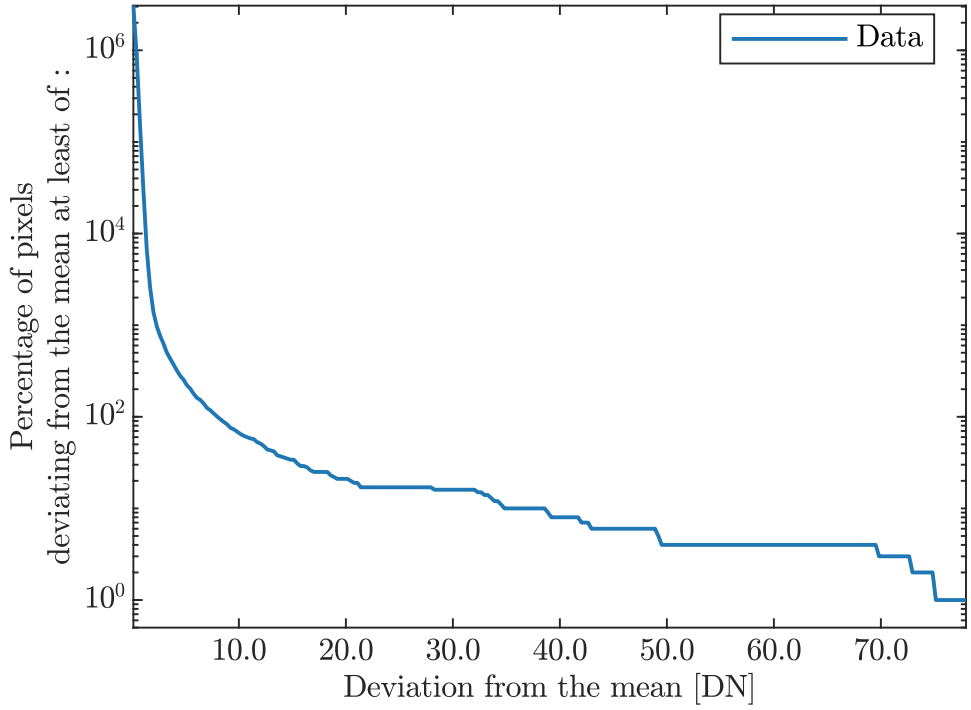
Logarithmic Histogram DSNU



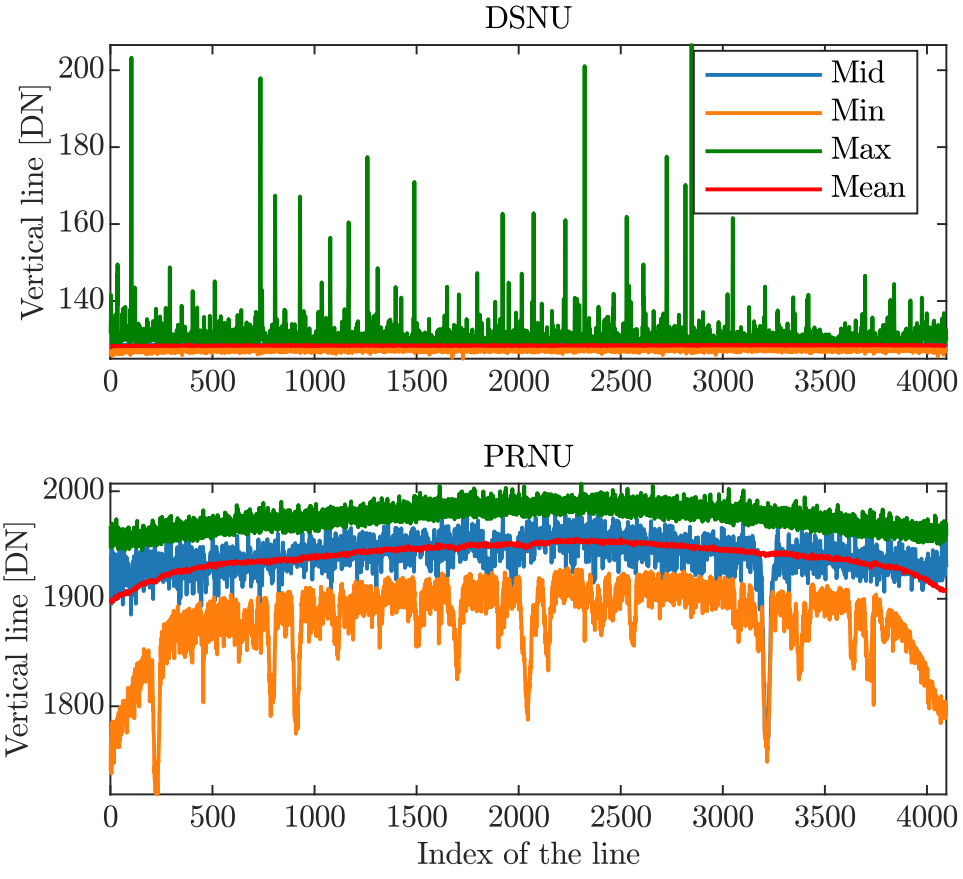
Accumulated Log Histogram PRNU



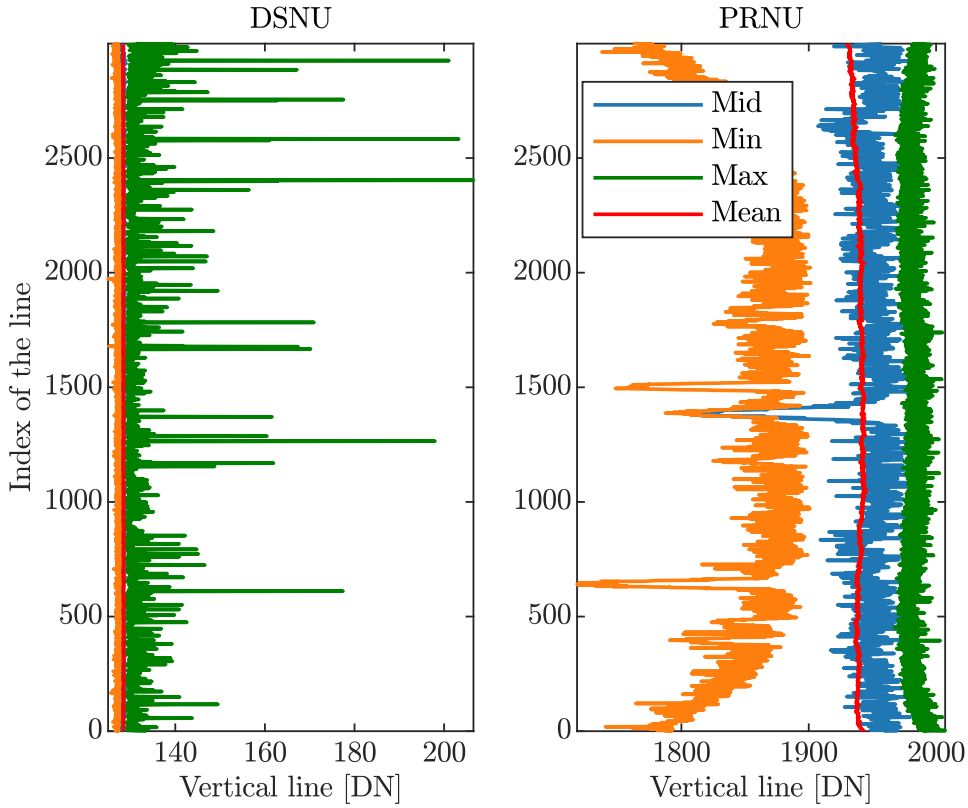
Accumulated Log Histogram DSNU



Horizontal Profile



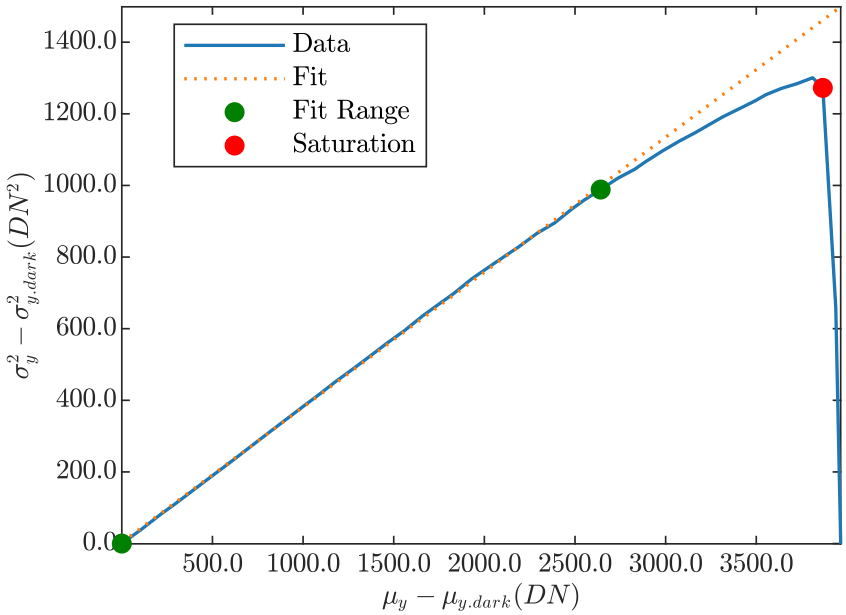
Vertical Profile



