

**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](http://www.standard1288.org)).

Vendor	KAYA Instruments	Sensor diagonal	18.1mm
Model	Iron0505-C	Sensor	GMAX0505
Camera type	Color	Sensor type	CMOS
Date	11-Apr-2022 14:01:12	Shutter type	Global
Data type	Single	Overlap capabilities	Overlapping
Sensor type	CMOS	Frame rate	40 Hz
Lens category	C-Mount	Exposure control	by irradiance
Resolution	5120 x 5120 ,12 bits	Exposure time	12000 $\mu$ s
Pixel size	2.5 $\mu$ m x 2.5 $\mu$ m	Illumination	Variable with constant exposure time
Maximum readout rate	42 fps	Irradiation Steps	50
Dark current compensation	No	Irradiation calibration accuracy	-
Interface type	CXP-12	Irradiation measurement error	-
Serial number	123456	Standart version	4.0 Linear
Firmware version	1.0.2-2022.4.3	Light source	Integrating Sphere

International Distributors



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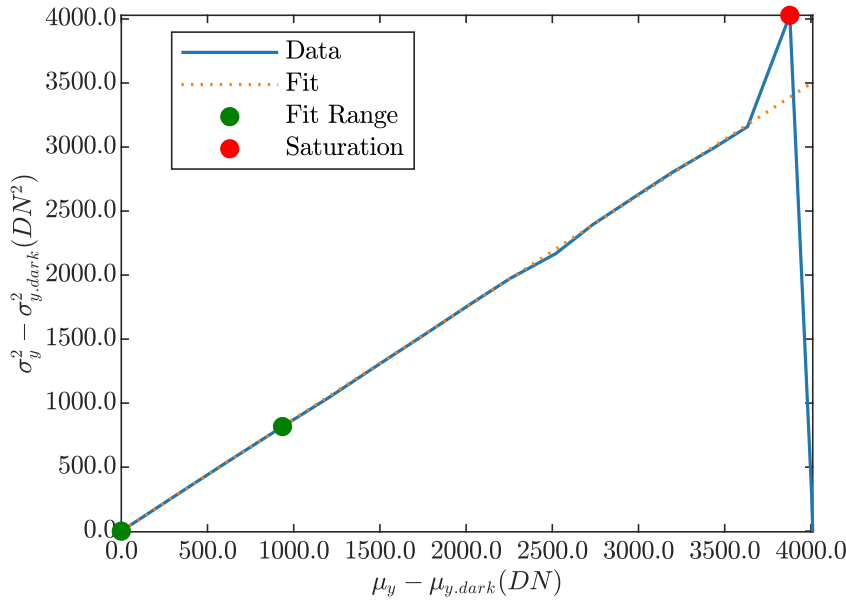


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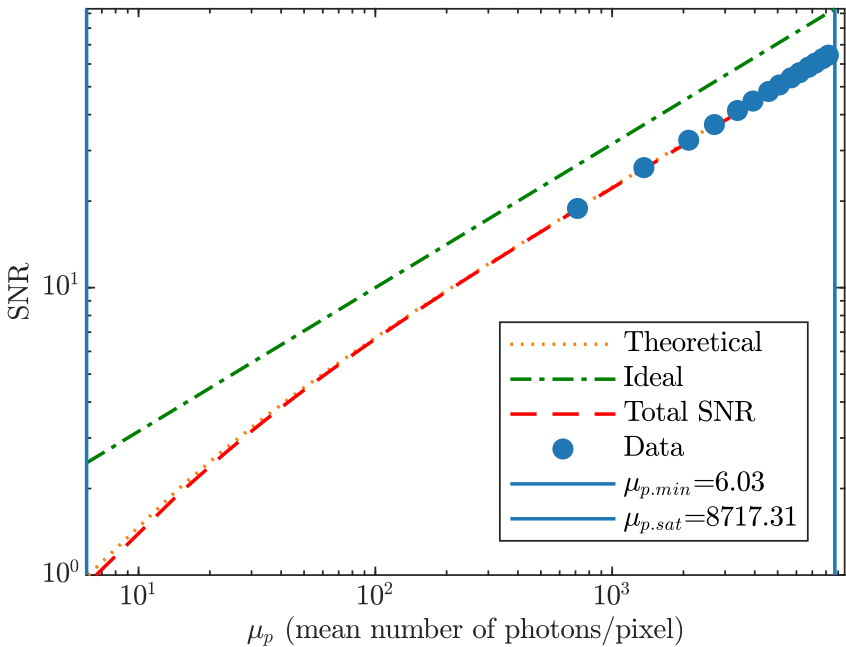
Summary Sheet for Operation Point 1 at a Wavelength of 520 nm

Camera setting		Operation point parameters	
Gain	2.5	Environmental temperature	22.81
Black level	-1032	Camera body temperature	22.81
		Sensor temperature	53.947
		Processor temperature	63

