

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	11.8mm
Model	Iron2509-C	Sensor	GMAX2509
Camera type	Color	Sensor type	CMOS
Date	28-Feb-2023 15:38:03	Shutter type	Global
Data type	Single	Overlap capabilities	Overlapping
Sensor type	CMOS	Frame rate	80 Hz
Lens category	C-Mount	Exposure control	by irradiance
Resolution	4200 x 2160 ,12 bits	Exposure time	3000.487 μ s
Pixel size	2.5 μ m x 2.5 μ m	Illumination	Variable with constant exposure time
Maximum readout rate	118 fps	Irradiation Steps	50
Dark current compensation	No	Irradiation calibration accuracy	-
Interface type	CXP-12	Irradiation measurement error	-
Serial number	2305064	Standart version	4.0 Linear
Firmware version	2.2.2-2023.2.27	Light source	Integrating Sphere

International Distributor

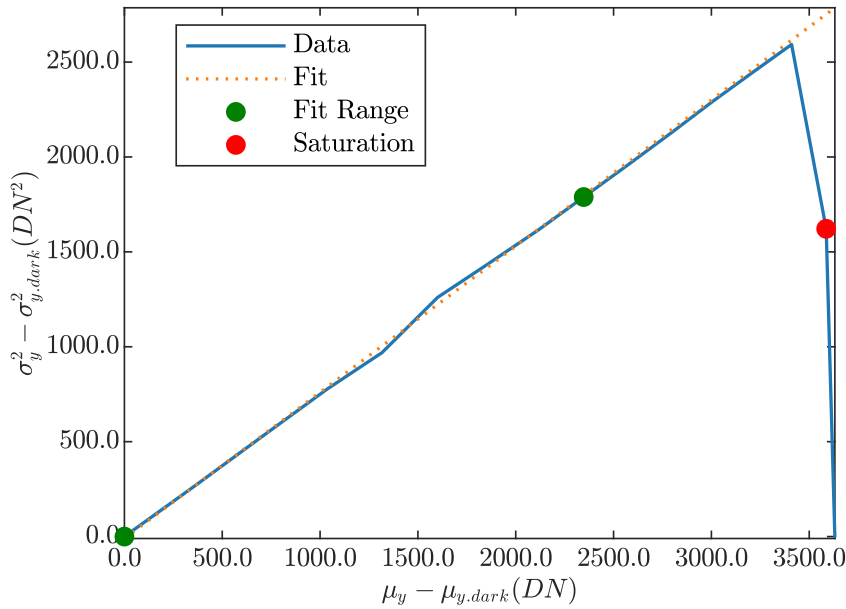


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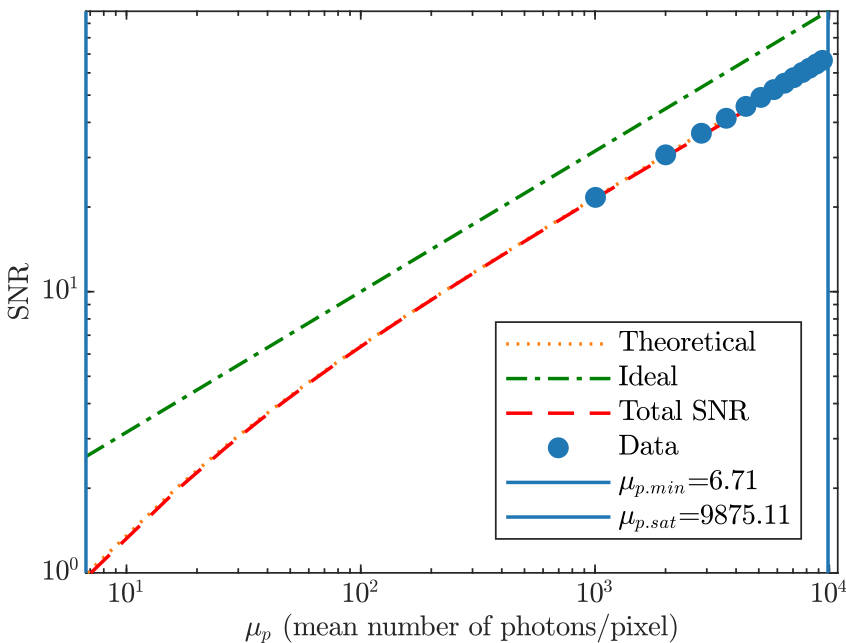
Summary Sheet for Operation Point 1 at a Wavelength of 520 nm

Camera setting		Operation point parameters	
Gain	2	Environmental temperature	23
Black level	-1032	Camera body temperature	41.43
		Sensor temperature	50
		Processor temperature	50

Photon Transfer



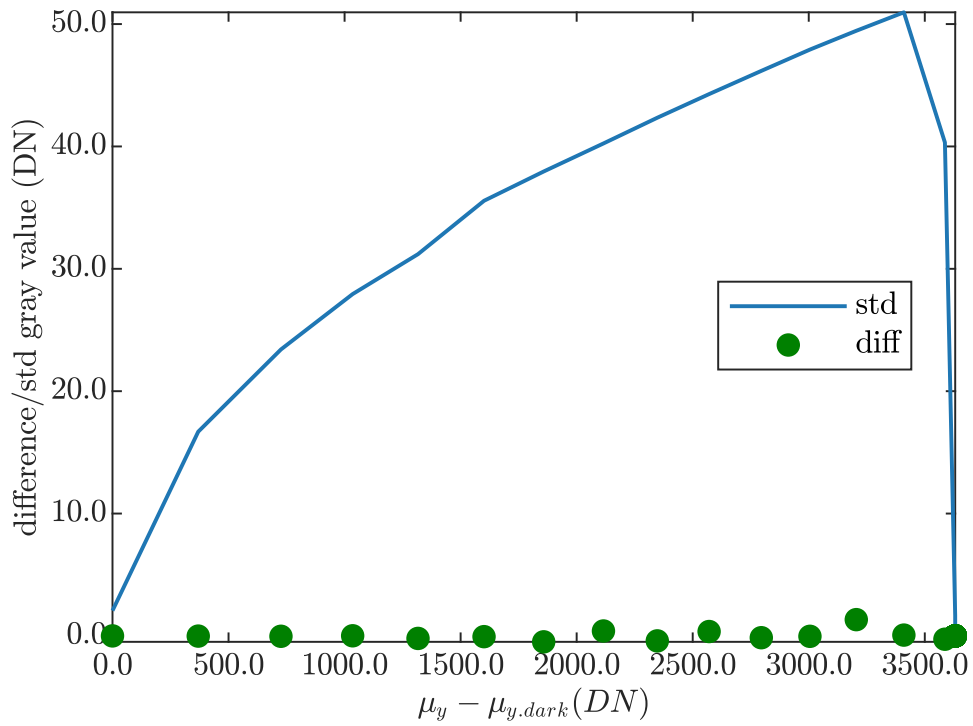
Signal-to-Noise Ratio



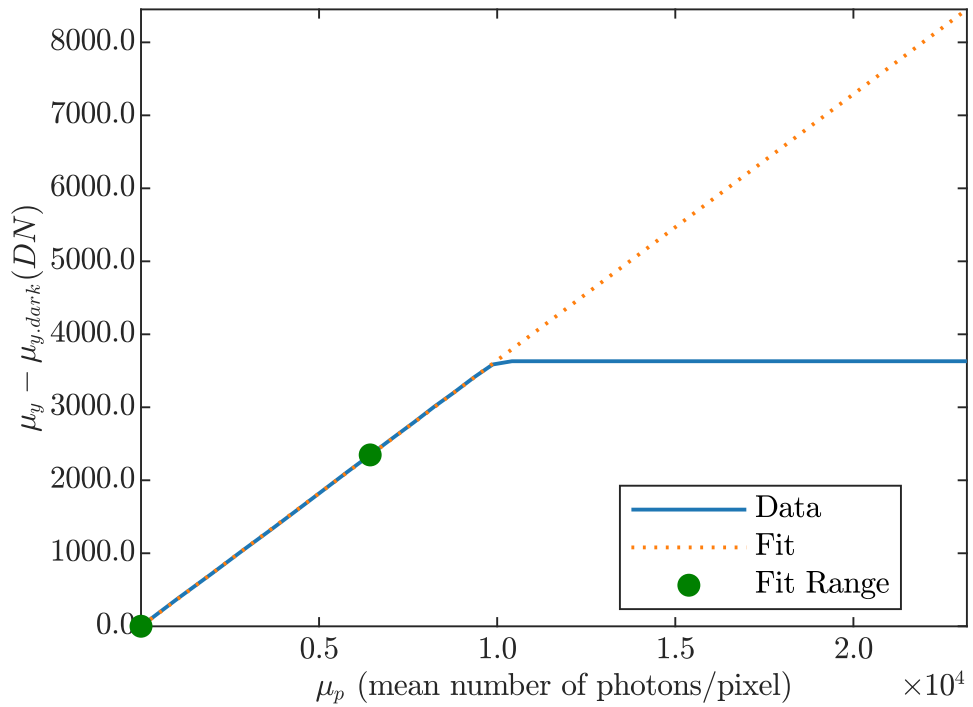
Performance

Quantum efficiency		
η	47.3456	%
System gain		
K	0.77008	DN/e ⁻
1/K	1.2986	e ⁻ /DN
Temporal dark noise		
σ_d	2.6525	e ⁻
$\sigma_{y,dark}$	2.063	DN
Signal-to-noise ratio		
SNR _{max}	68.3771	
	36.6982	dB
	6.0954	bit
1/SNR _{max}	1.4625	%
Absolute sensitivity threshold		
$\mu_{e,min}$	3.1789	e ⁻
$\mu_{e,min,area}$	0.50862	e ⁻ /μm ²
Saturation capacity		
$\mu_{e,sat}$	4675.4342	e ⁻
$\mu_{e,sat,area}$	748.0695	e ⁻ /μm ²
Dynamic range		
DR	1470.7707	
	63.3509	dB
	10.5224	bit
Spatial nonuniformities		
DSNU ₁₂₈₈	0.75372	e ⁻
DSNU _{1288,col}	0.53353	e ⁻
DSNU _{1288,row}	0.44003	e ⁻
DSNU _{1288,pix}	0.29969	e ⁻
PRNU ₁₂₈₈	0.56406	%
PRNU _{1288,col}	0.22144	%
PRNU _{1288,row}	0.022201	%
PRNU _{1288,pix}	0.5183	%
Linearity error		
LE	0.0022314	%
Dark current		
$\mu_{l,mean}$	12.2243	e ⁻ /s
$\mu_{l,var}$	2.2072	e ⁻ /s