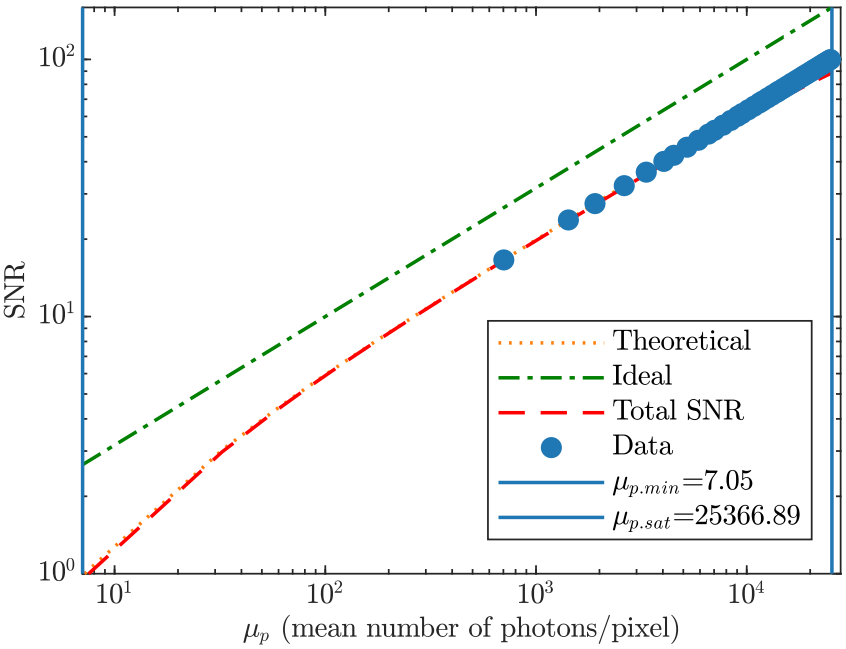
Summary Sheet for Operation Point 3 at a Wavelength of 448 nm

Camera setting		Operation point parameters	
Gain	GainLevelx1	Environmental temperature	24.5
Black level	128	Camera body temperature	35.68
		Sensor temperature	38.68
		Processor temperature	42