Photon Transfer

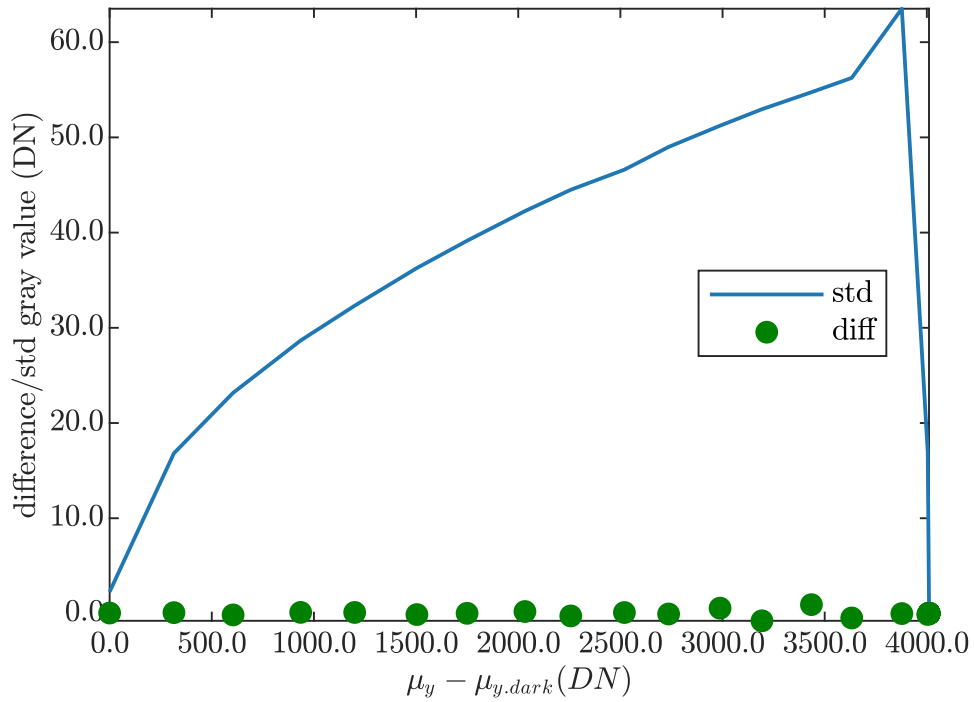


Signal-to-Noise Ratio

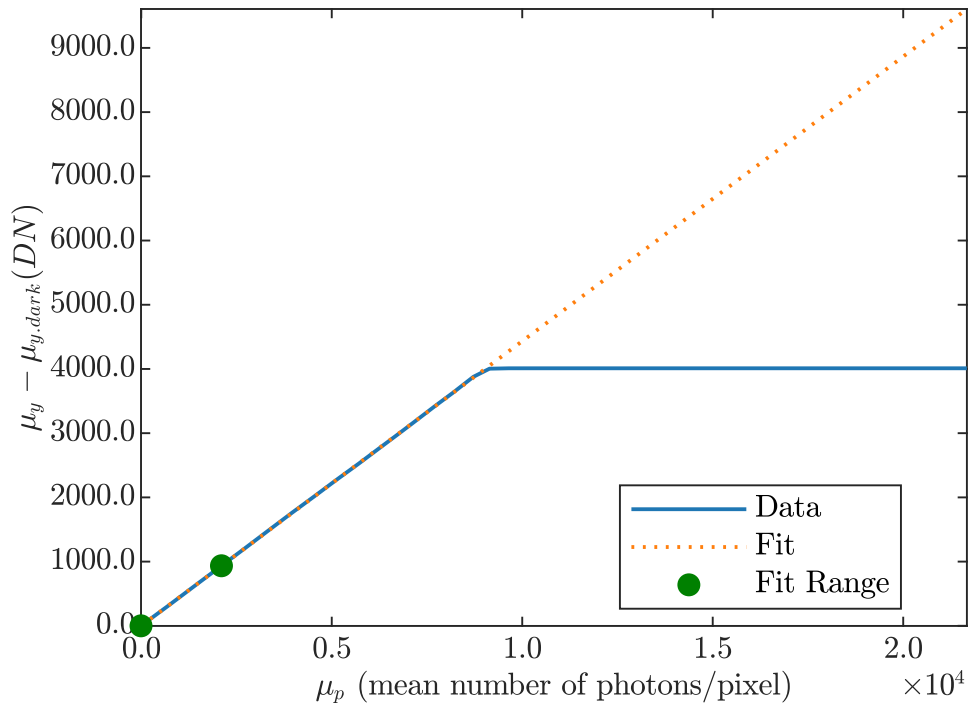


Performance	
<b>Quantum efficiency</b>	
$\eta$	50.734 %
<b>System gain</b>	
K	0.87358 DN/e <sup>-</sup>
1/K	1.1447 e <sup>-</sup> /DN
<b>Temporal dark noise</b>	
$\sigma_d$	2.5401 e <sup>-</sup>
$\sigma_{y,dark}$	2.2376 DN
<b>Signal-to-noise ratio</b>	
SNR <sub>max</sub>	66.5029
	36.4568 dB
	6.0553 bit
1/SNR <sub>max</sub>	1.5037 %
<b>Absolute sensitivity threshold</b>	
$\mu_{e,min}$	3.0615 e <sup>-</sup>
$\mu_{e,min,area}$	0.48984 e <sup>-</sup> /μm <sup>2</sup>
<b>Saturation capacity</b>	
$\mu_{e,sat}$	4422.6388 e <sup>-</sup>
$\mu_{e,sat,area}$	707.6222 e <sup>-</sup> /μm <sup>2</sup>
<b>Dynamic range</b>	
DR	1444.6103
	63.195 dB
	10.4965 bit
<b>Spatial nonuniformities</b>	
DSNU <sub>1288</sub>	1.1284 e <sup>-</sup>
DSNU <sub>1288,col</sub>	0.43015 e <sup>-</sup>
DSNU <sub>1288,row</sub>	0.33606 e <sup>-</sup>
DSNU <sub>1288,pix</sub>	0.98757 e <sup>-</sup>
PRNU <sub>1288</sub>	0.50675 %
PRNU <sub>1288,col</sub>	0.15926 %
PRNU <sub>1288,row</sub>	0.010278 %
PRNU <sub>1288,pix</sub>	0.48096 %
<b>Linearity error</b>	
LE	0.00075822 %
<b>Dark current</b>	
$\mu_{l,mean}$	NaN e <sup>-</sup> /s
$\mu_{l,var}$	2.7964 e <sup>-</sup> /s