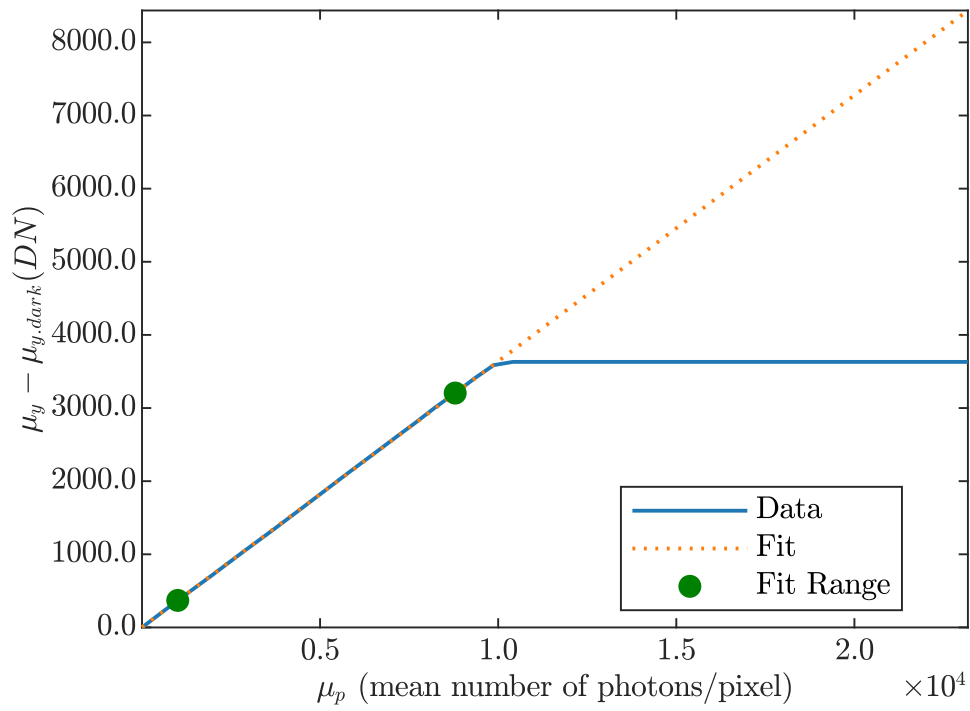
Stability check



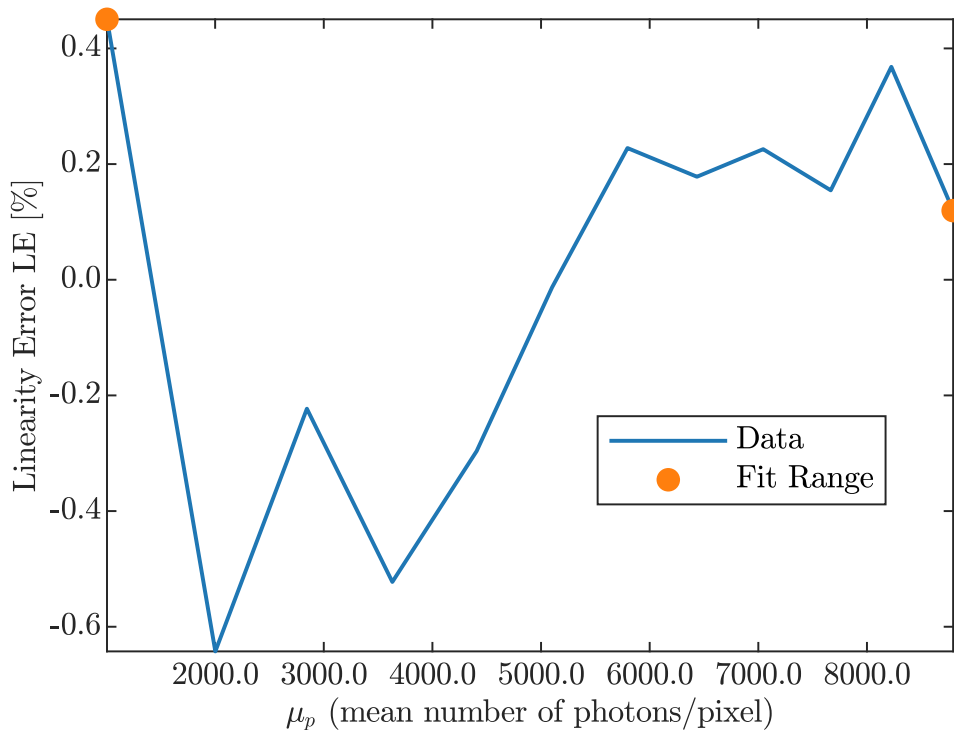
Sensitivity



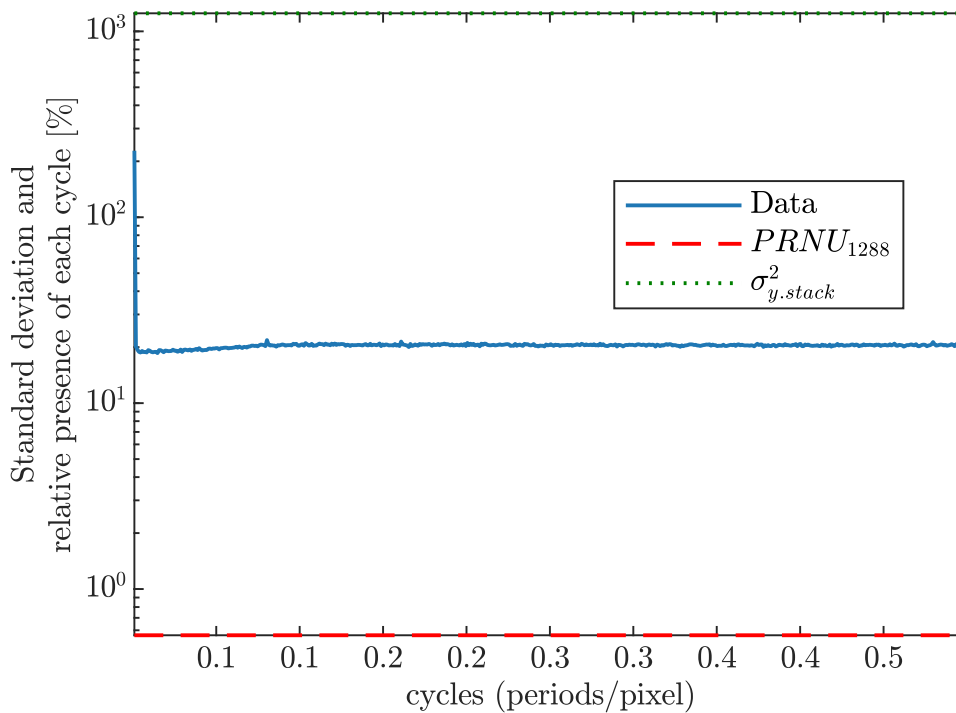
Linearity



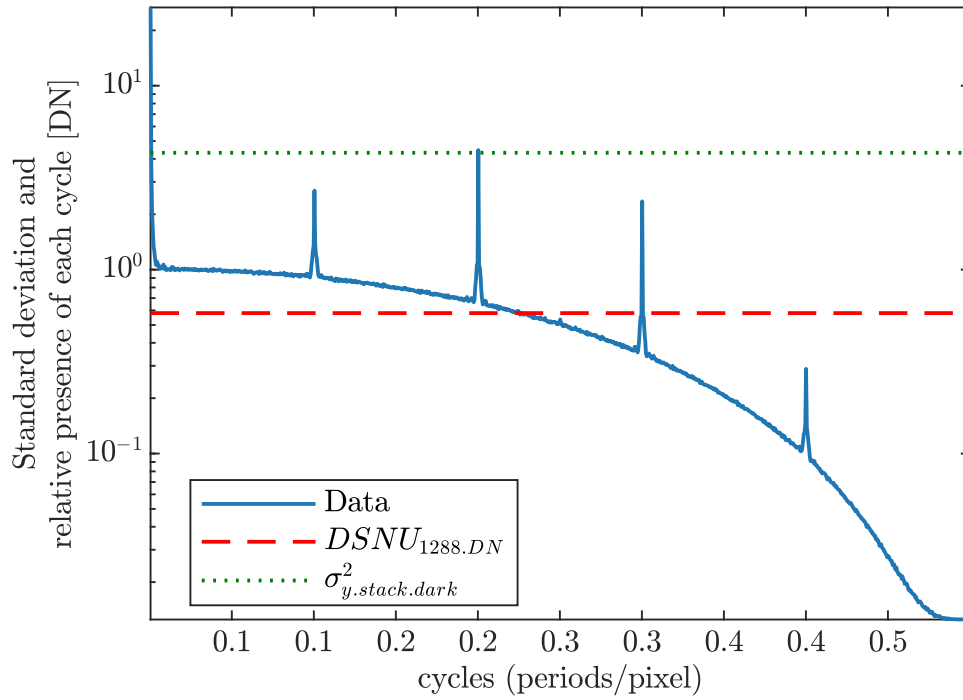
Deviation Linearity



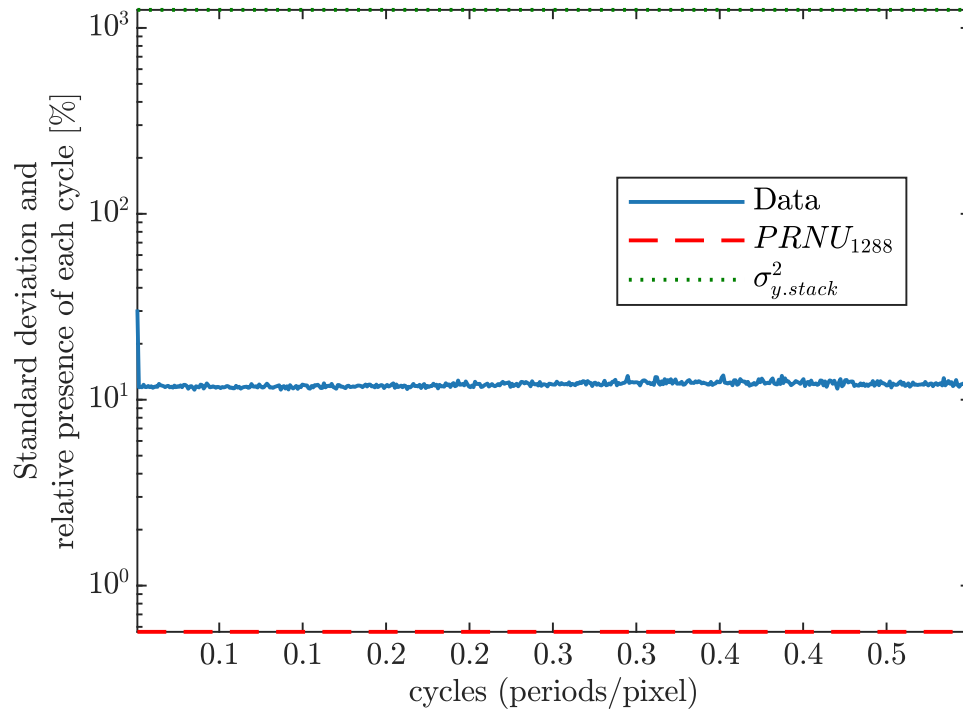
Horizontal Spectrogram PRNU



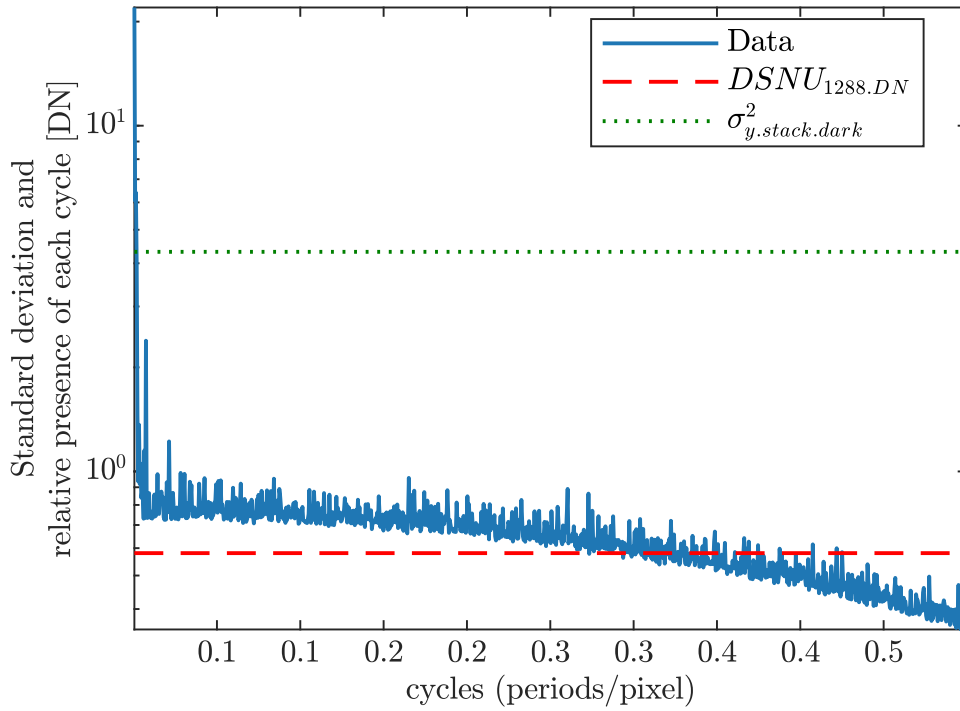
Horizontal Spectrogram DSNU



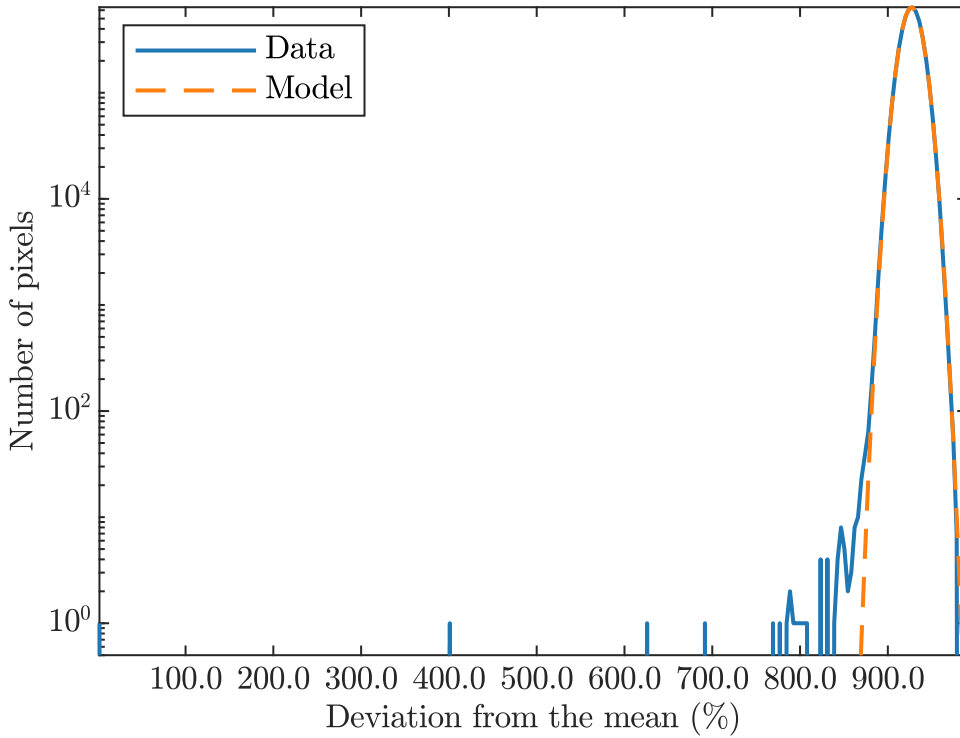
Vertical Spectrogram PRNU



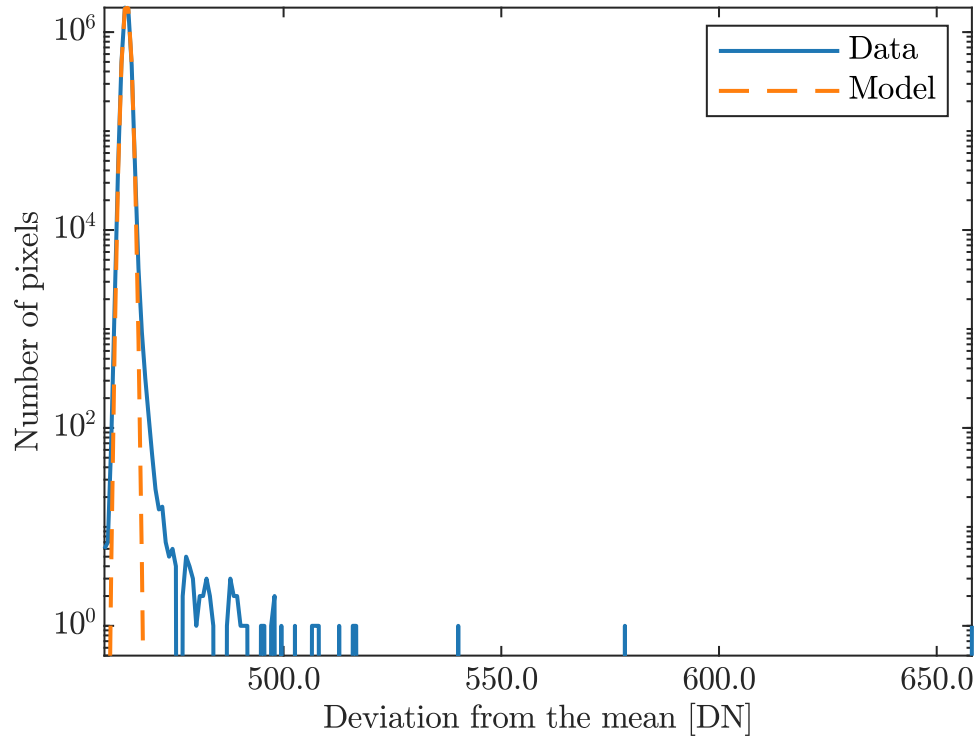
Vertical Spectrogram DSNU



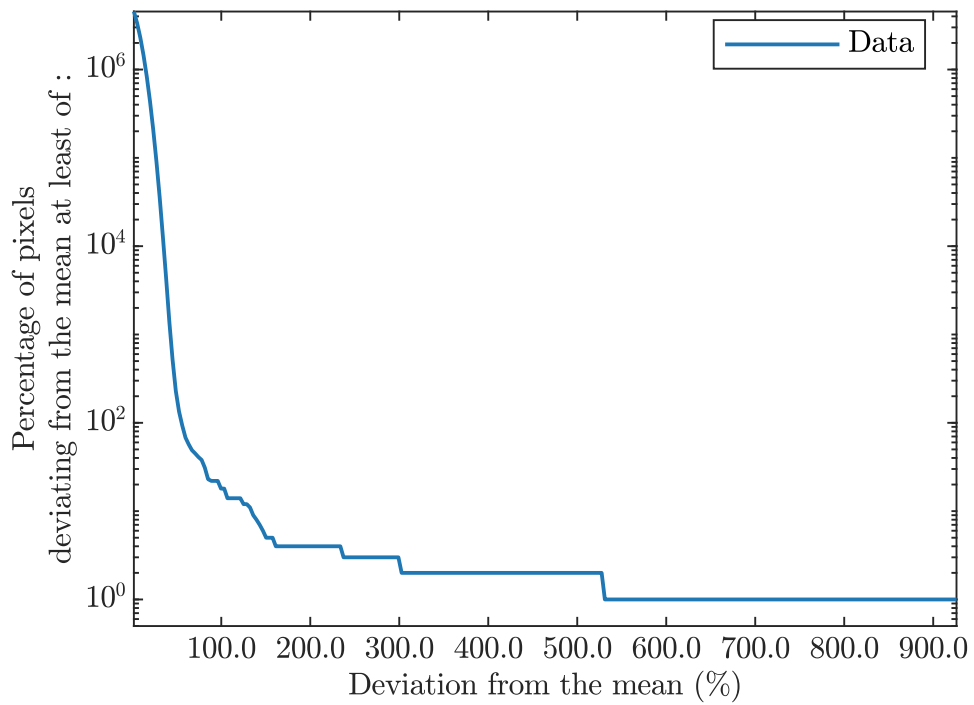
Logarithmic Histogram PRNU