Photon Transfer



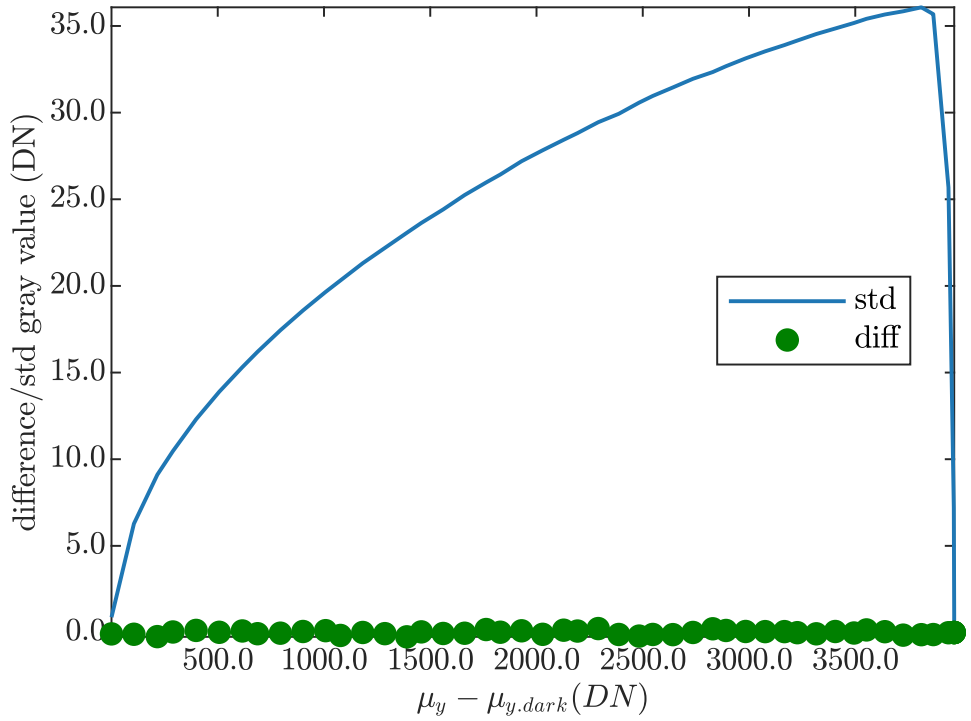
Signal-to-Noise Ratio



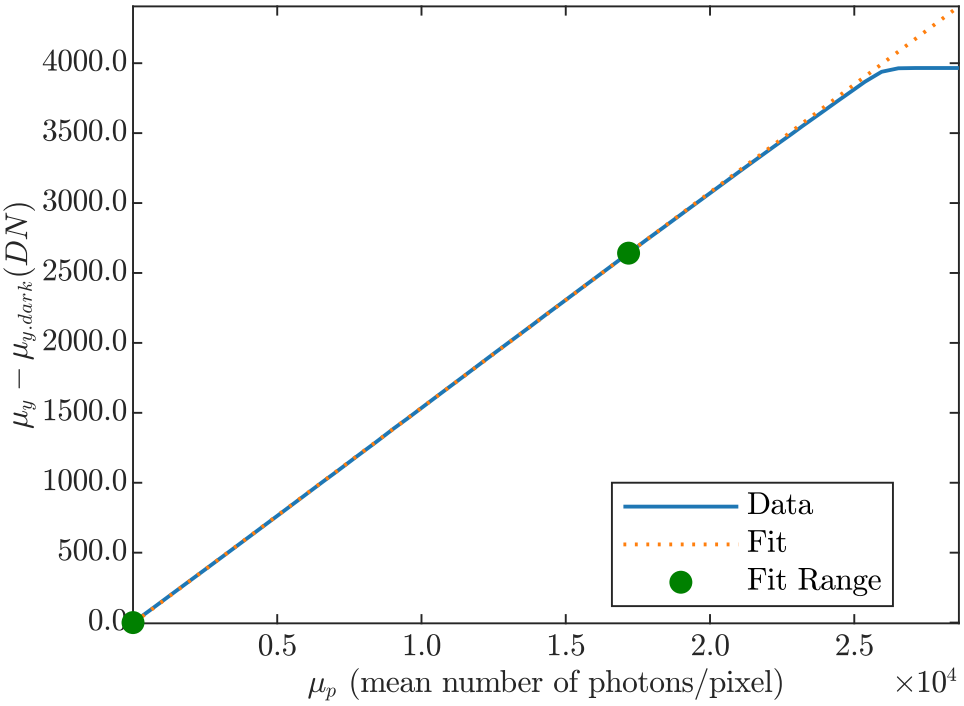
Performance

Quantum efficiency		
η	39.9627	%
System gain		
K	0.38335	DN/e^-
1/K	2.6086	e^-/DN
Temporal dark noise		
σ_d	2.1922	e^-
$\sigma_{y.dark}$	0.88857	DN
Signal-to-noise ratio		
SNR_{max}	100.6841	
	40.0592	dB
	6.6537	bit
$1/SNR_{max}$	0.99321	%
Absolute sensitivity threshold		
$\mu_{e.min}$	2.8179	e^-
$\mu_{e.min.area}$	0.23675	$e^-/\mu m^2$
Saturation capacity		
$\mu_{e.sat}$	10137.2958	e^-
$\mu_{e.sat.area}$	851.6947	$e^-/\mu m^2$
Dynamic range		
DR	3597.4607	
	71.1199	dB
	11.8128	bit
Spatial nonuniformities		
$DSNU_{1288}$	0.76349	e^-
$DSNU_{1288.col}$	0.15753	e^-
$DSNU_{1288.row}$	0.087881	e^-
$DSNU_{1288.pix}$	0.74188	e^-
$PRNU_{1288}$	0.53567	%
$PRNU_{1288.col}$	0.042234	%
$PRNU_{1288.row}$	0.021378	%
$PRNU_{1288.pix}$	0.53357	%
Linearity error		
LE	0.00084786	%
Dark current		
$\mu_{l.mean}$	19.2116	e^-/s
$\mu_{l.var}$	1.3214	e^-/s