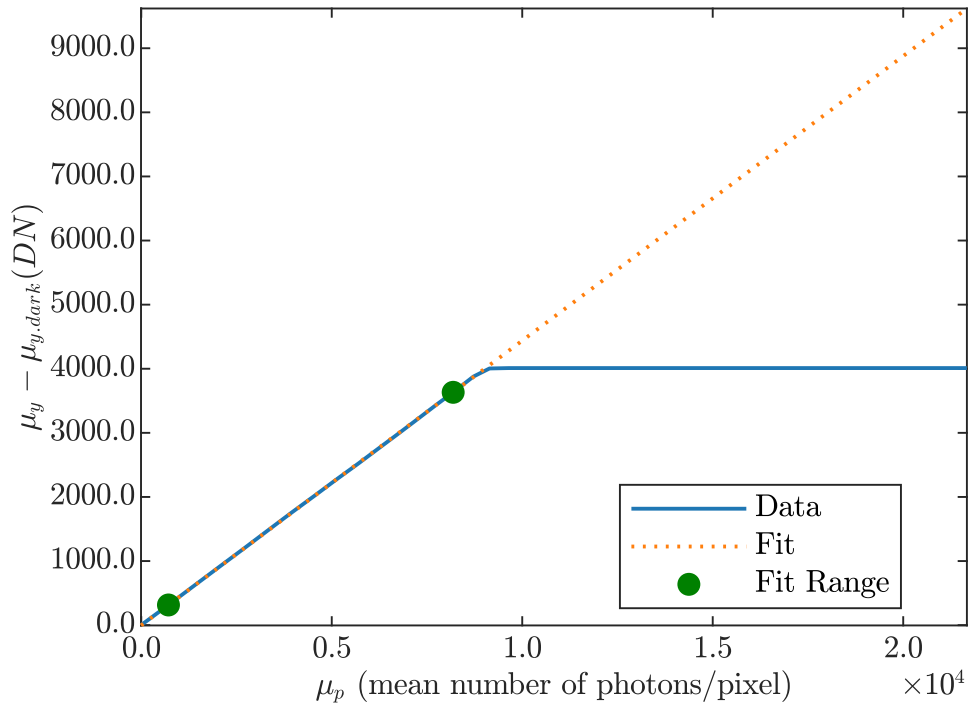
### Stability check



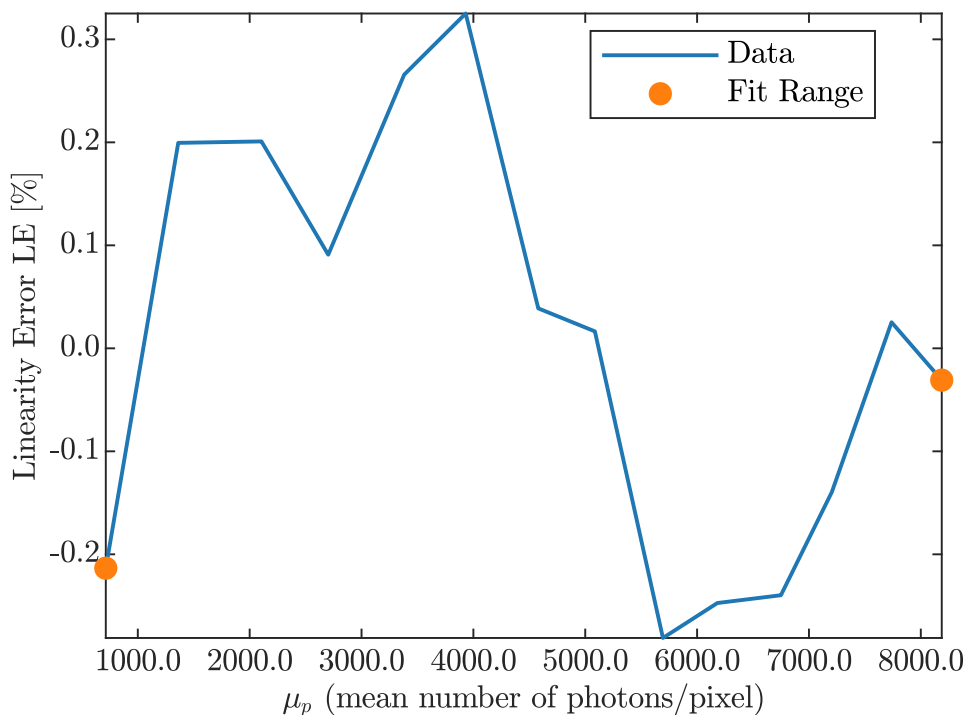
### Sensitivity



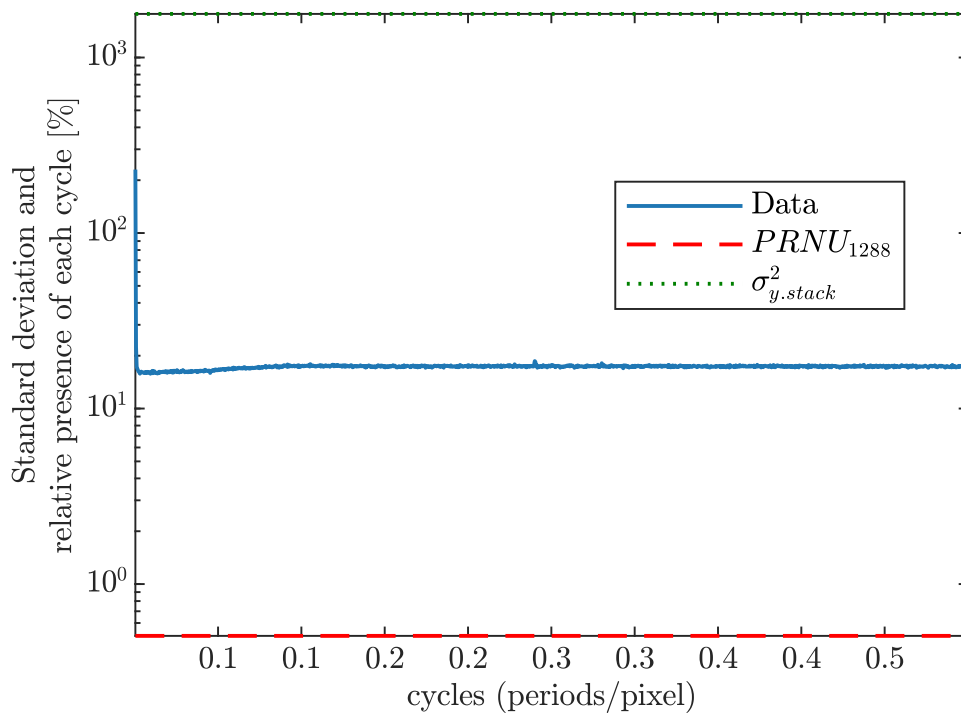
### Linearity



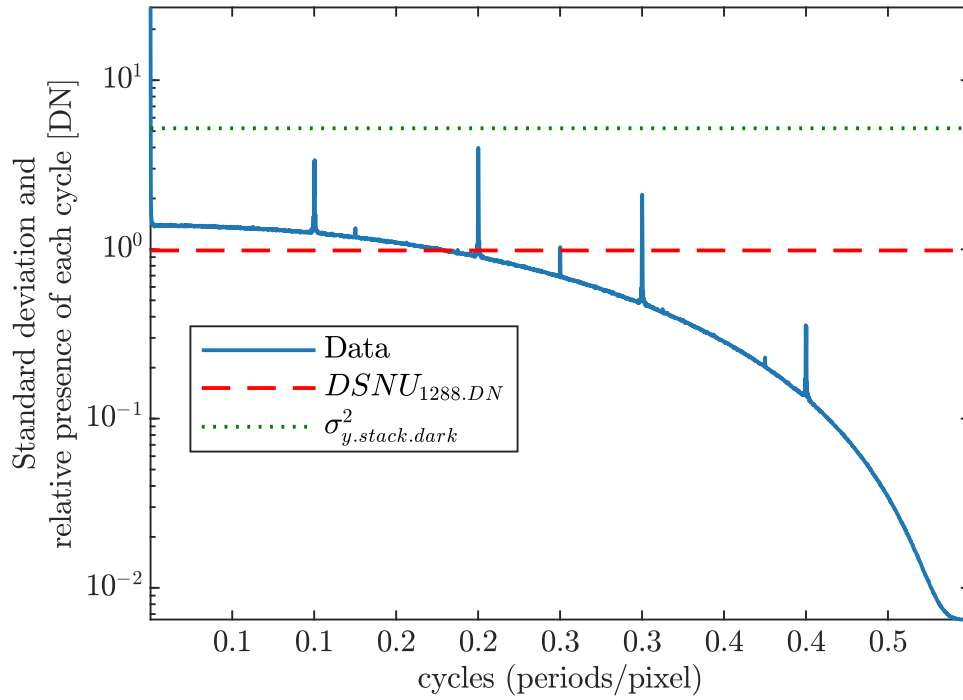