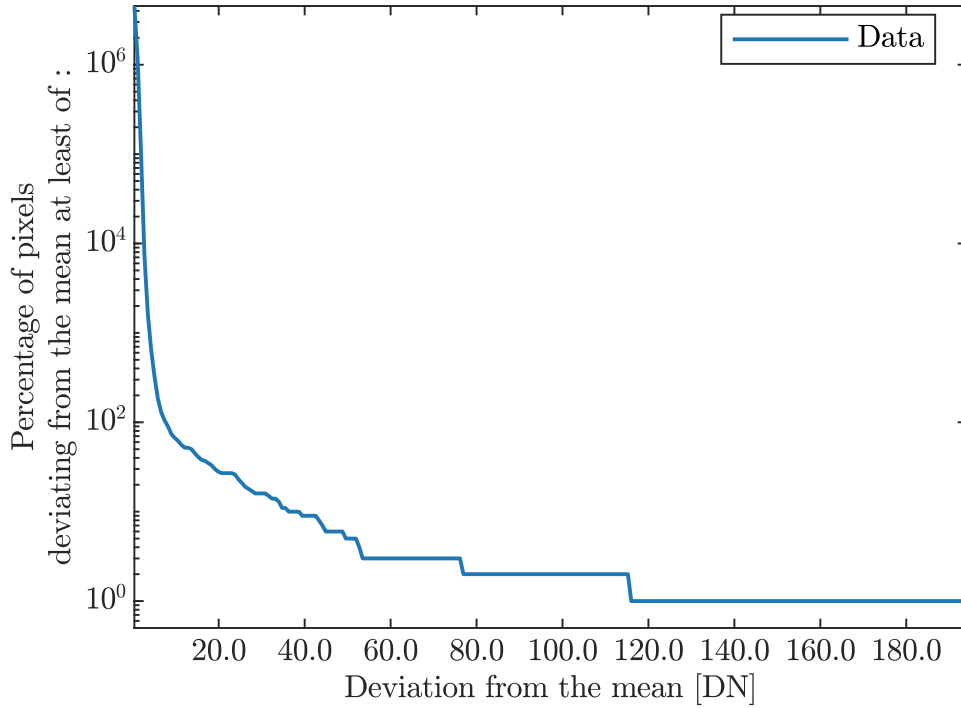
Logarithmic Histogram DSNU



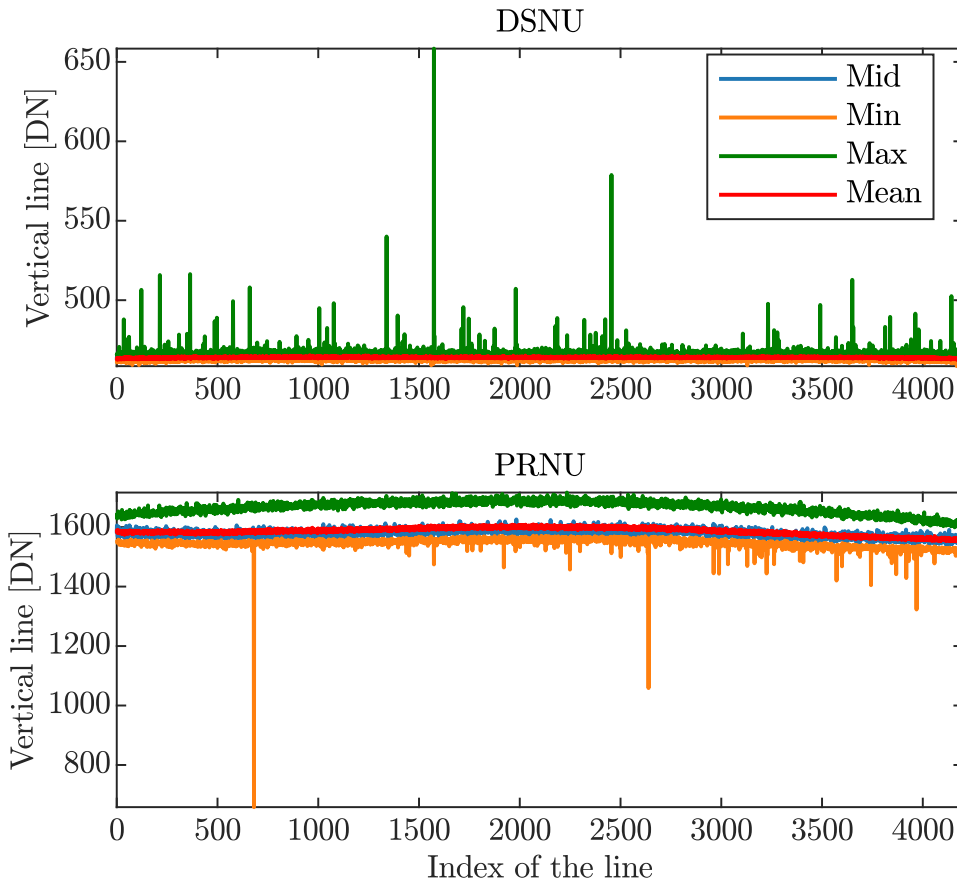
Accumulated Log Histogram PRNU



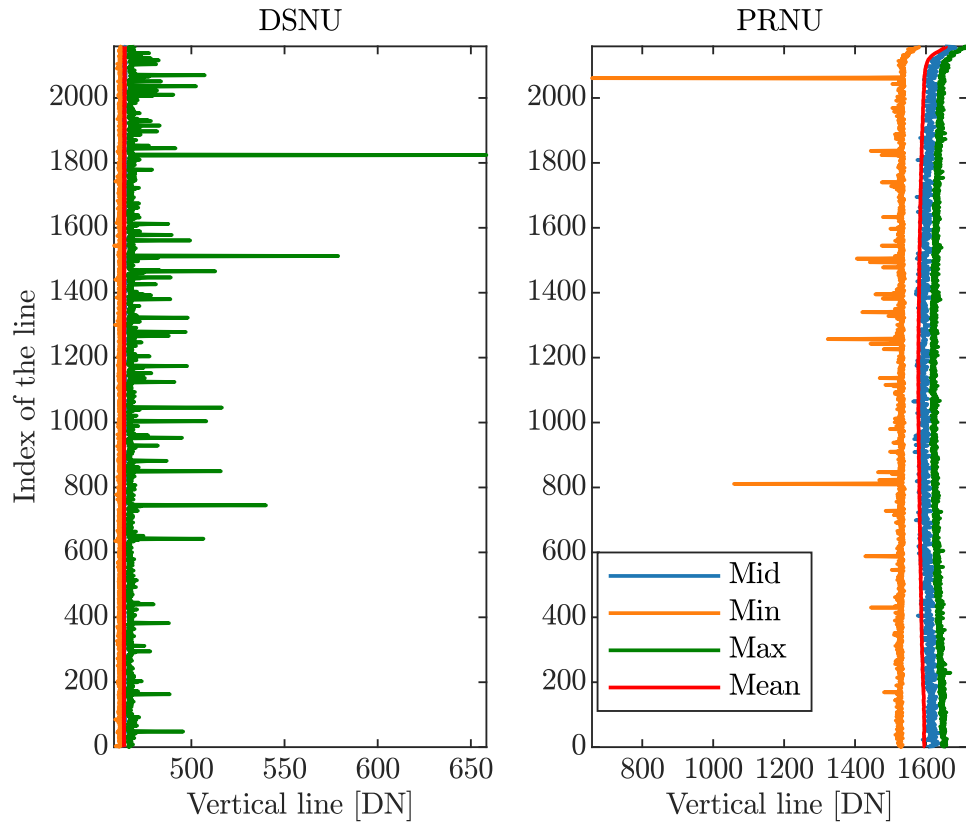
Accumulated Log Histogram DSNU



Horizontal Profile



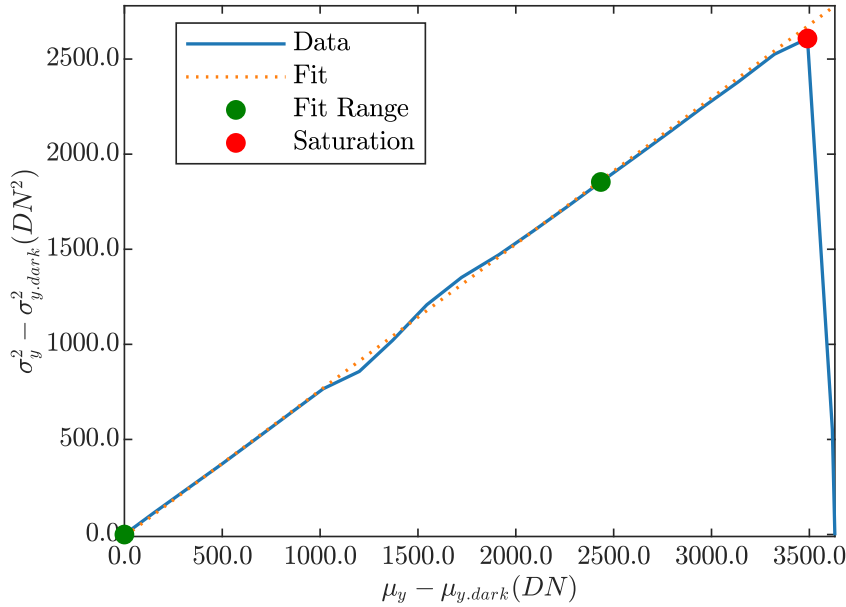
Vertical Profile



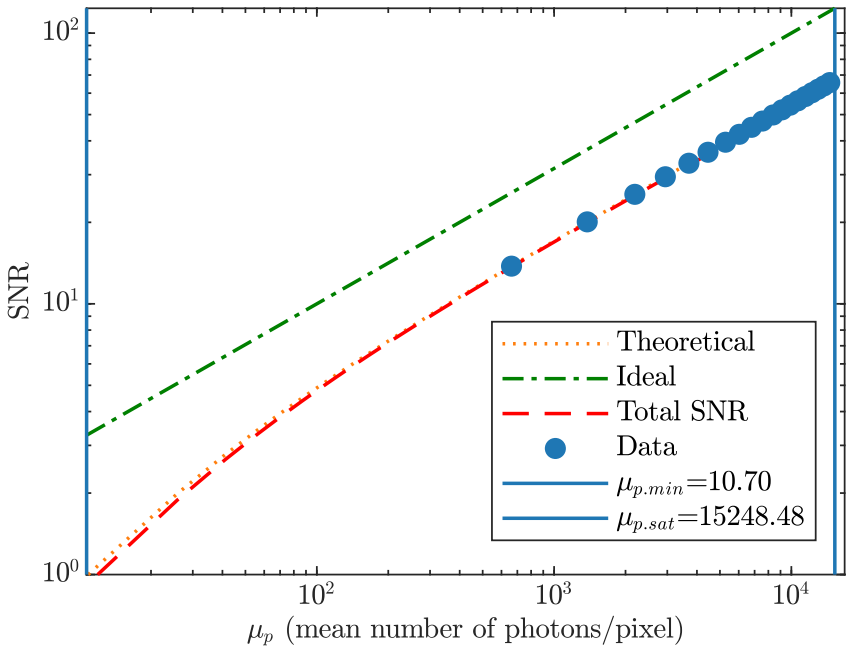
Summary Sheet for Operation Point 2 at a Wavelength of 632 nm

Camera setting		Operation point parameters	
Gain	2	Environmental temperature	23.12
Black level	-1032	Camera body temperature	41.62
		Sensor temperature	51
		Processor temperature	52