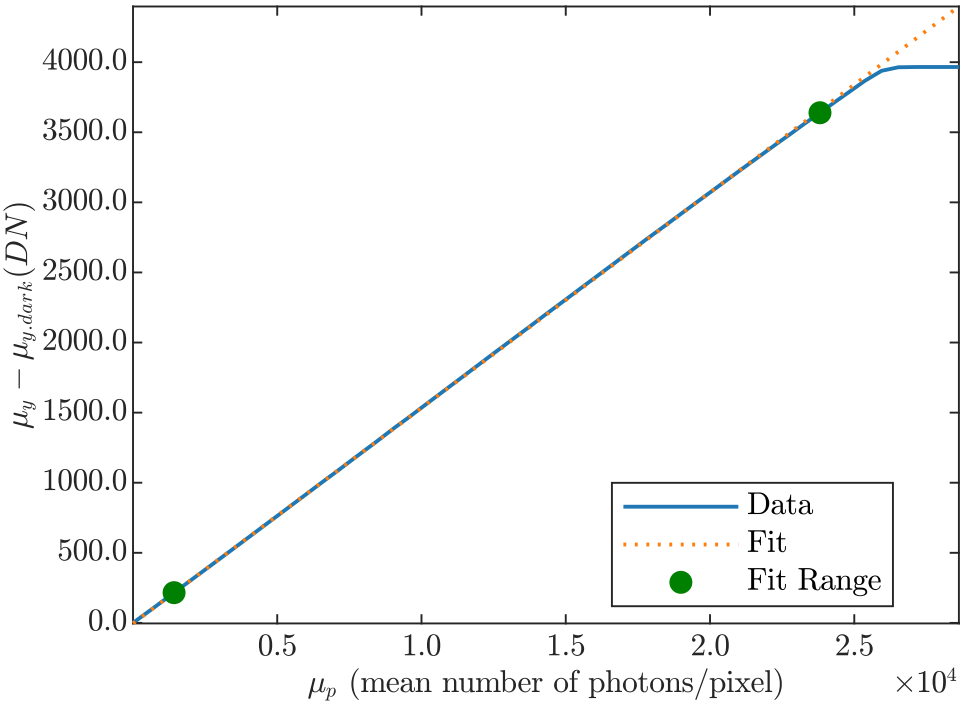
Stability check



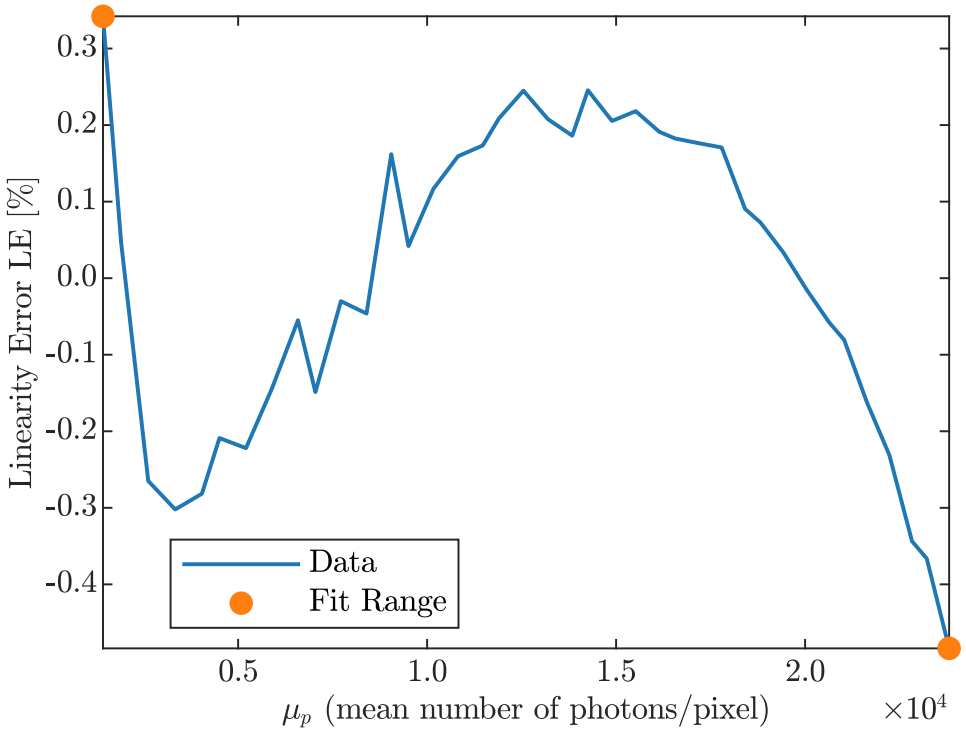
Sensitivity



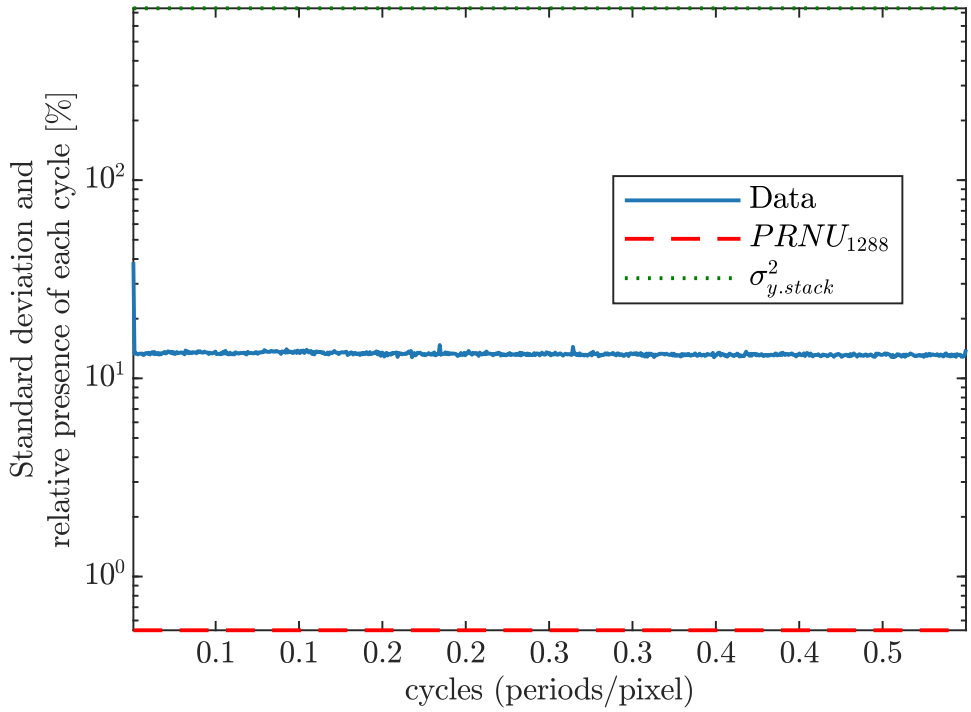
Linearity


4000.0
3500.0
3000.0
2500.0
2000.0
1500.0
1000.0
500.0
0.0
$\mu_y - \mu_{y,dark}(DN)$
0.5
1.0
1.5
2.0
2.5
μ_p (mean number of photons/pixel)
$\times 10^4$
Data
Fit
Fit Range