### Deviation Linearity



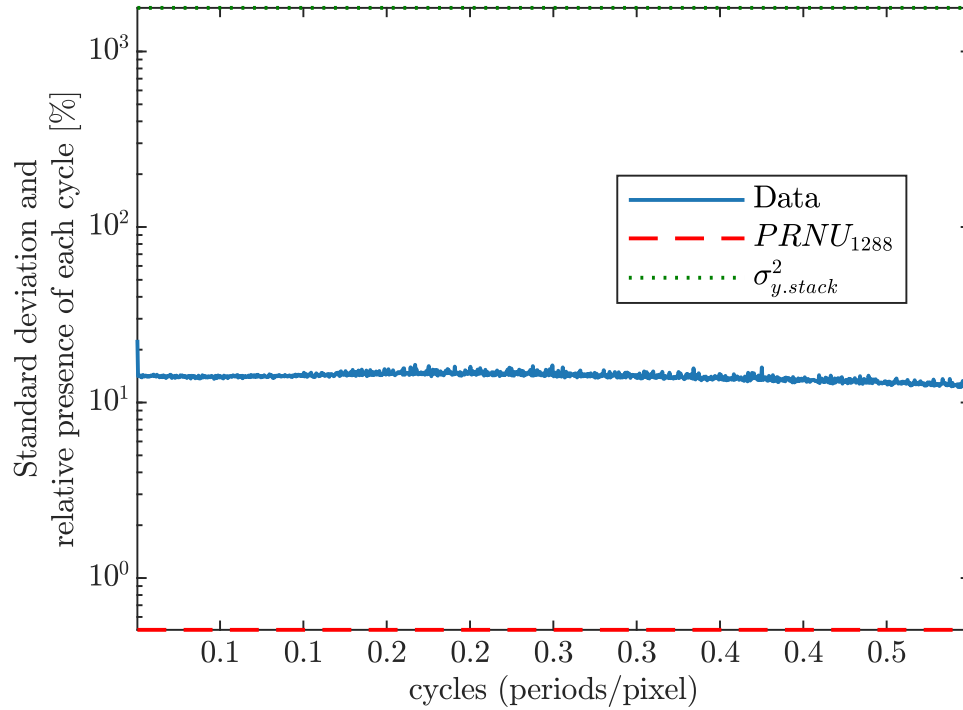
### Horizontal Spectrogram PRNU



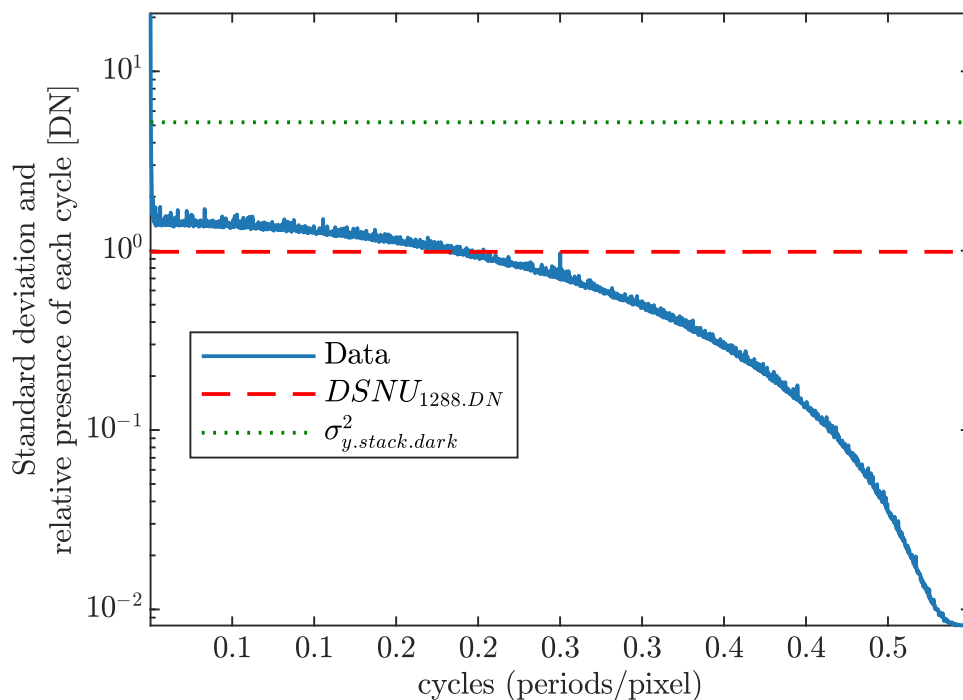
### Horizontal Spectrogram DSNU



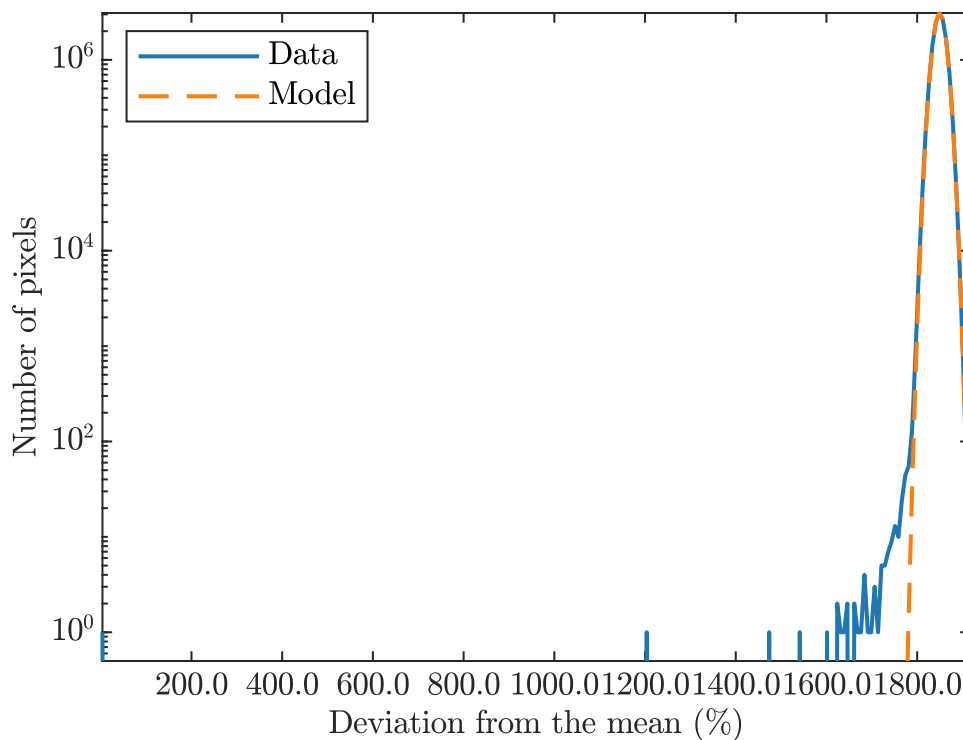