Photon Transfer



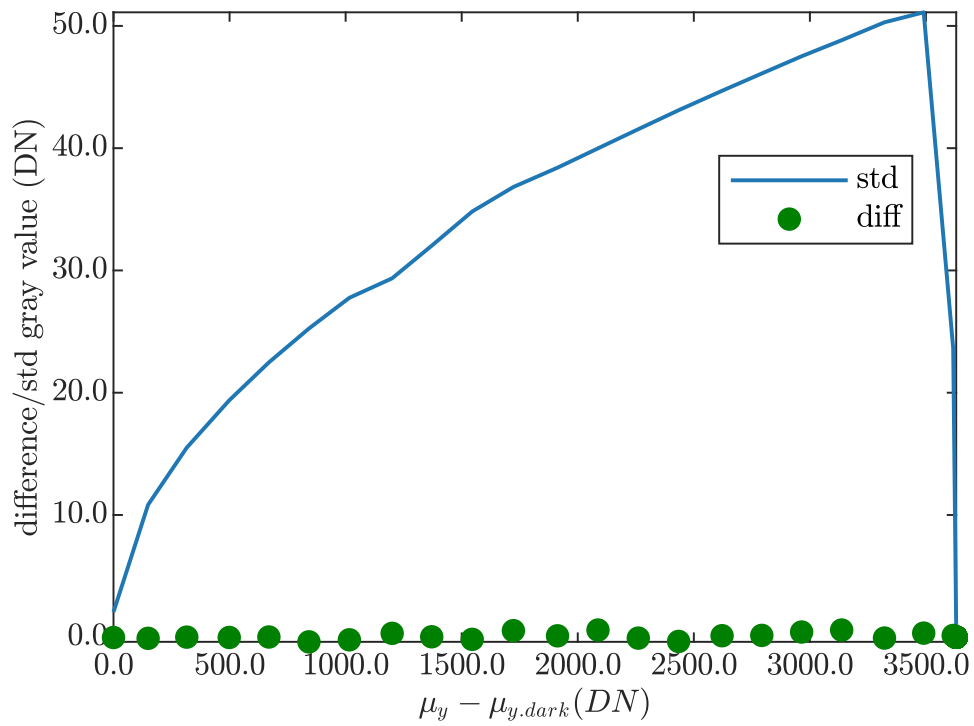
Signal-to-Noise Ratio



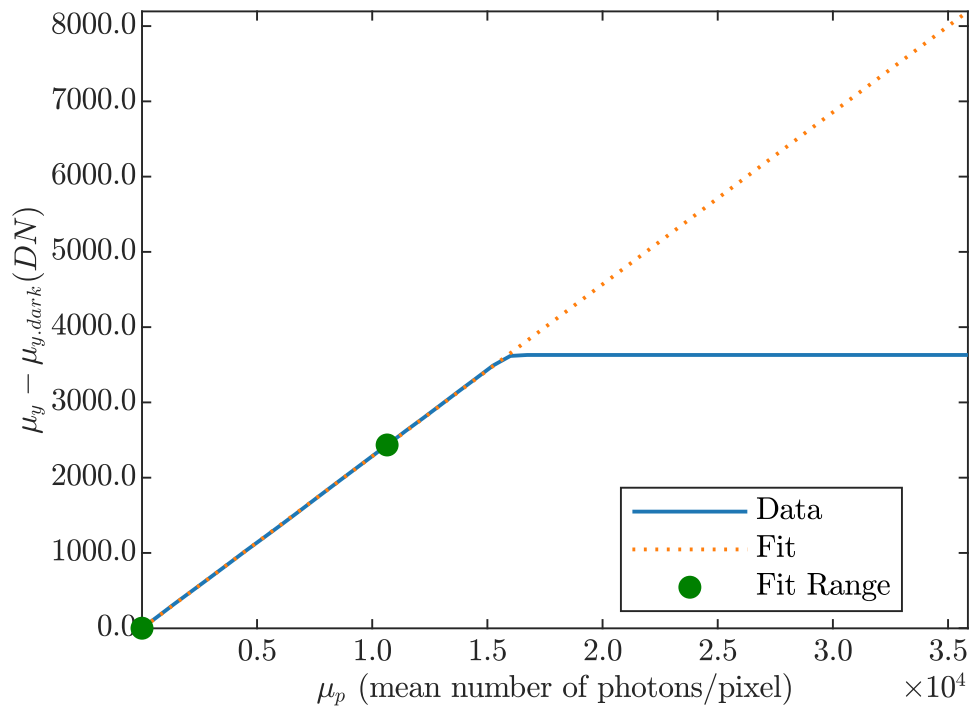
Performance

Quantum efficiency		
η	29.7419	%
System gain		
K	0.76867	DN/e ⁻
1/K	1.301	e ⁻ /DN
Temporal dark noise		
σ_d	2.6574	e ⁻
$\sigma_{y,dark}$	2.063	DN
Signal-to-noise ratio		
SNR _{max}	67.3437	
	36.5659	dB
	6.0735	bit
1/SNR _{max}	1.4849	%
Absolute sensitivity threshold		
$\mu_{e,min}$	3.1838	e ⁻
$\mu_{e,min,area}$	0.50941	e ⁻ /μm ²
Saturation capacity		
$\mu_{e,sat}$	4535.1793	e ⁻
$\mu_{e,sat,area}$	725.6287	e ⁻ /μm ²
Dynamic range		
DR	1424.4388	
	63.0729	dB
	10.4762	bit
Spatial nonuniformities		
DSNU ₁₂₈₈	1.3101	e ⁻
DSNU _{1288,col}	0.44973	e ⁻
DSNU _{1288,row}	1.1417	e ⁻
DSNU _{1288,pix}	0.45902	e ⁻
PRNU ₁₂₈₈	0.53699	%
PRNU _{1288,col}	0.12645	%
PRNU _{1288,row}	0.053726	%
PRNU _{1288,pix}	0.51912	%
Linearity error		
LE	0.0012653	%
Dark current		
$\mu_{l,mean}$	12.2243	e ⁻ /s
$\mu_{l,var}$	2.2072	e ⁻ /s