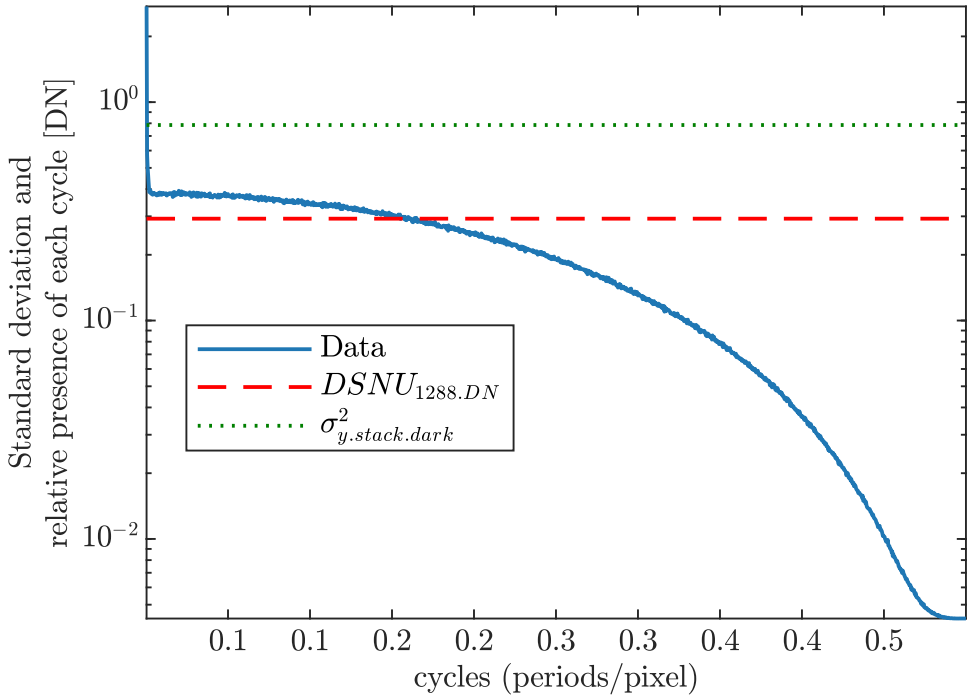
Deviation Linearity



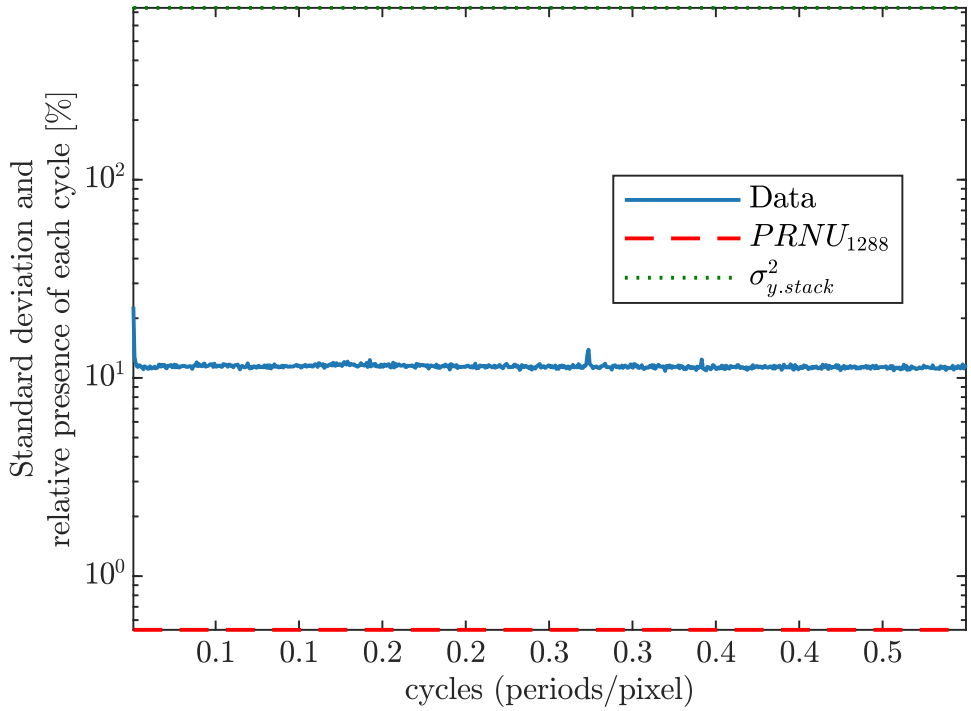
Horizontal Spectrogram PRNU



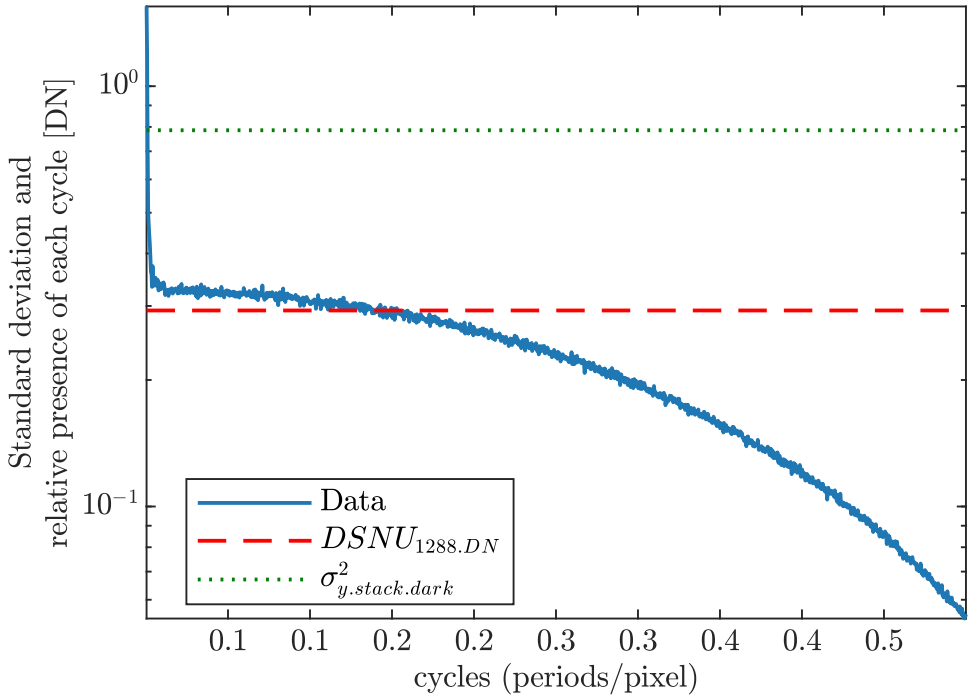
Horizontal Spectrogram DSNU