### Vertical Spectrogram PRNU



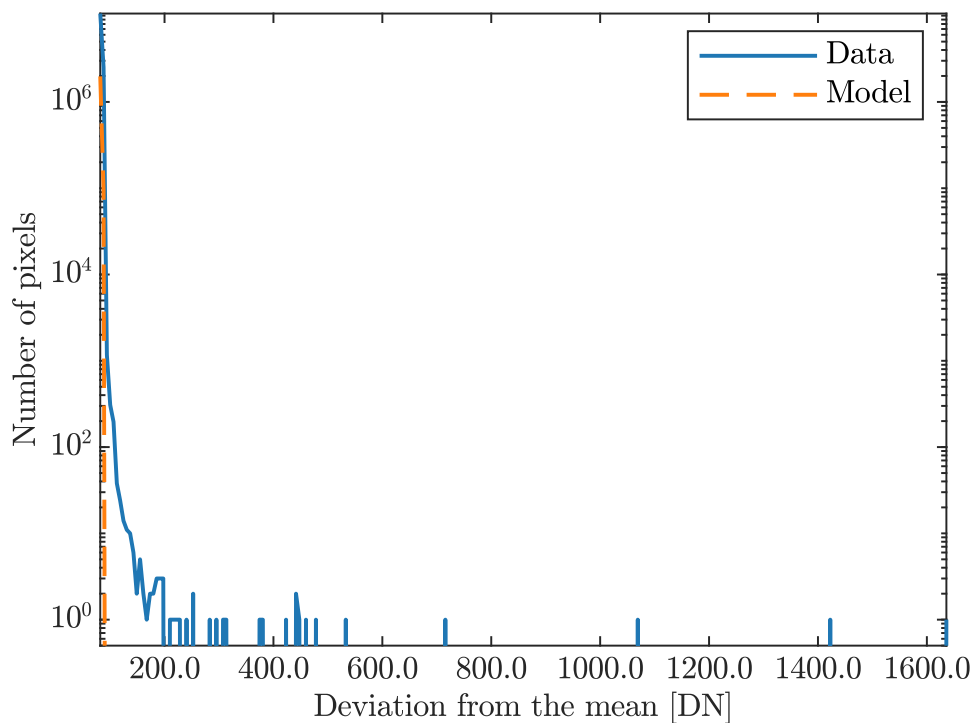
### Vertical Spectrogram DSNU



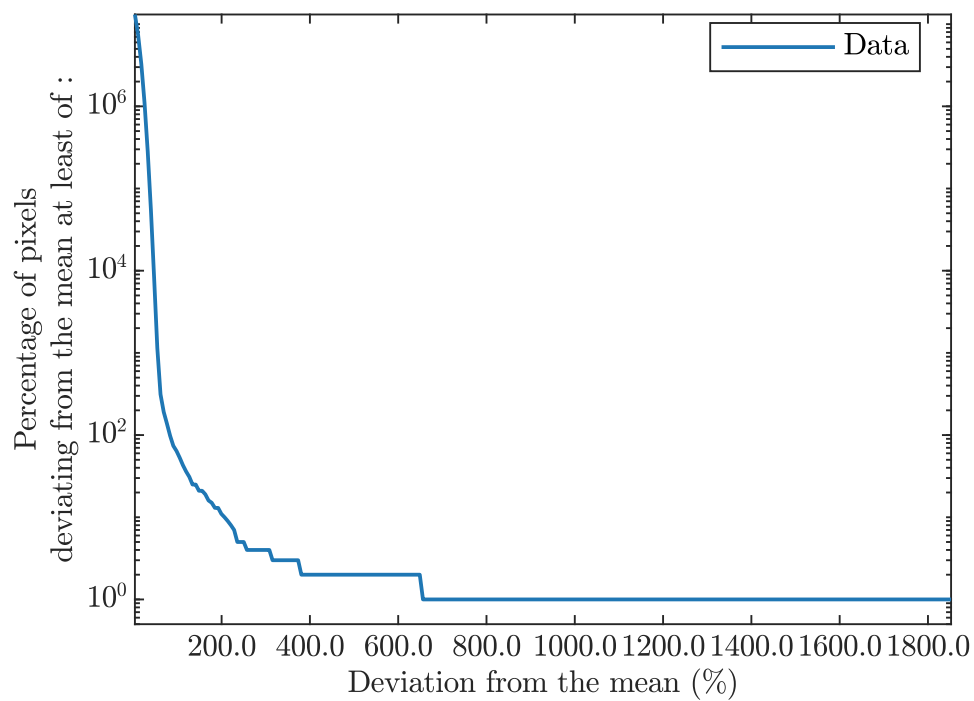
### Logarithmic Histogram PRNU