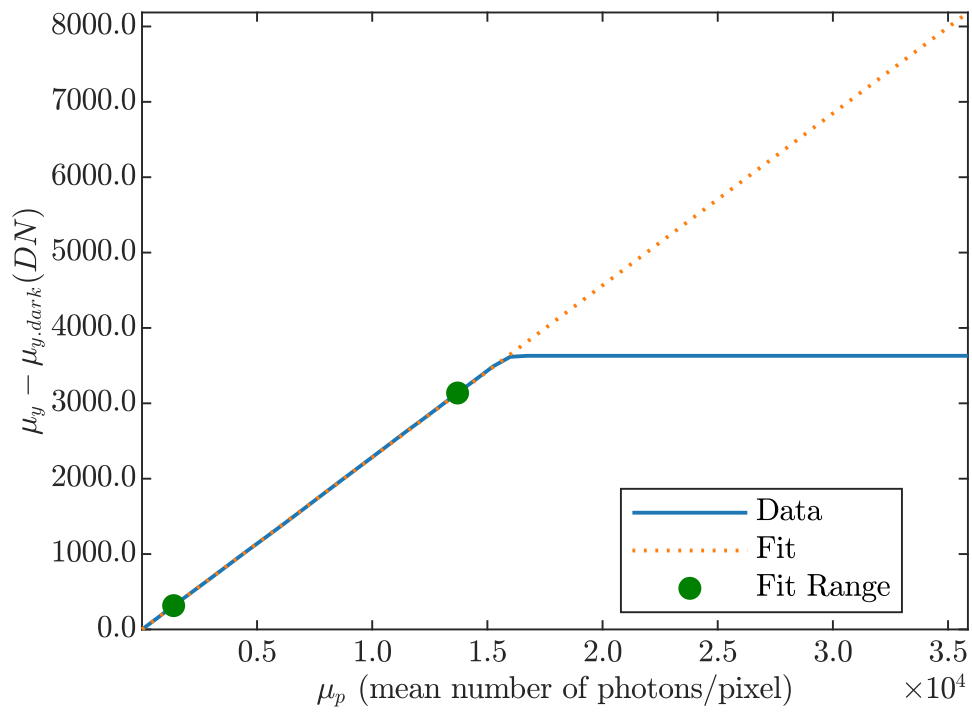
Stability check



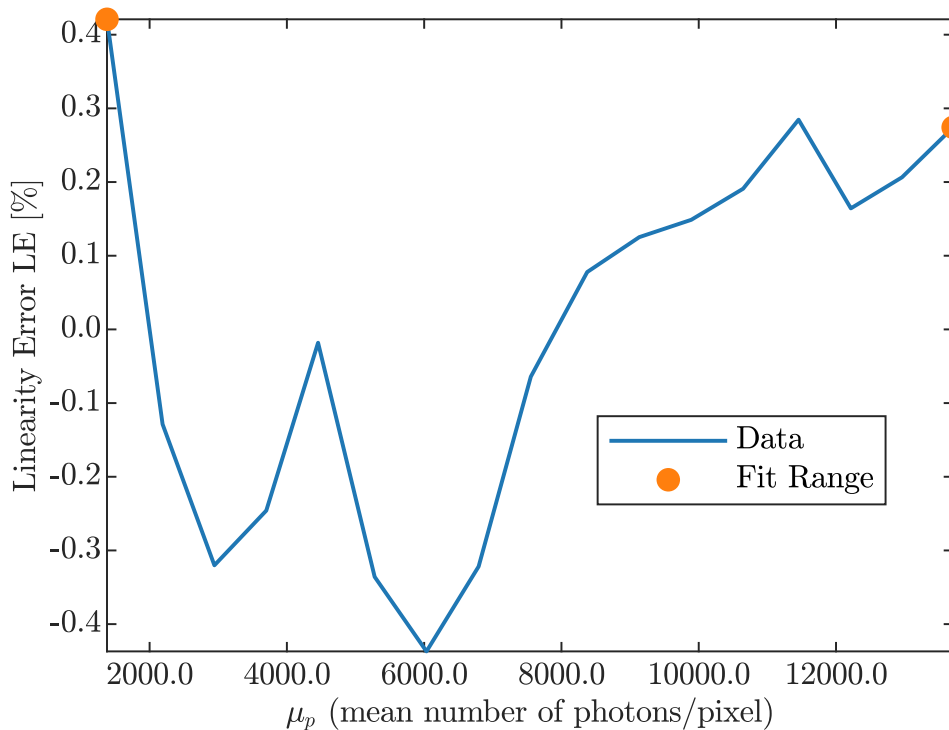
Sensitivity



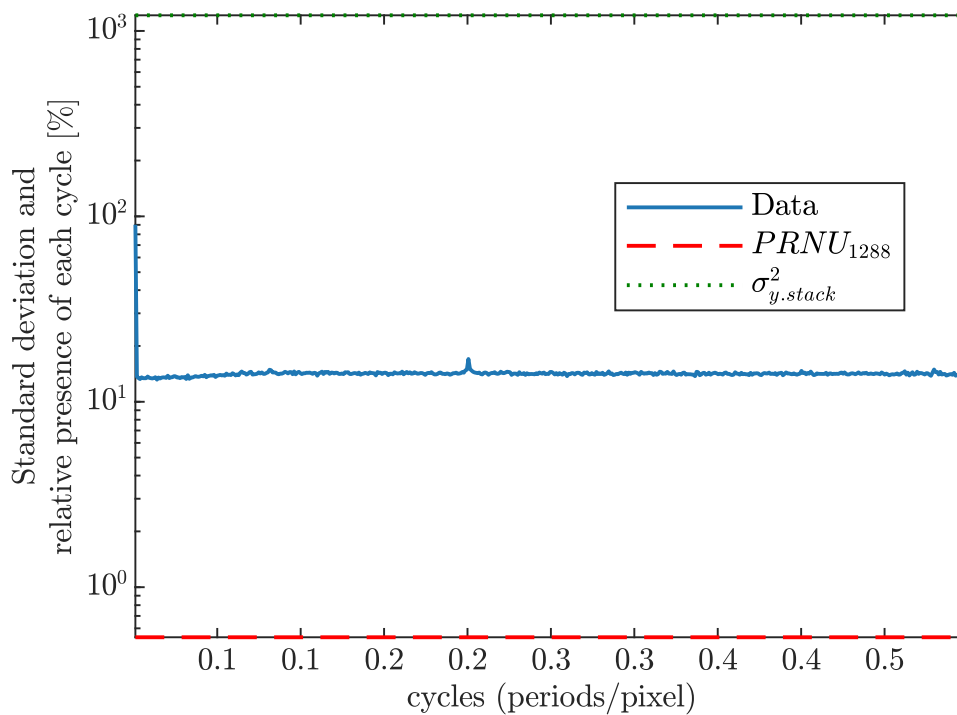
Linearity



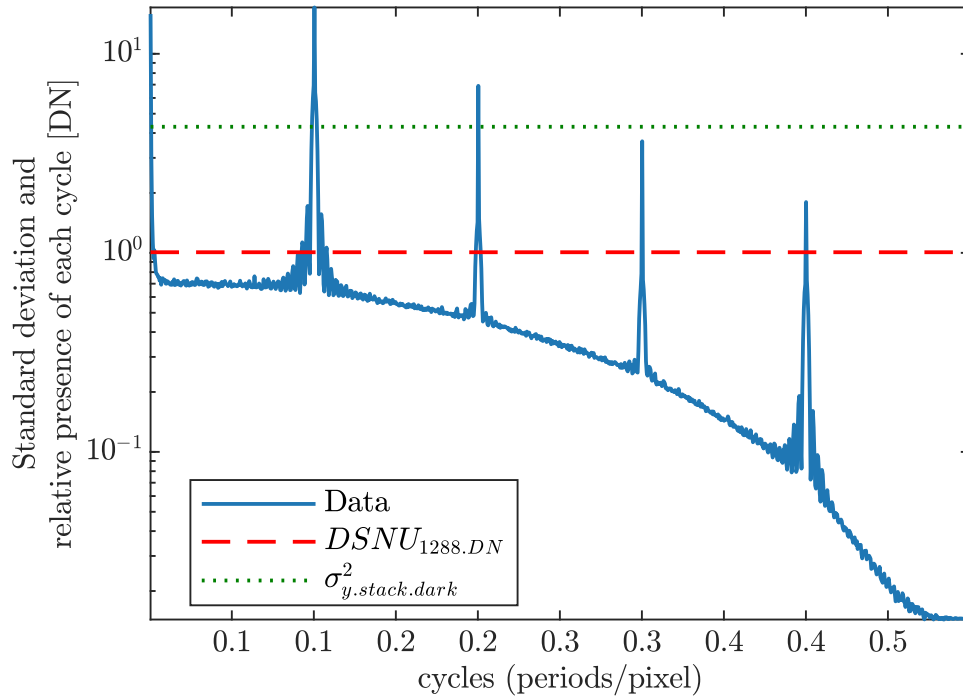
Deviation Linearity



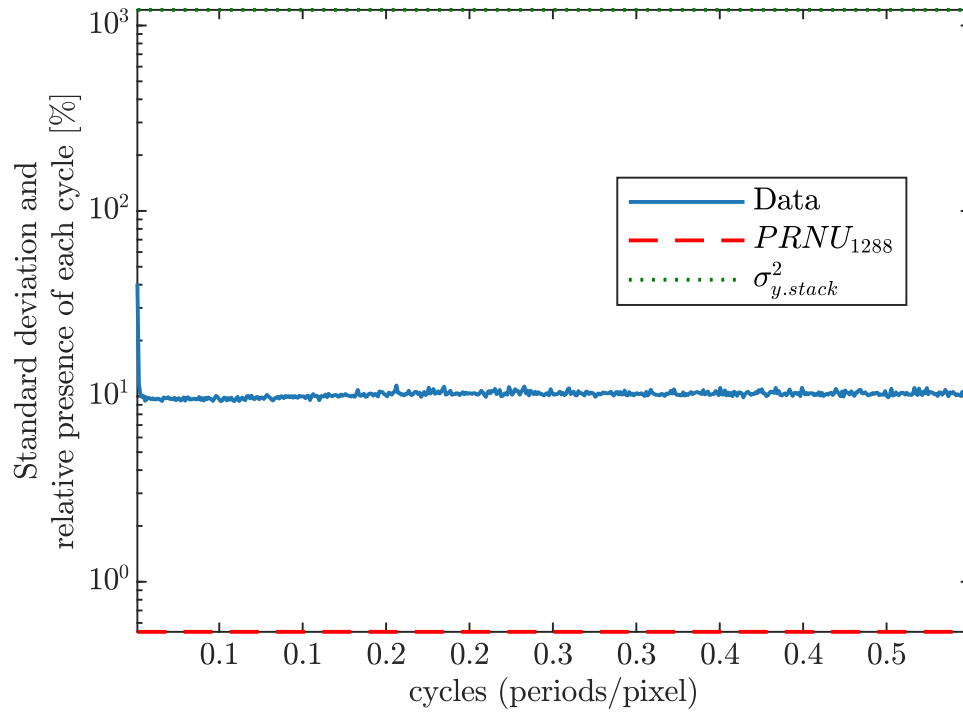
Horizontal Spectrogram PRNU



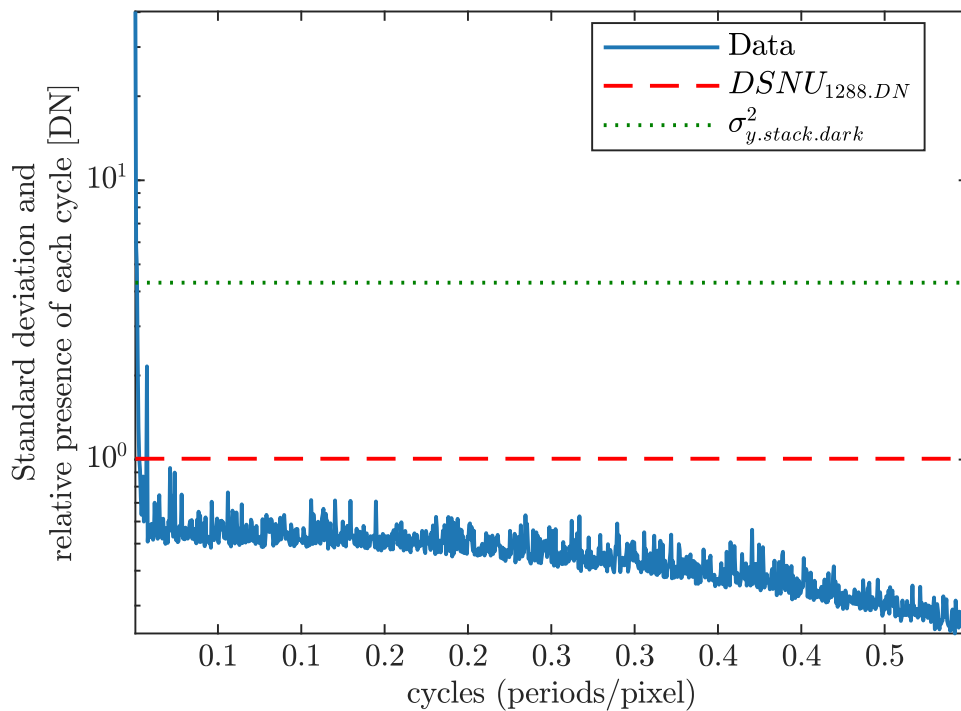
Horizontal Spectrogram DSNU



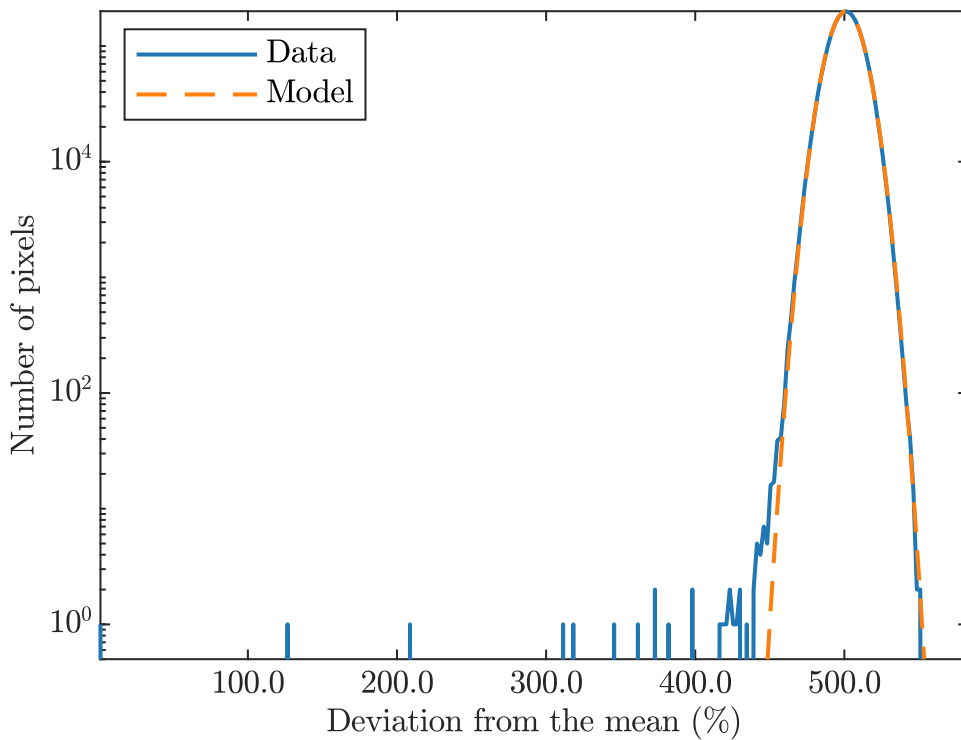
Vertical Spectrogram PRNU



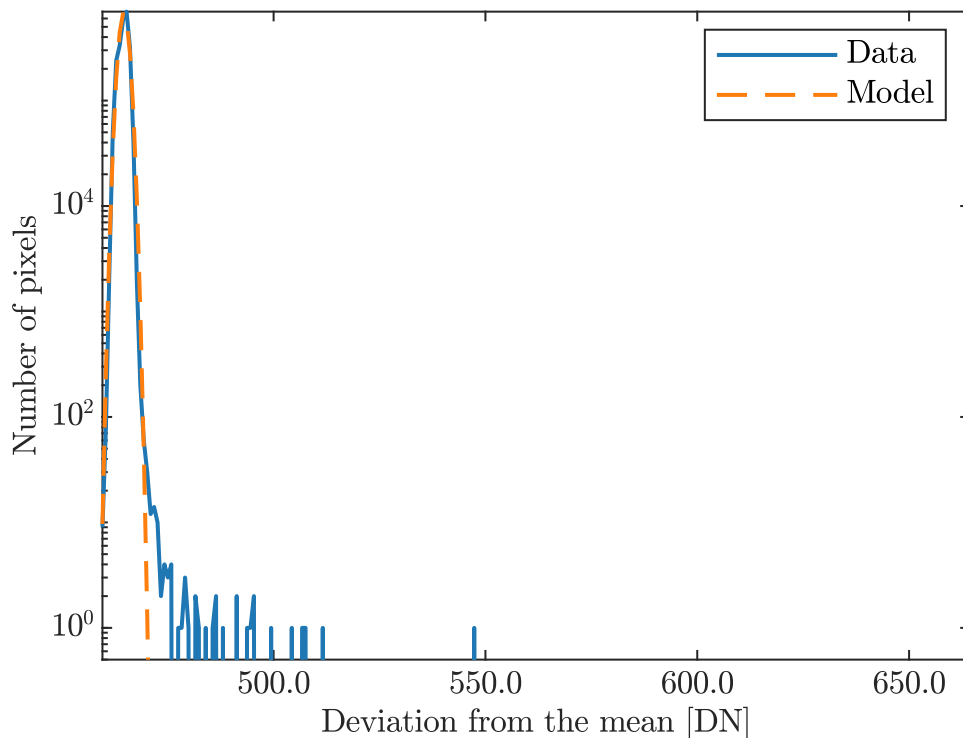
Vertical Spectrogram DSNU



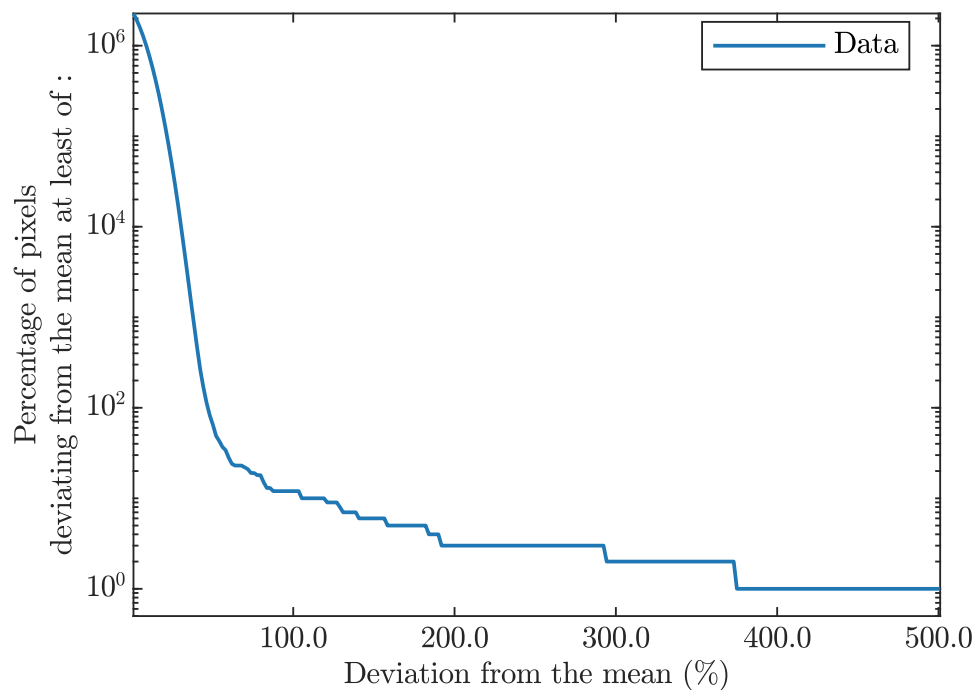
Logarithmic Histogram PRNU



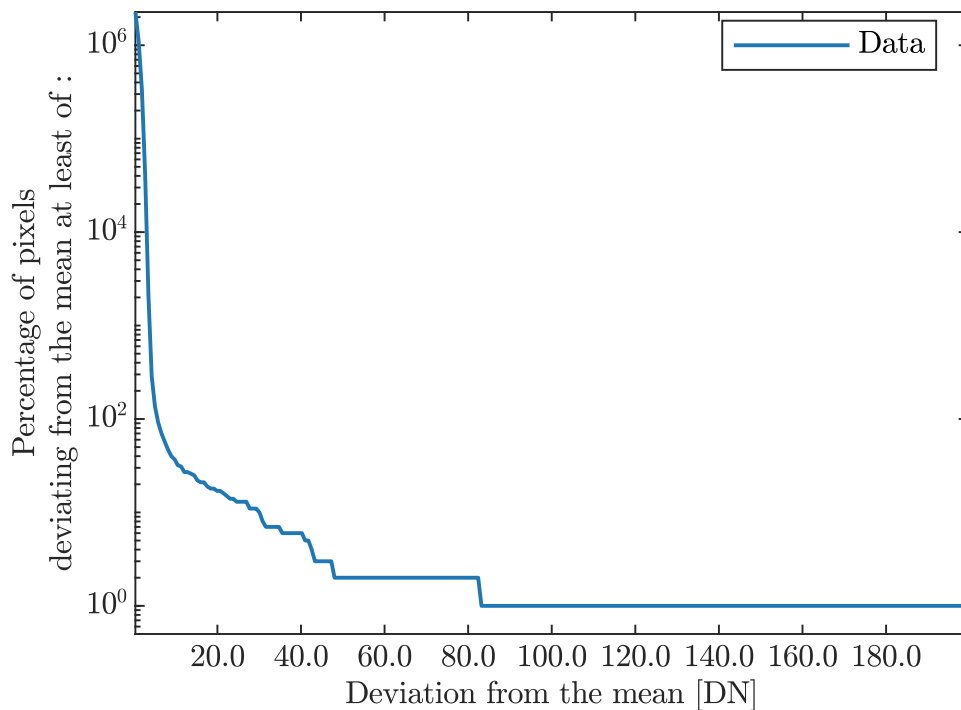
Logarithmic Histogram DSNU



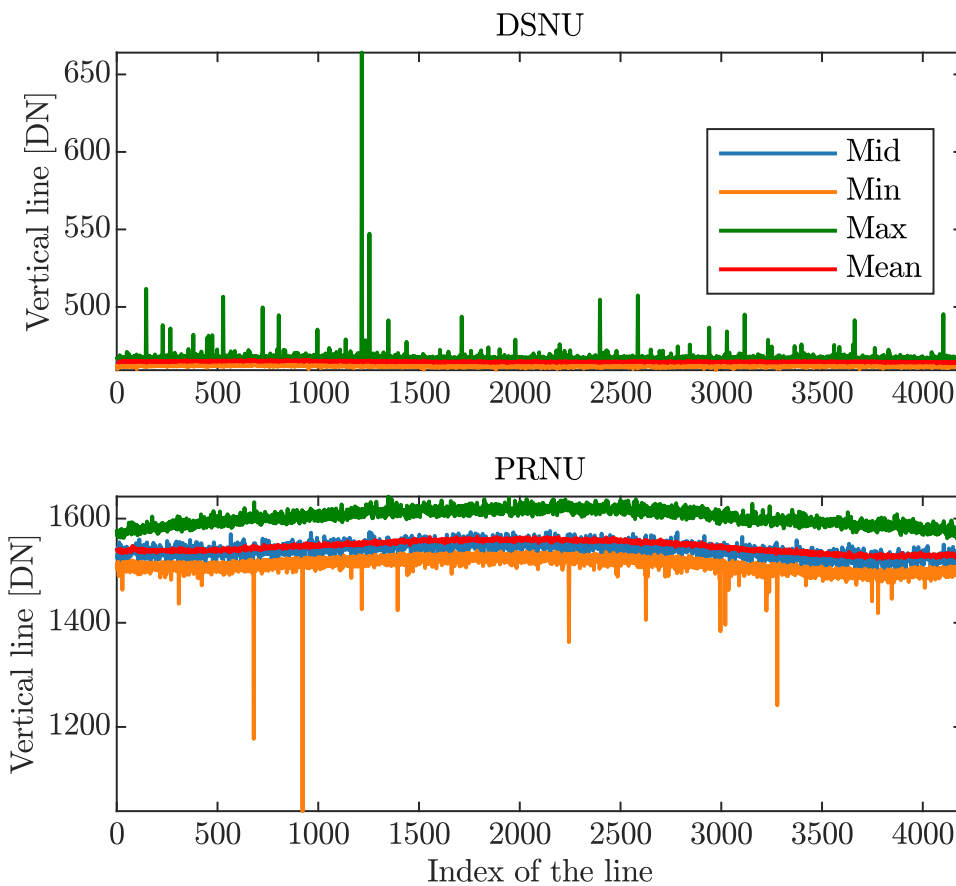
Accumulated Log Histogram PRNU



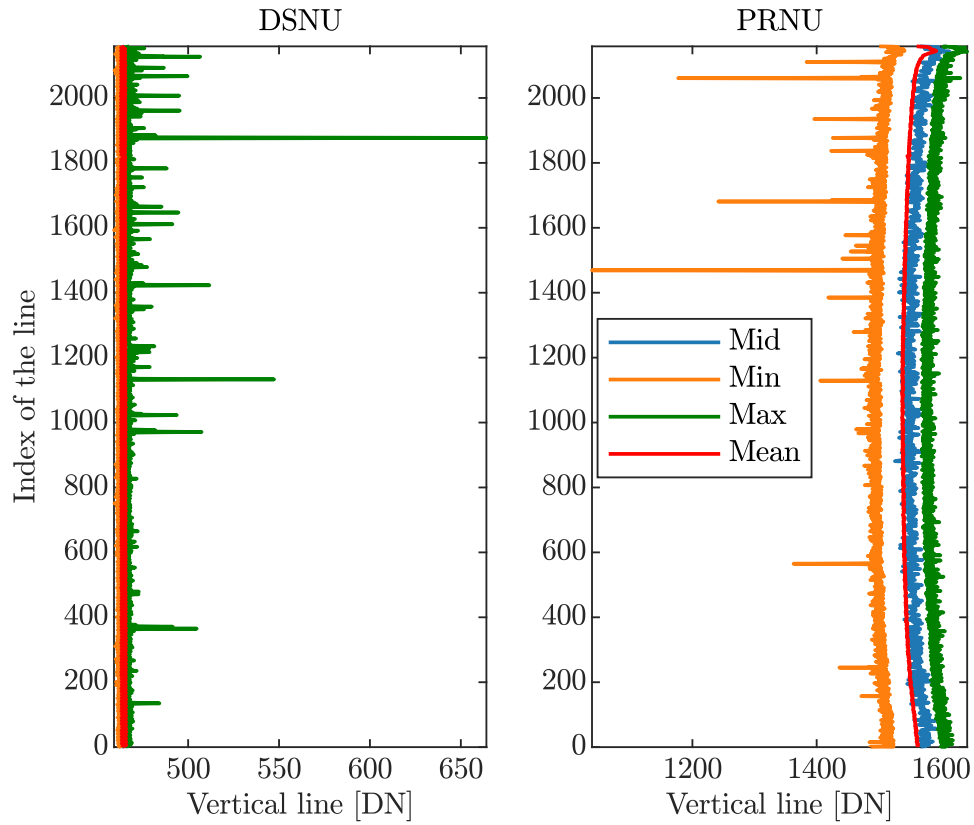
Accumulated Log Histogram DSNU



Horizontal Profile



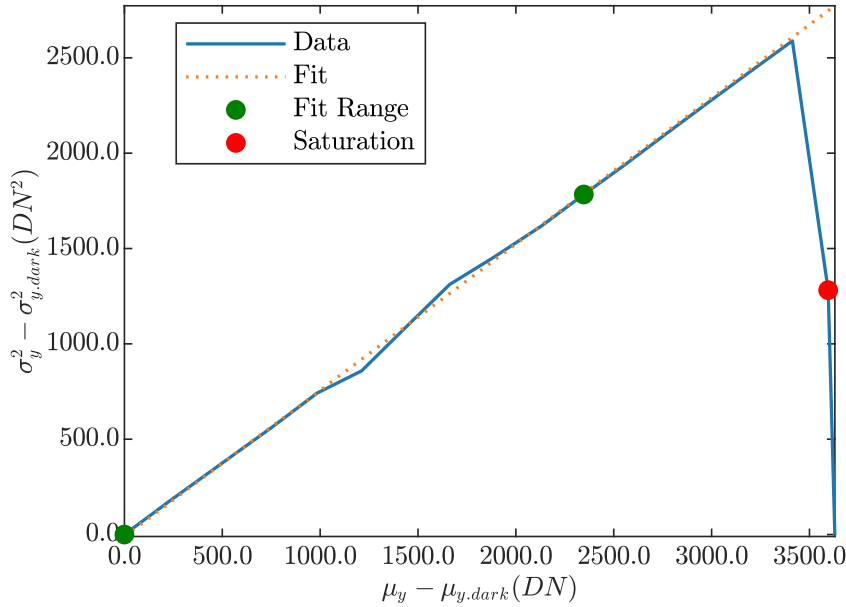
Vertical Profile



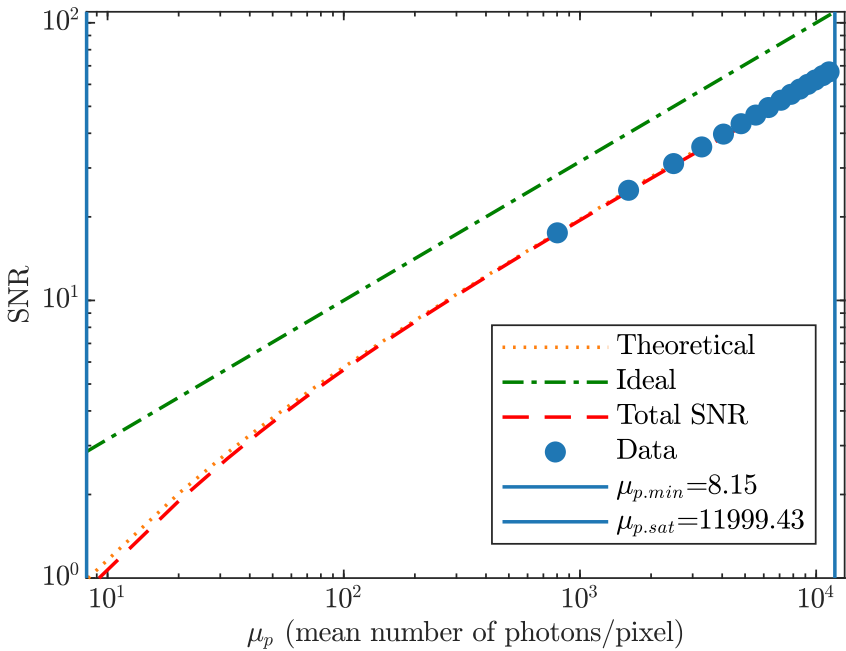
Summary Sheet for Operation Point 3 at a Wavelength of 448 nm

Camera setting		Operation point parameters	
Gain	2	Environmental temperature	23.18