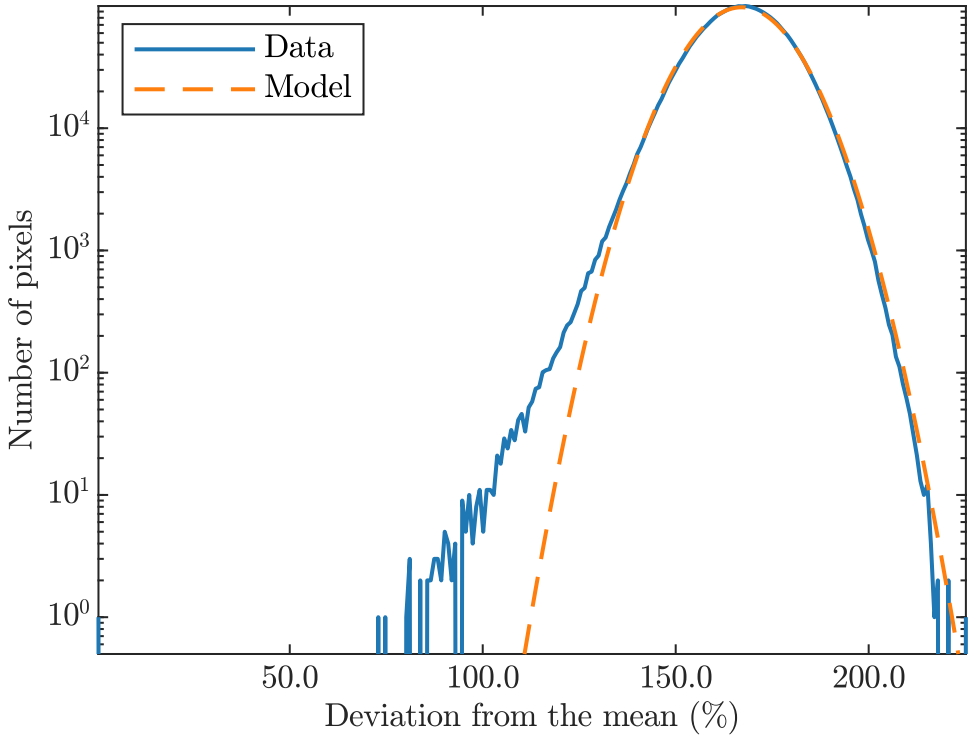
Vertical Spectrogram PRNU



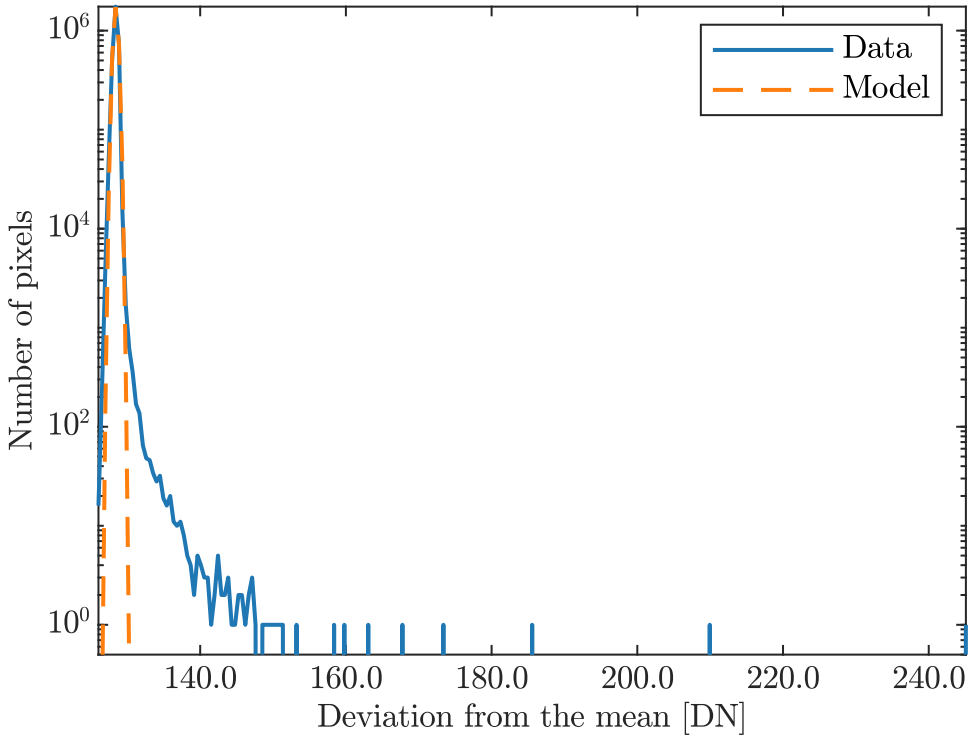
Vertical Spectrogram DSNU



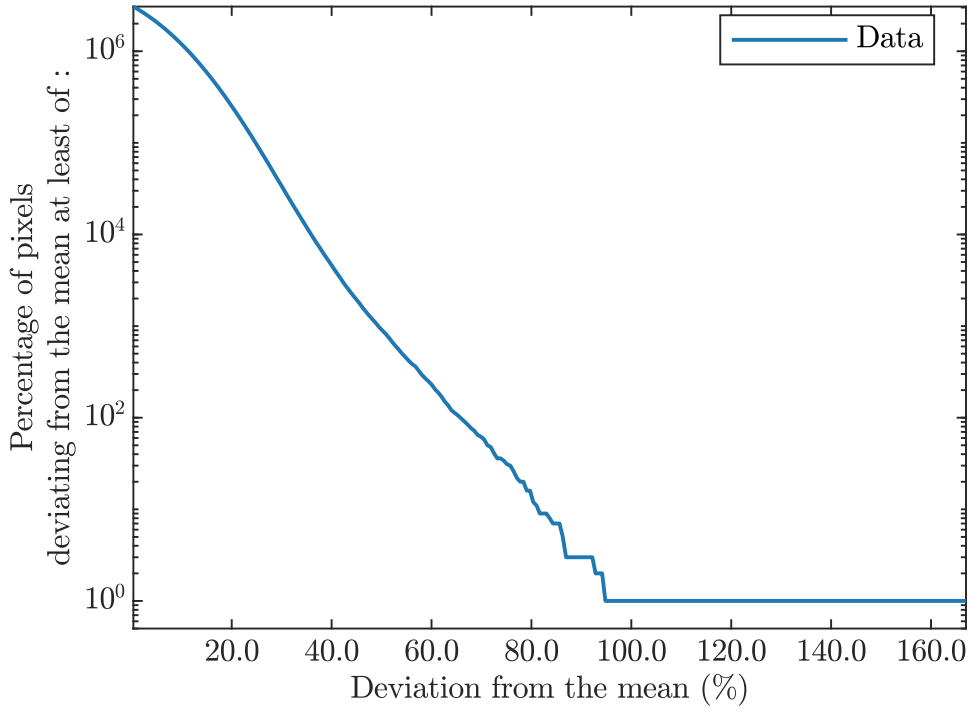
Logarithmic Histogram PRNU



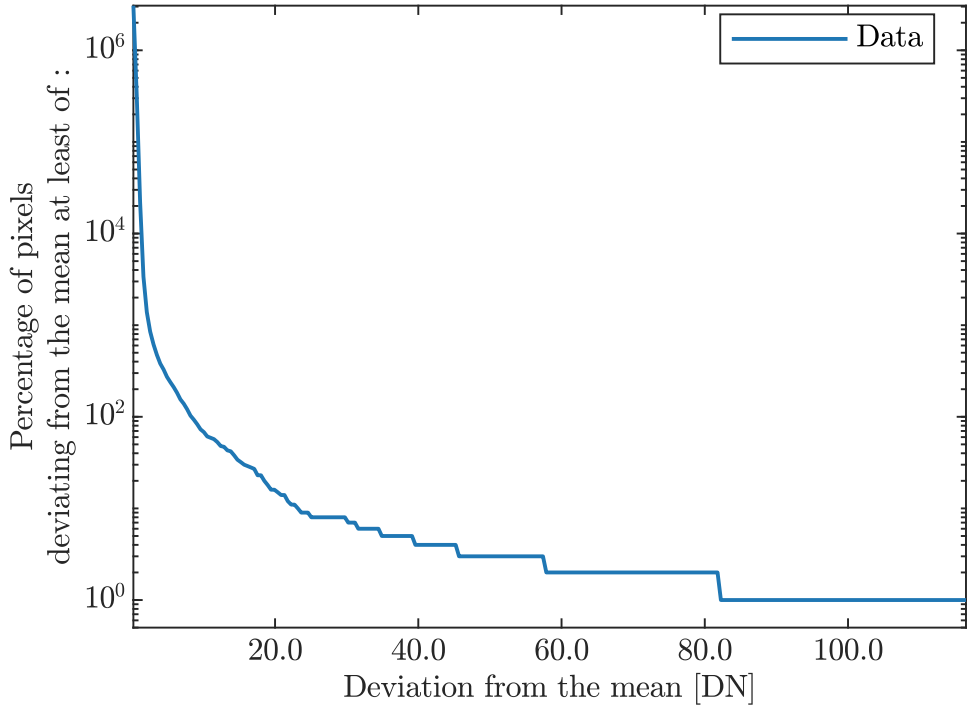