### Logarithmic Histogram DSNU

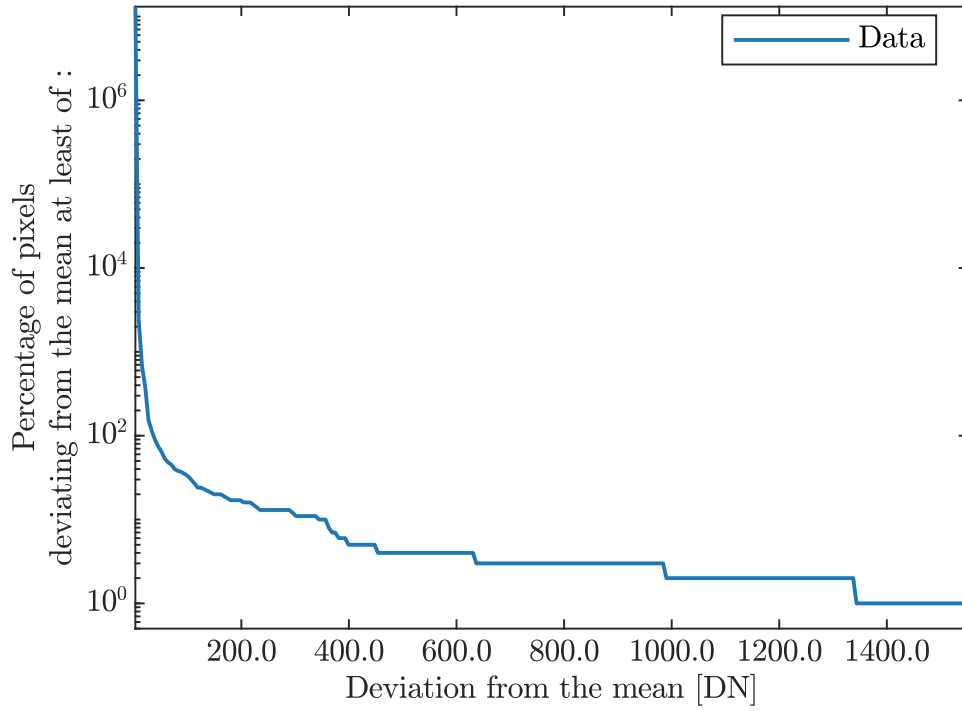


### Accumulated Log Histogram PRNU

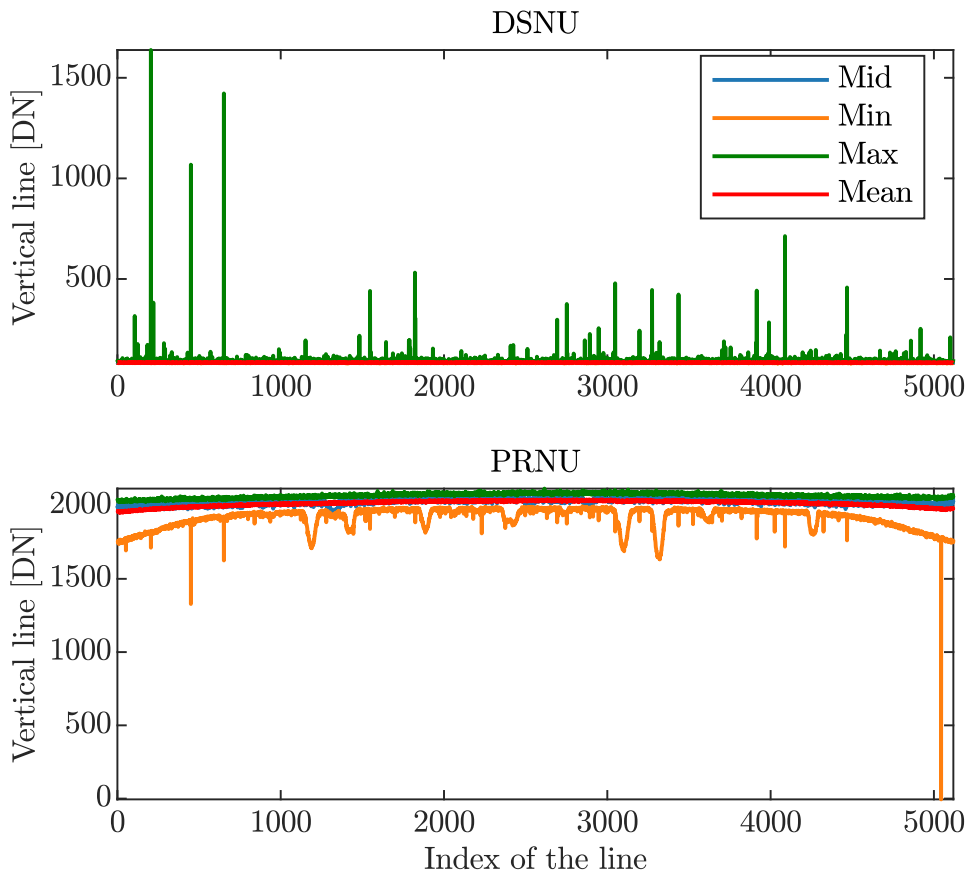




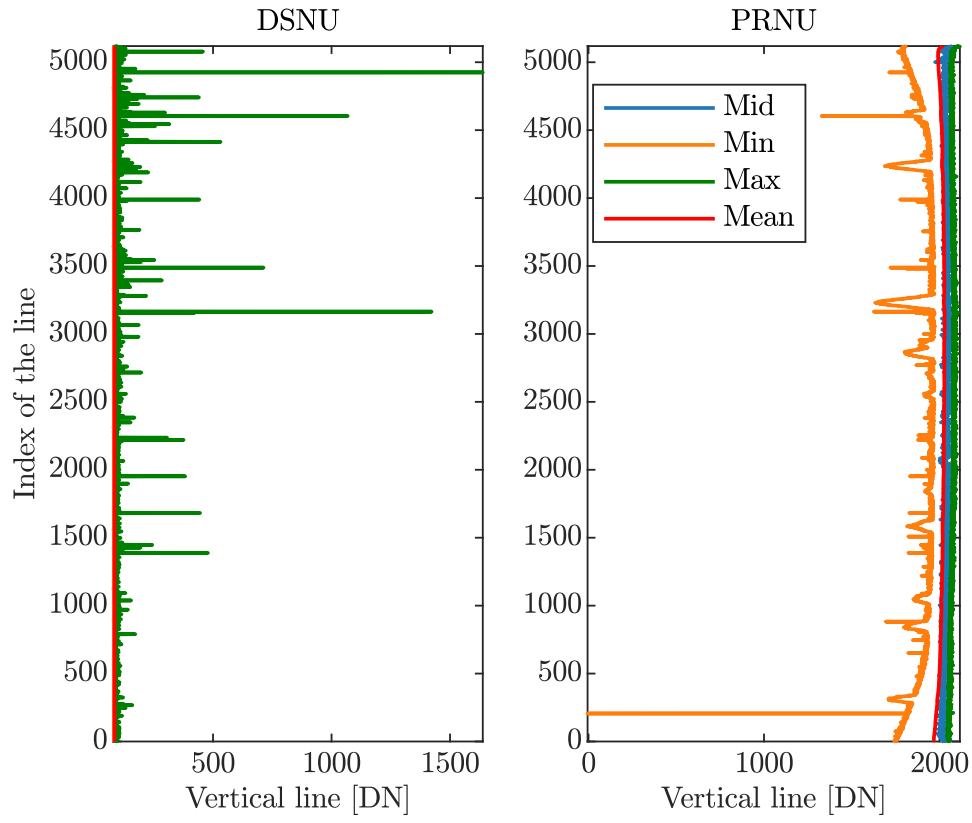