Black level	-1032	Camera body temperature	41.75
		Sensor temperature	50
		Processor temperature	51

Photon Transfer

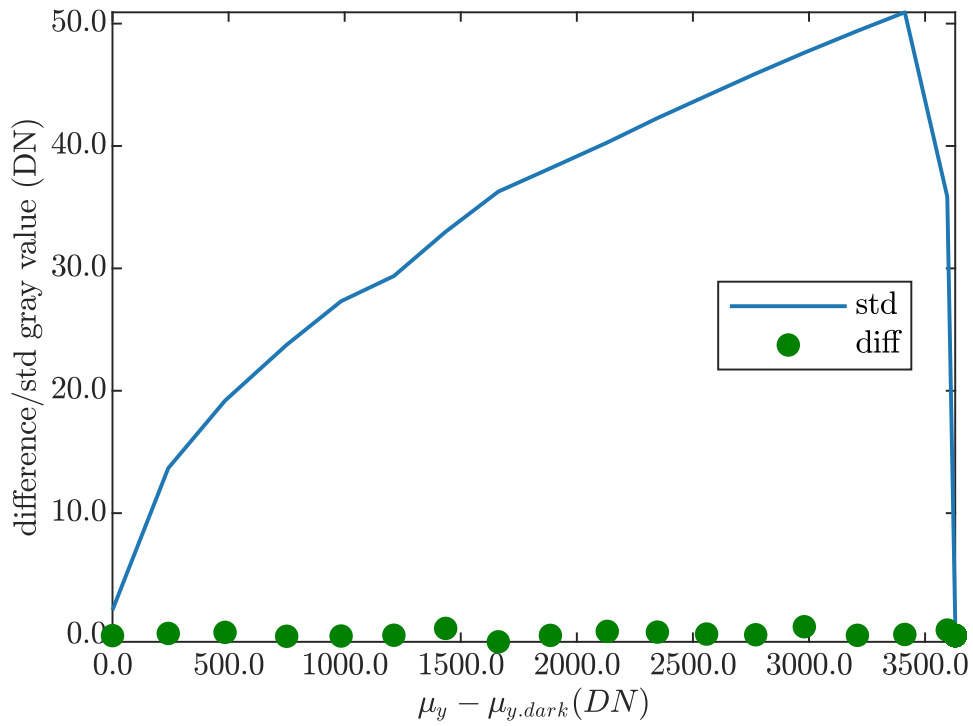


Signal-to-Noise Ratio

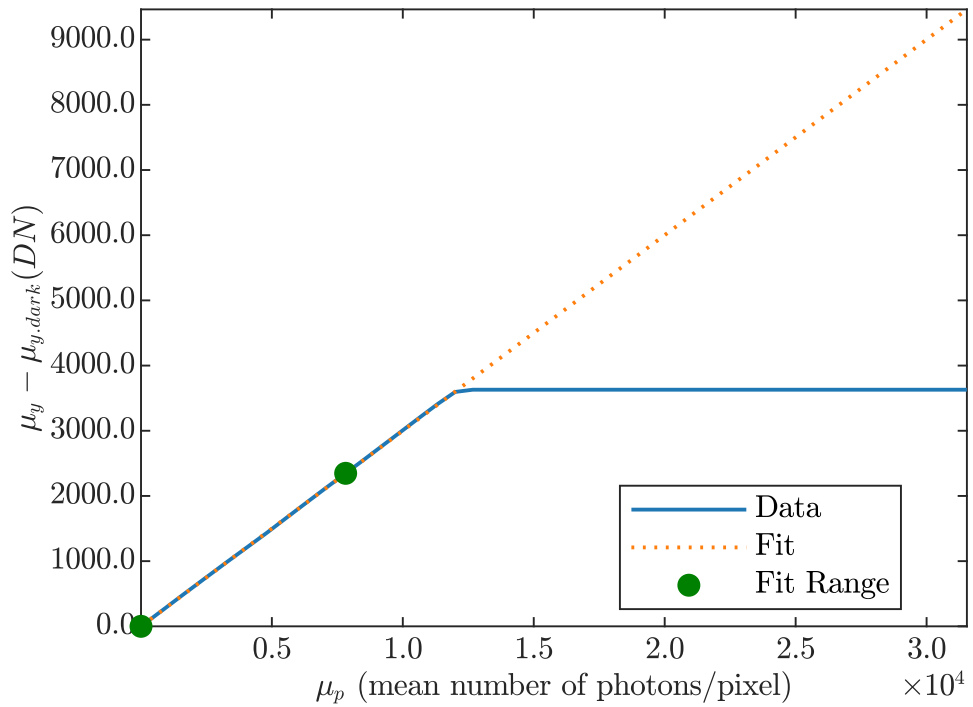


Performance		
Quantum efficiency		
η	39.1372	%
System gain		
K	0.76678	DN/e ⁻
1/K	1.3042	e ⁻ /DN
Temporal dark noise		
σ_d	2.664	e ⁻
$\sigma_{y,dark}$	2.063	DN
Signal-to-noise ratio		
SNR _{max}	68.5292	
	36.7175	dB
	6.0986	bit
1/SNR _{max}	1.4592	%
Absolute sensitivity threshold		
$\mu_{e,min}$	3.1904	e ⁻
$\mu_{e,min,area}$	0.51047	e ⁻ /μm ²
Saturation capacity		
$\mu_{e,sat}$	4696.245	e ⁻
$\mu_{e,sat,area}$	751.3992	e ⁻ /μm ²
Dynamic range		
DR	1471.9718	
	63.358	dB
	10.5235	bit
Spatial nonuniformities		
DSNU ₁₂₈₈	1.4162	e ⁻
DSNU _{1288,col}	0.47271	e ⁻
DSNU _{1288,row}	1.1527	e ⁻
DSNU _{1288,pix}	0.67338	e ⁻
PRNU ₁₂₈₈	0.54064	%
PRNU _{1288,col}	0.12829	%
PRNU _{1288,row}	0.049322	%
PRNU _{1288,pix}	0.52288	%
Linearity error		
LE	0.0015769	%
Dark current		
$\mu_{l,mean}$	12.2243	e ⁻ /s
$\mu_{l,var}$	2.2072	e ⁻ /s