Logarithmic Histogram DSNU



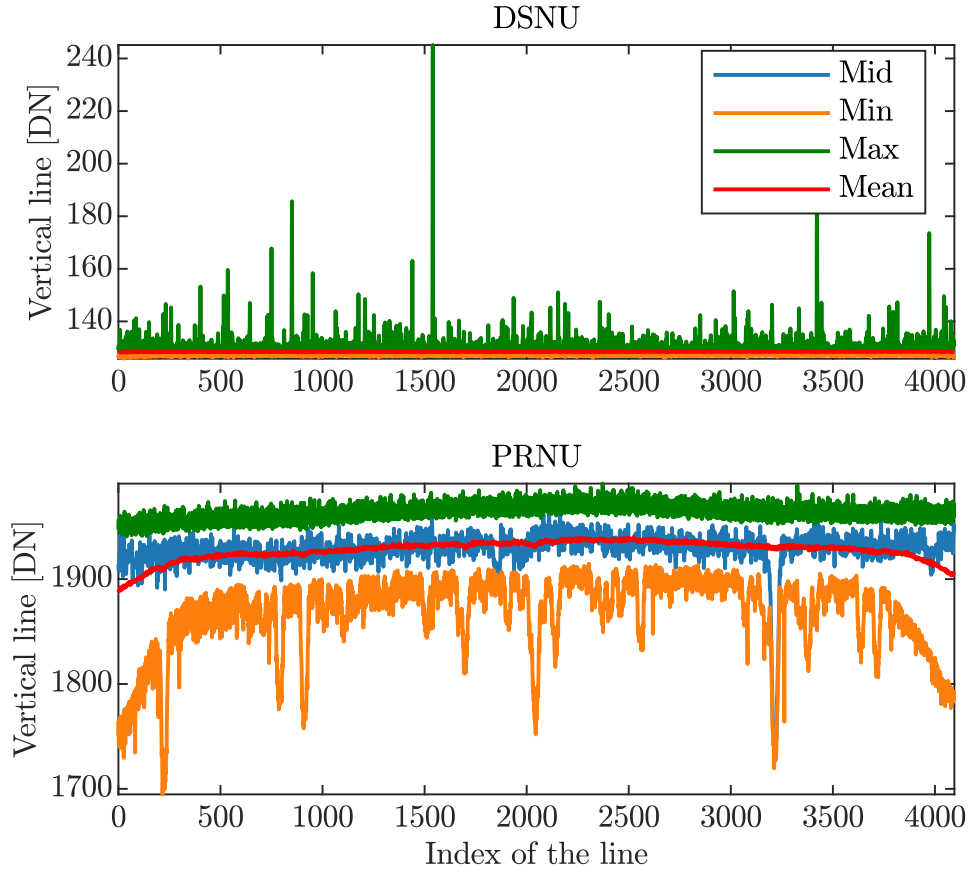
Accumulated Log Histogram PRNU



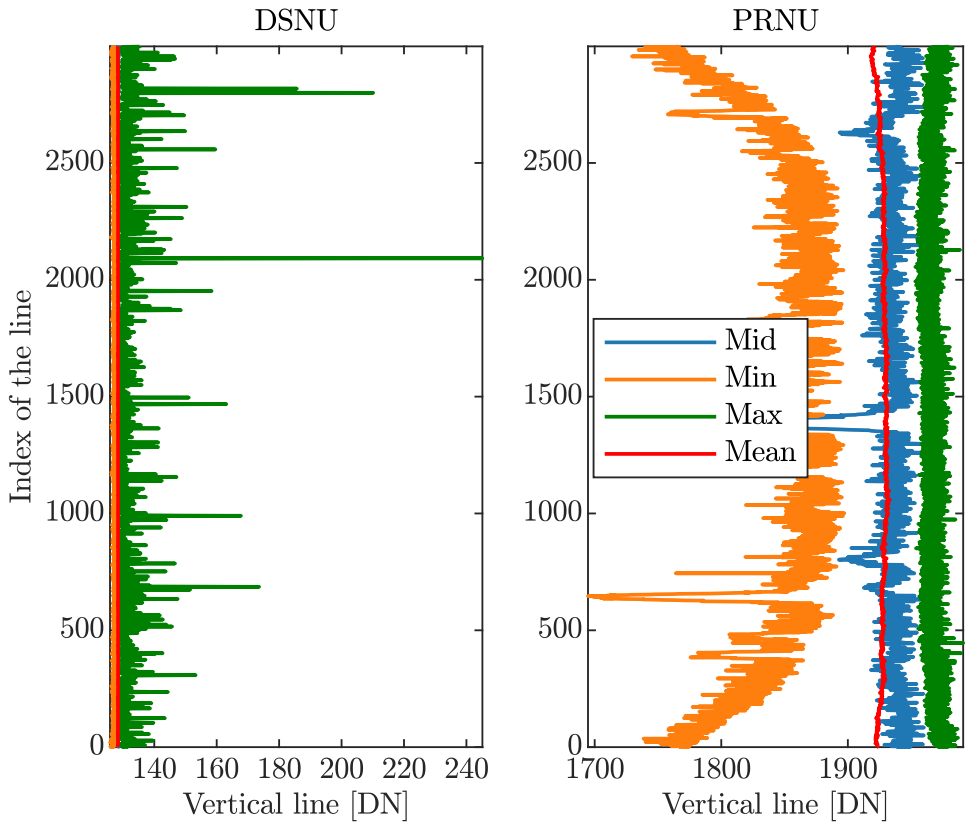
Accumulated Log Histogram DSNU



Horizontal Profile