### Accumulated Log Histogram DSNU



### Horizontal Profile



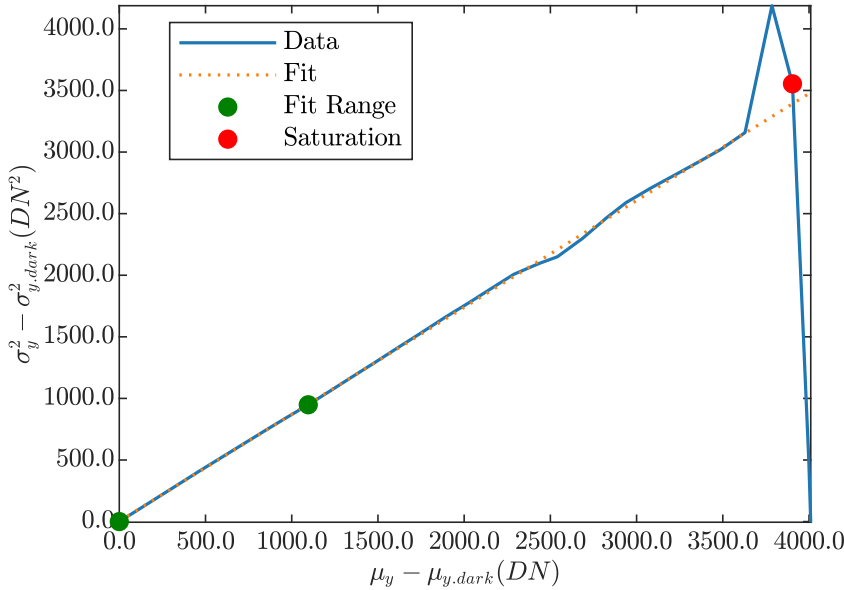
### Vertical Profile



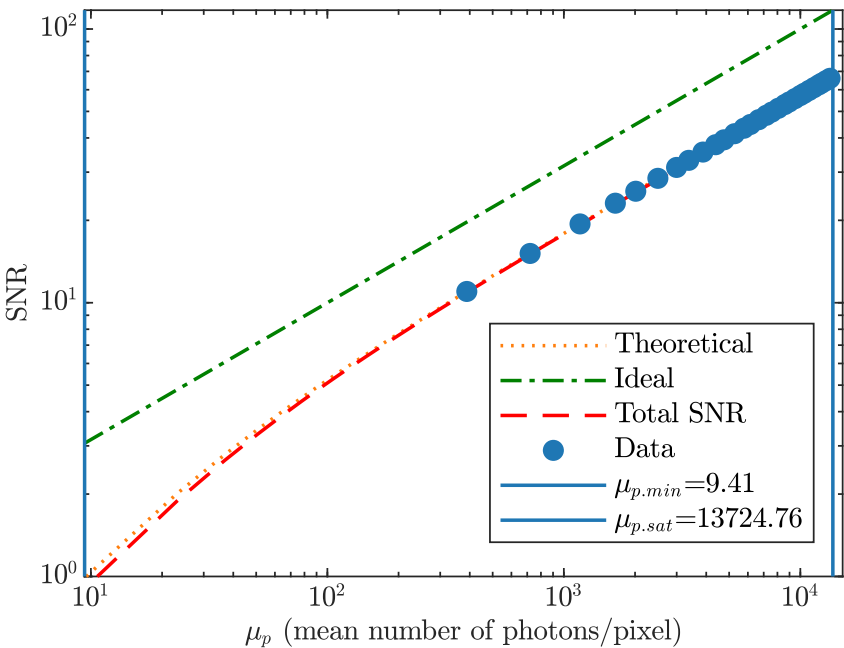
Summary Sheet for Operation Point 2 at a Wavelength of 632 nm