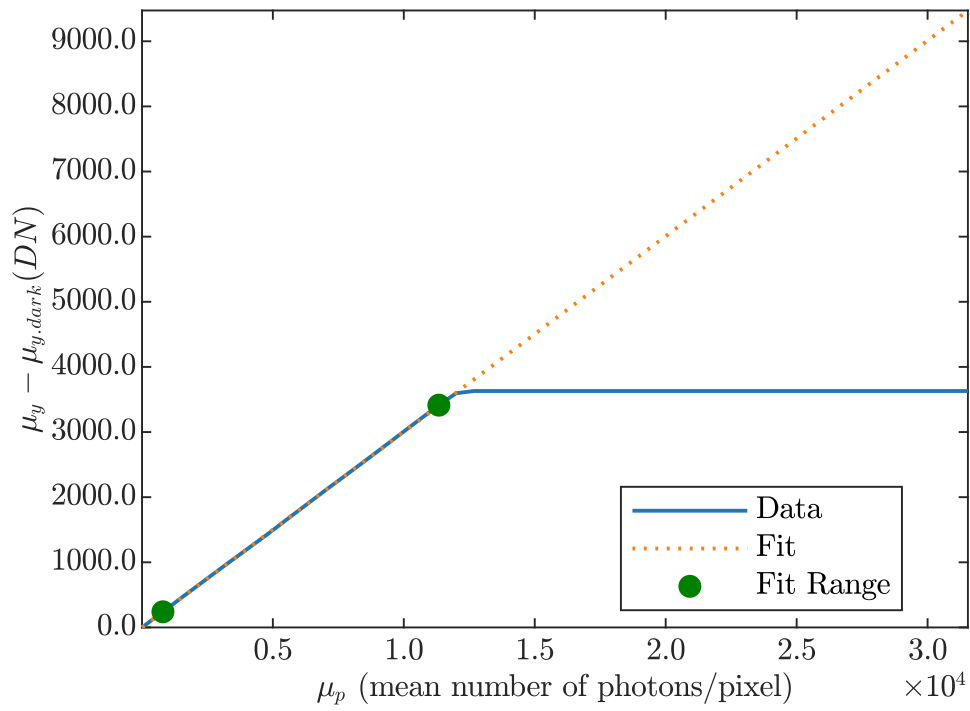
Stability check



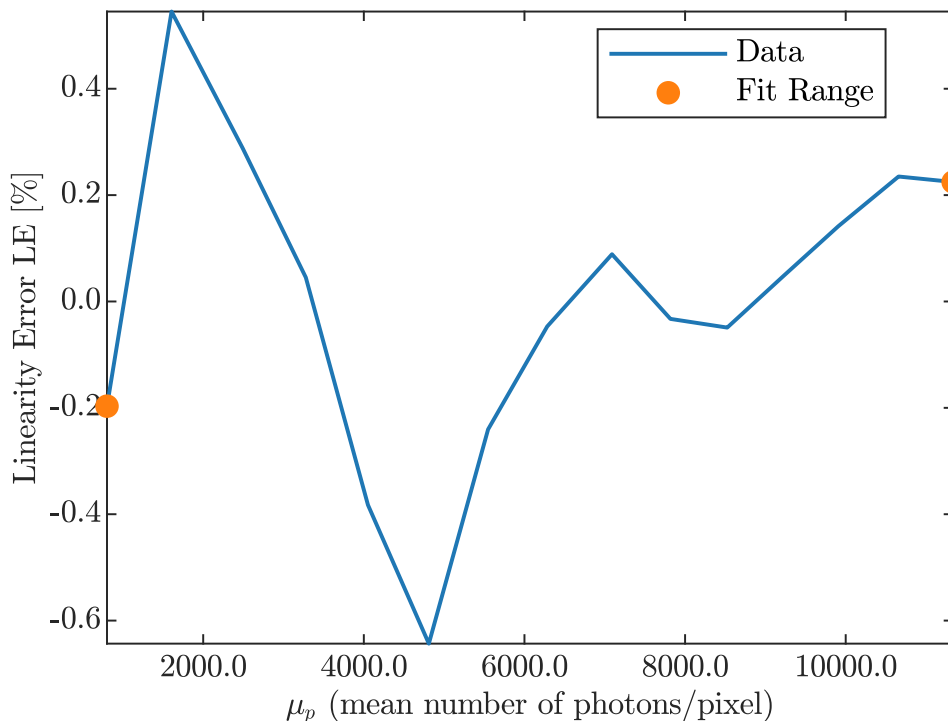
Sensitivity



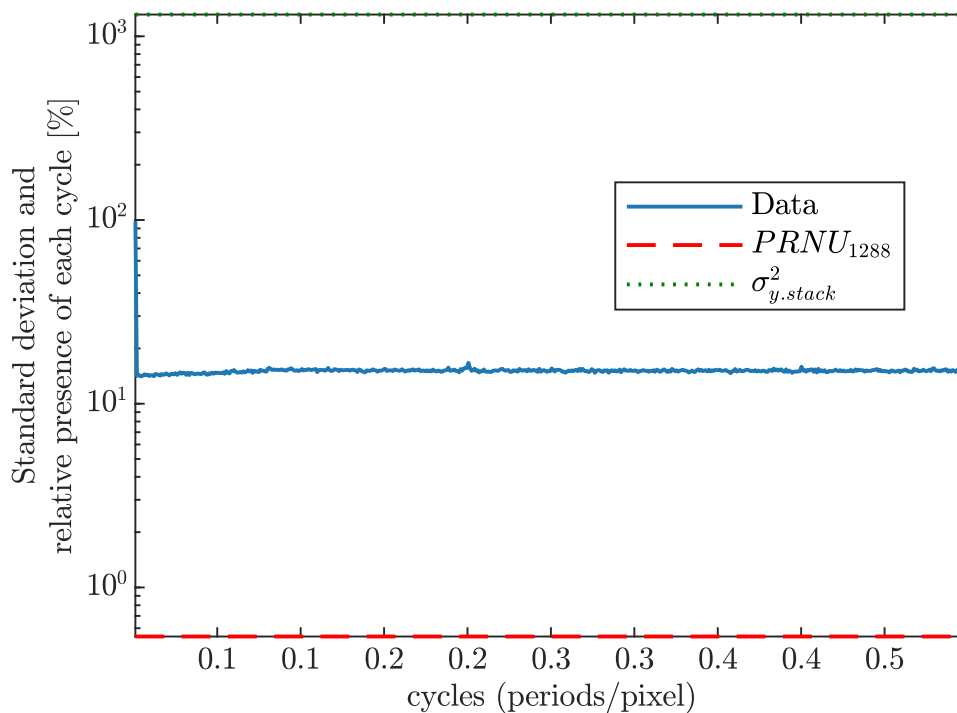
Linearity



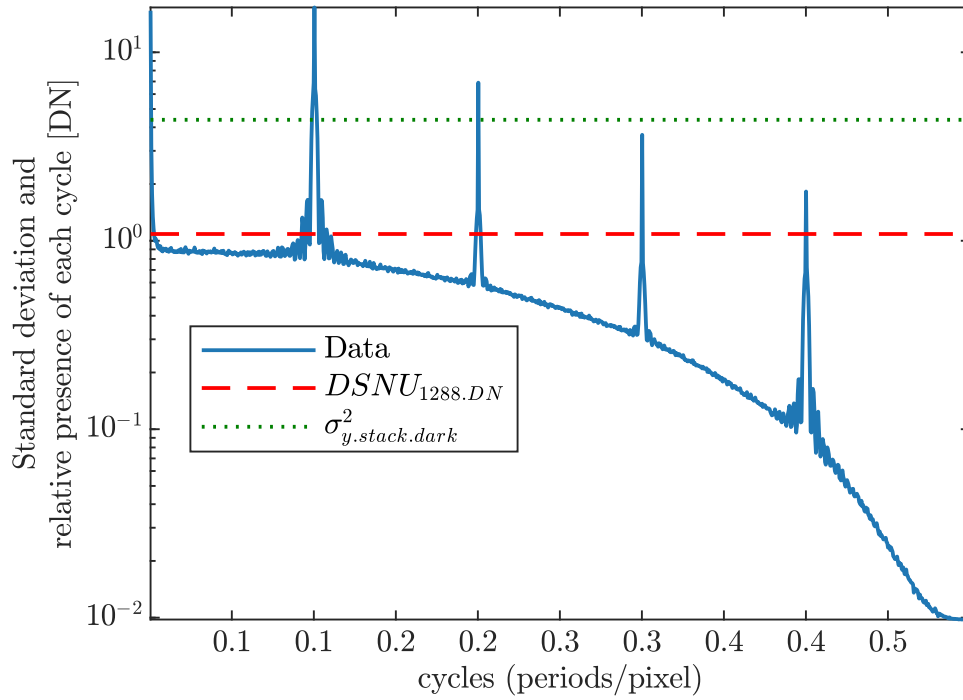
Deviation Linearity



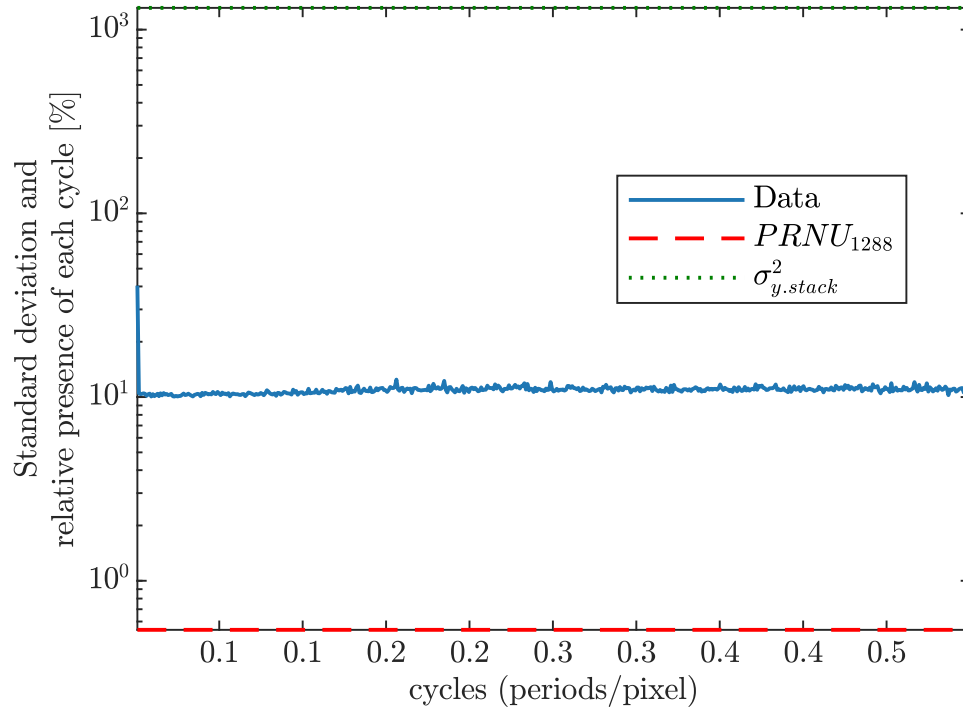
Horizontal Spectrogram PRNU



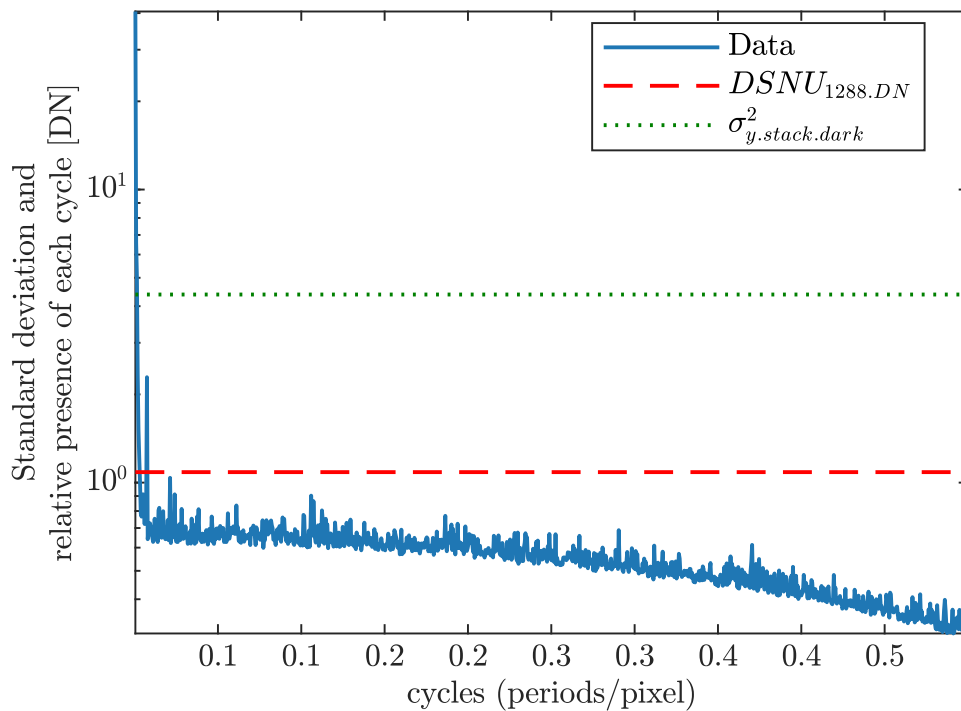
Horizontal Spectrogram DSNU



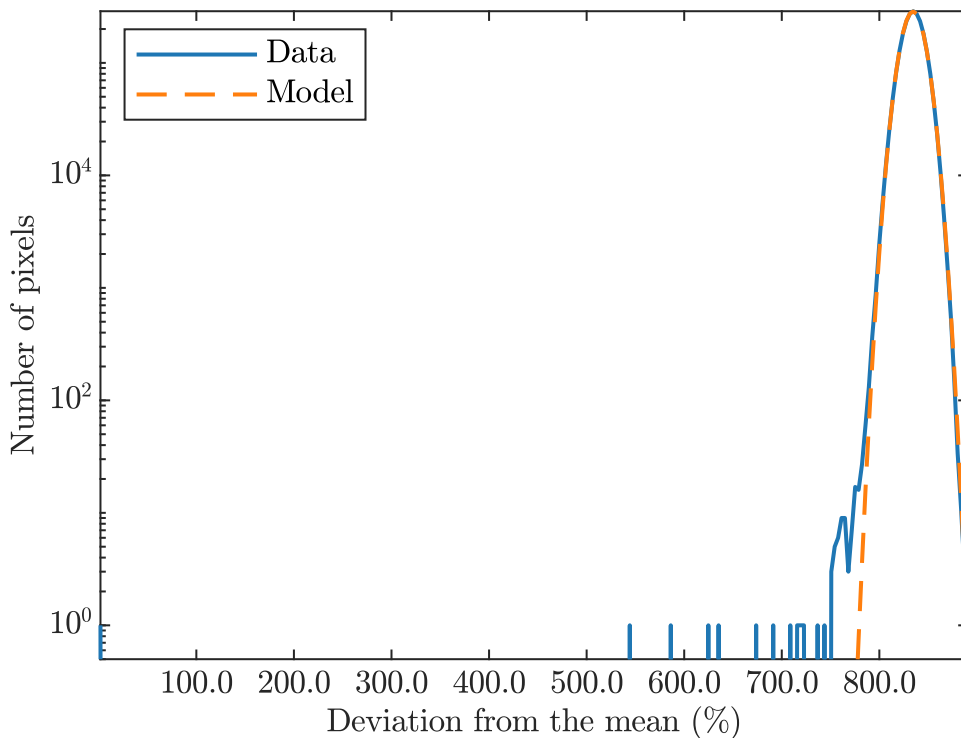
Vertical Spectrogram PRNU



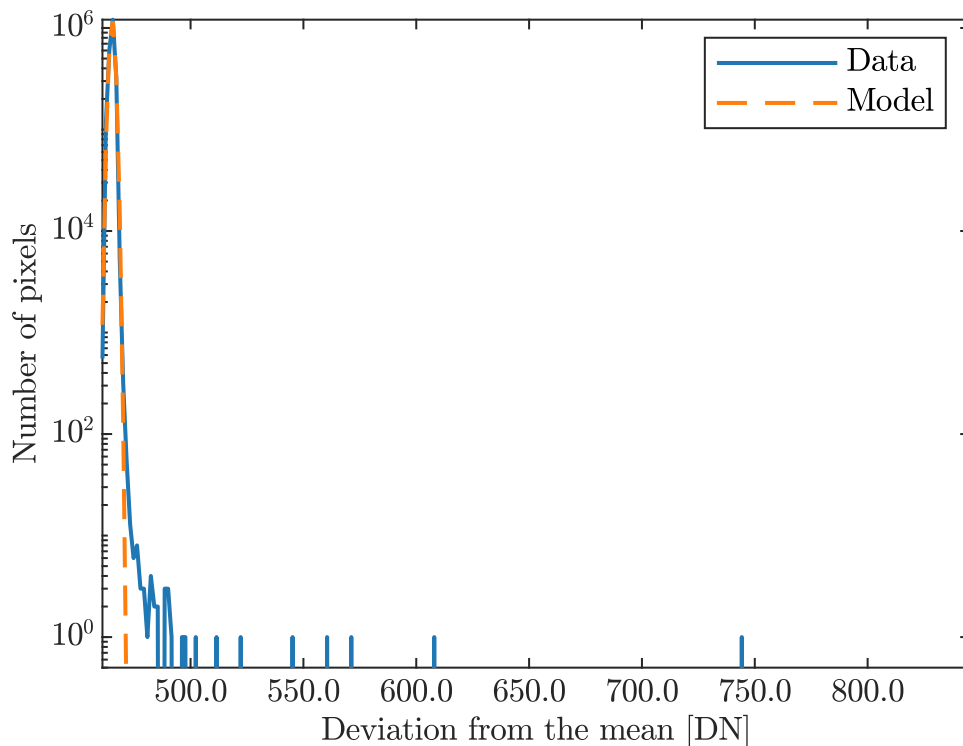
Vertical Spectrogram DSNU



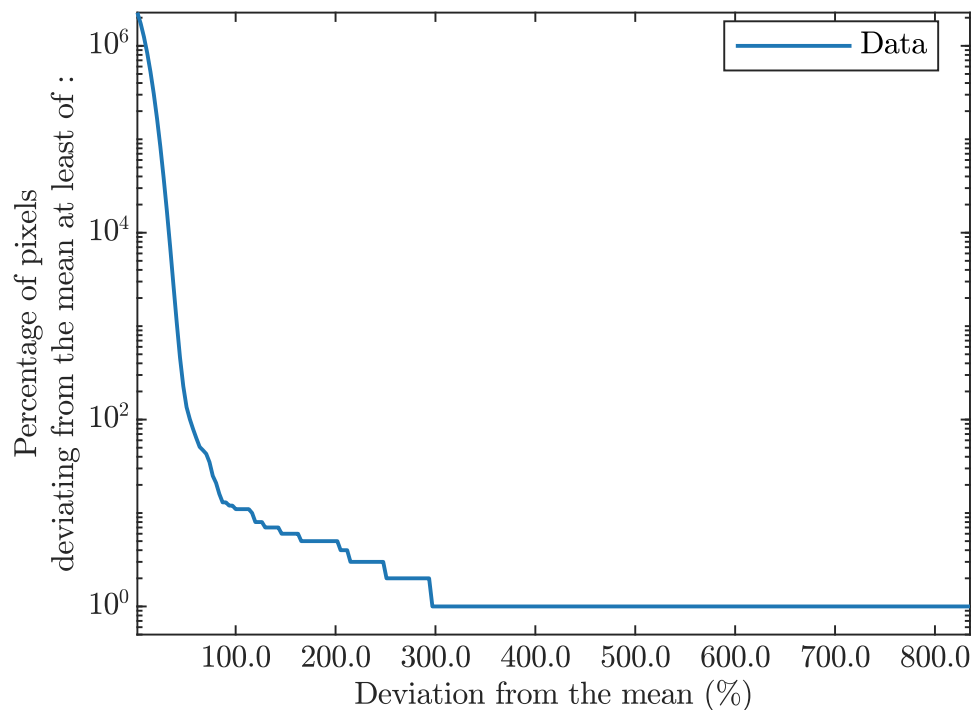