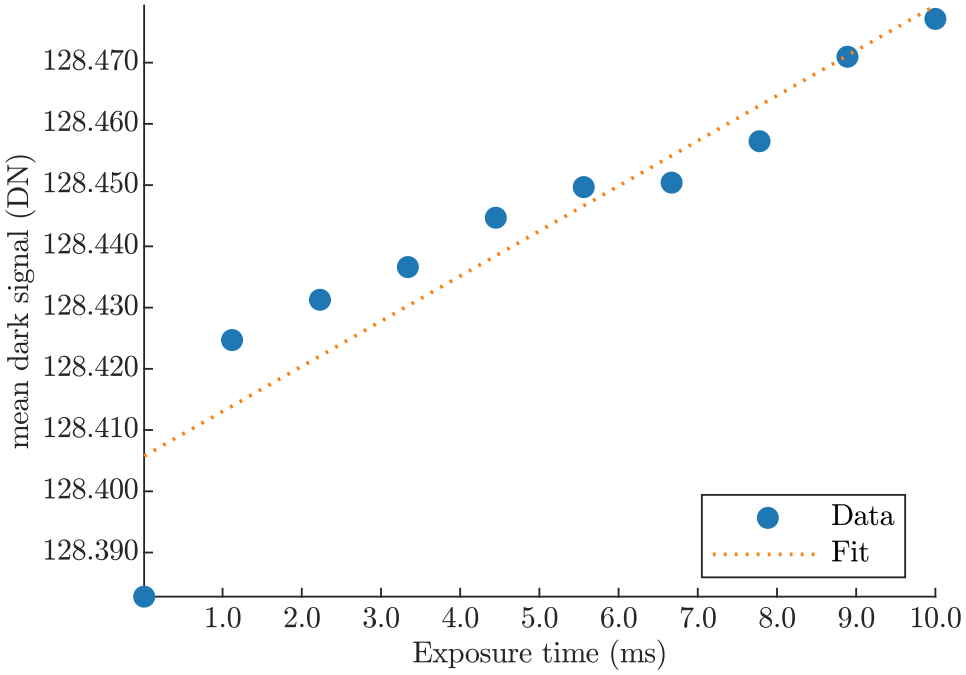


Vertical Profile

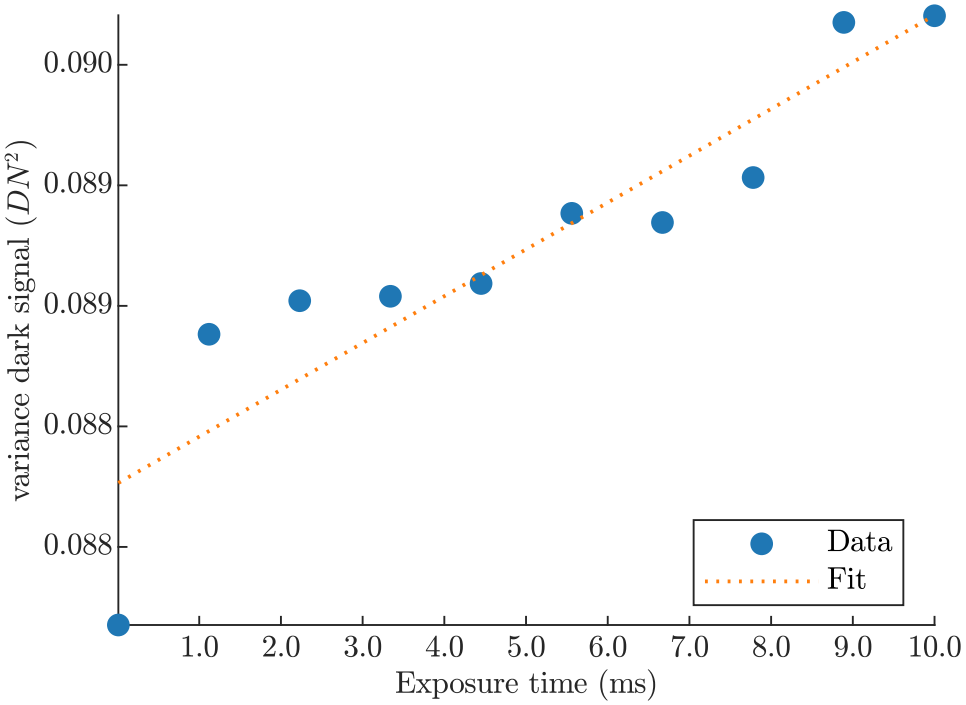


Dark Current

Dark Current from Mean



Dark Current from Variance



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