Logarithmic Histogram PRNU



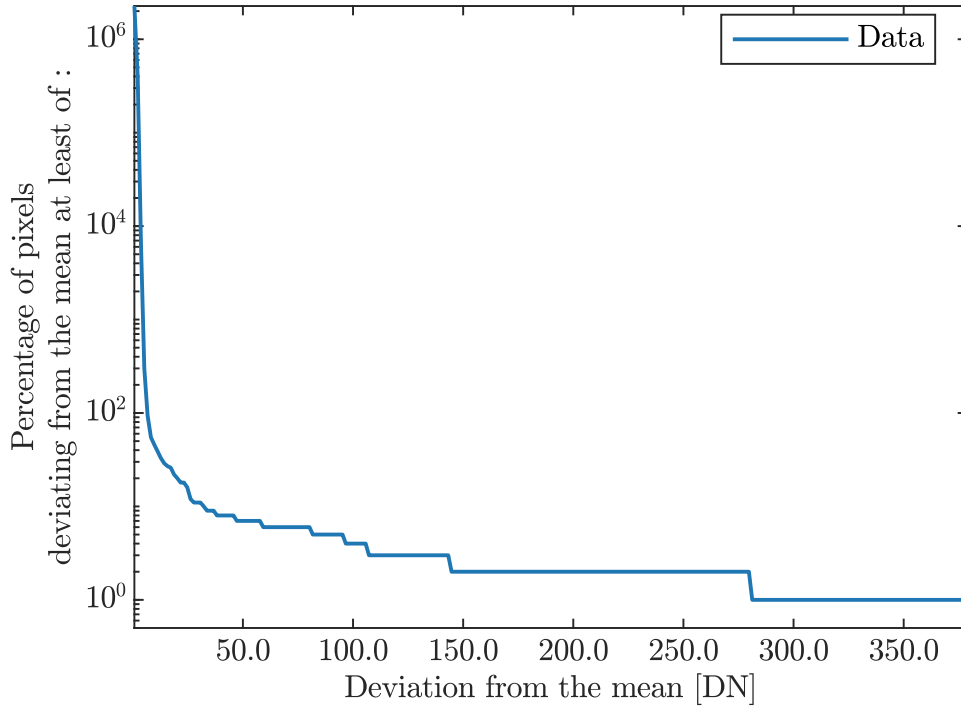
Logarithmic Histogram DSNU



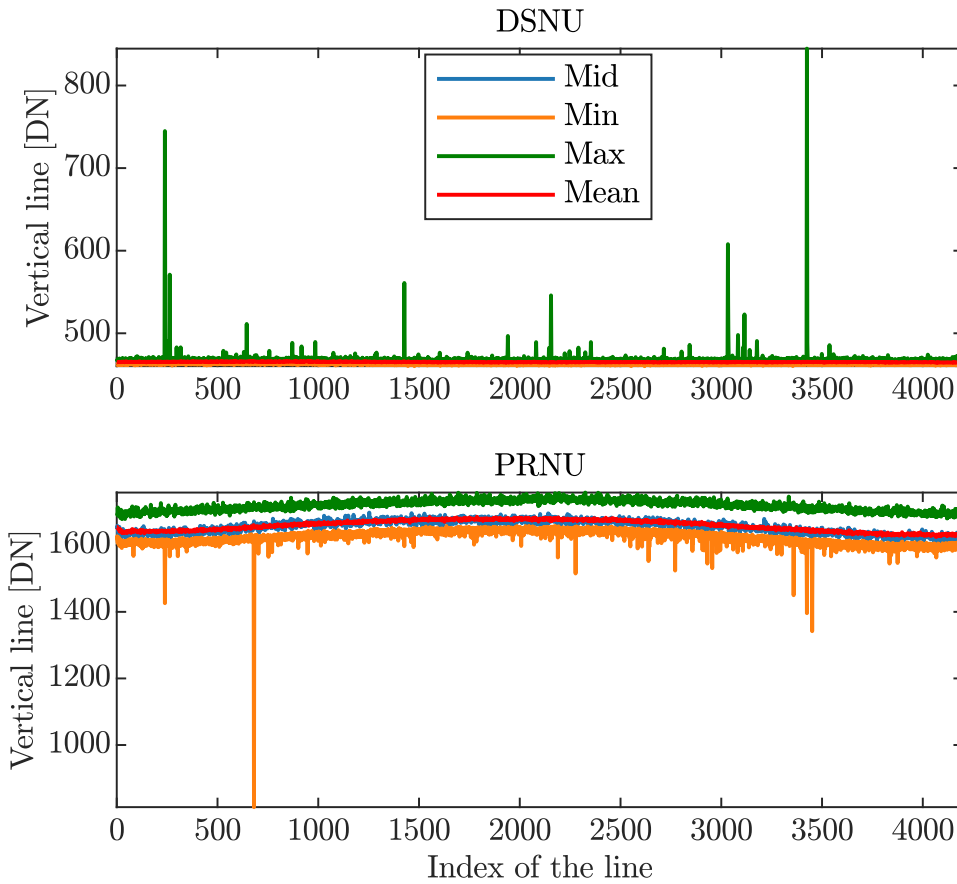
Accumulated Log Histogram PRNU



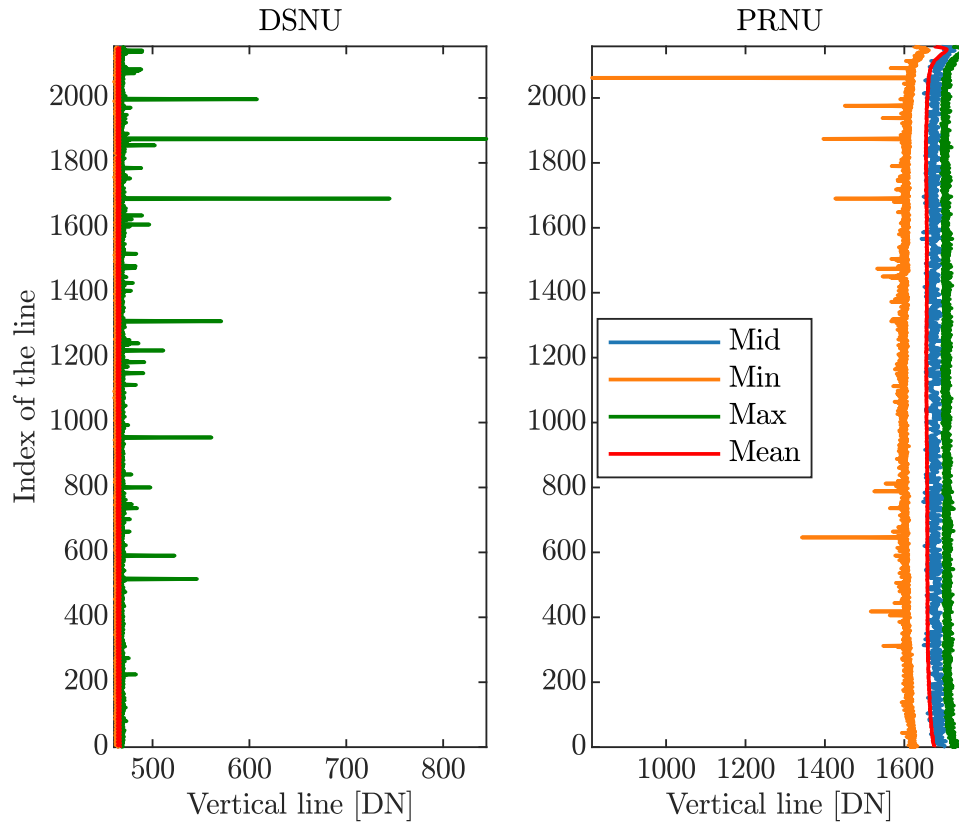
Accumulated Log Histogram DSNU



Horizontal Profile

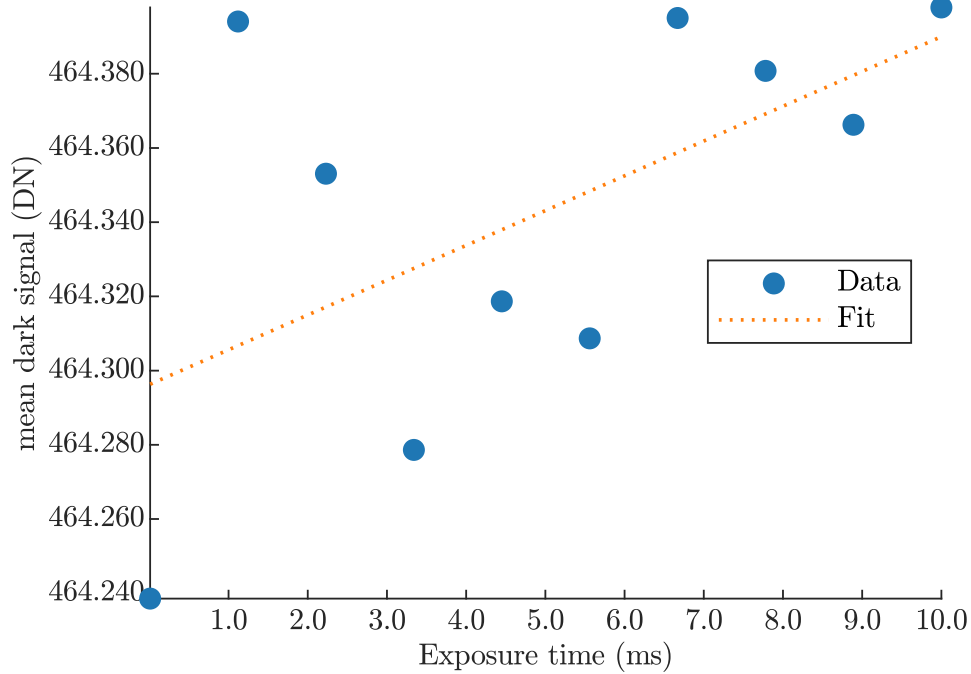


Vertical Profile

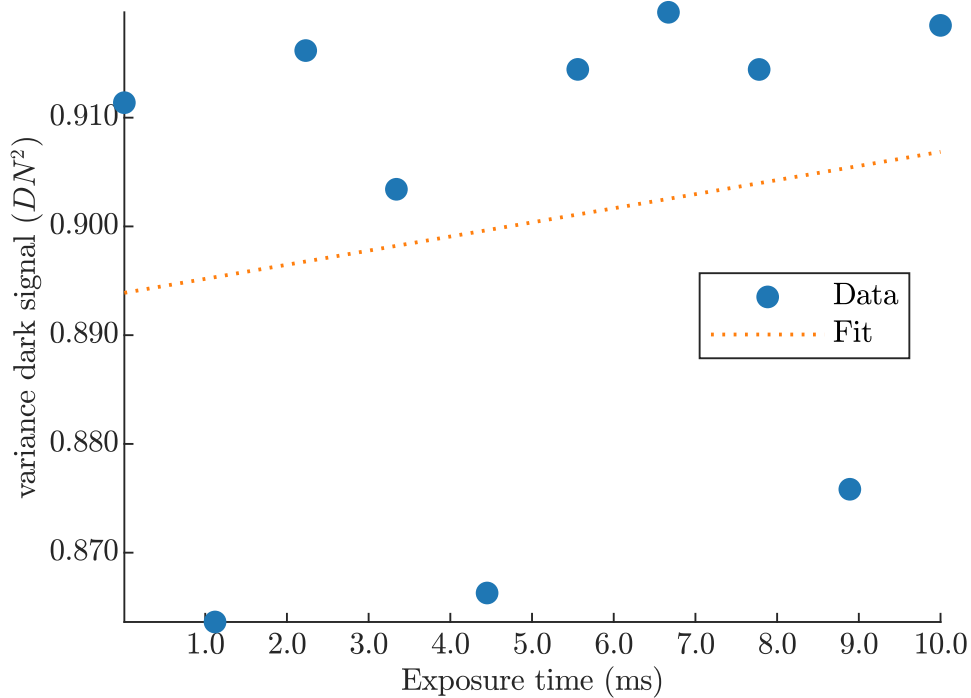


Dark Current

Dark Current from Mean



Dark Current from Variance



International Distributor



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