Camera setting		Operation point parameters	
Gain	2.5	Environmental temperature	23.25
Black level	-1032	Camera body temperature	23.37
		Sensor temperature	54.095
		Processor temperature	65

Photon Transfer



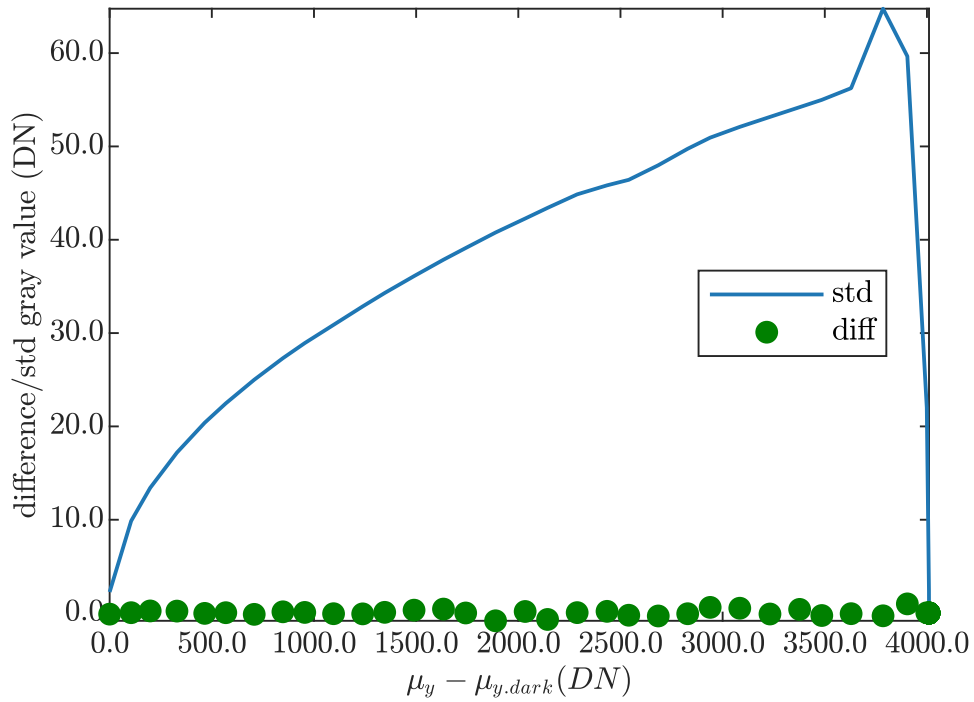
Signal-to-Noise Ratio



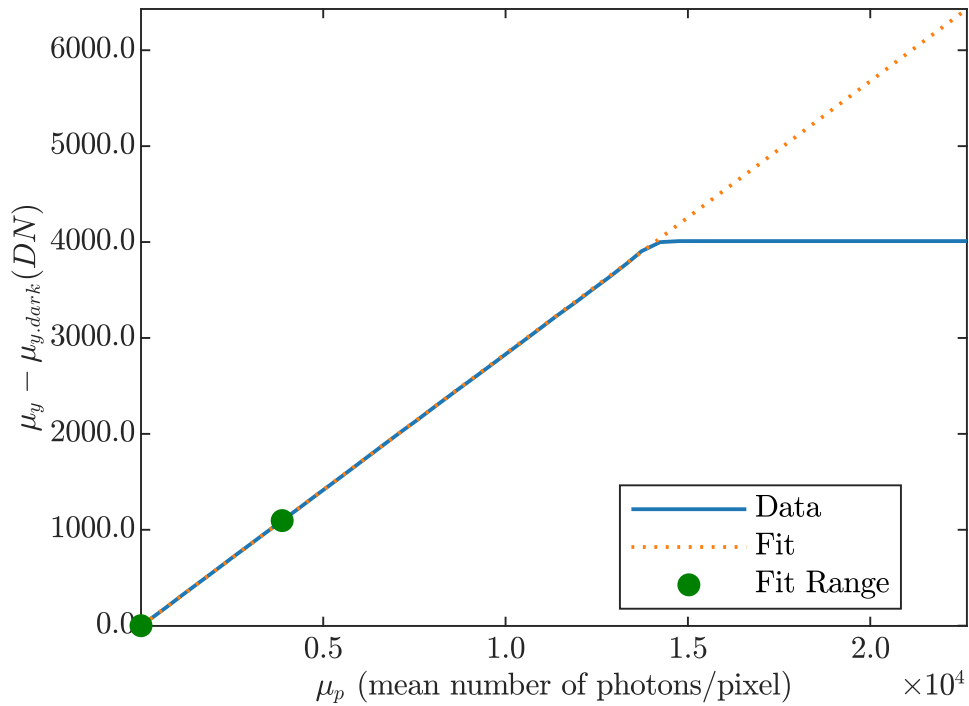
Performance

<b>Quantum efficiency</b>		
$\eta$	32.7293	%
<b>System gain</b>		
K	0.86787	DN/e <sup>-</sup>
1/K	1.1522	e <sup>-</sup> /DN
<b>Temporal dark noise</b>		
$\sigma_d$	2.5568	e <sup>-</sup>
$\sigma_{y, \text{dark}}$	2.2376	DN
<b>Signal-to-noise ratio</b>		
SNR <sub>max</sub>	67.0225	
	36.5244	dB
	6.0666	bit
1/SNR <sub>max</sub>	1.492	%
<b>Absolute sensitivity threshold</b>		
$\mu_{e, \text{min}}$	3.0783	e <sup>-</sup>
$\mu_{e, \text{min, area}}$	0.49253	e <sup>-</sup> /μm <sup>2</sup>
<b>Saturation capacity</b>		
$\mu_{e, \text{sat}}$	4492.0187	e <sup>-</sup>
$\mu_{e, \text{sat, area}}$	718.723	e <sup>-</sup> /μm <sup>2</sup>
<b>Dynamic range</b>		
DR	1459.2468	
	63.2826	dB
	10.511	bit
<b>Spatial nonuniformities</b>		
DSNU <sub>1288</sub>	1.3744	e <sup>-</sup>
DSNU <sub>1288, col</sub>	0.45648	e <sup>-</sup>
DSNU <sub>1288, row</sub>	0.4099	e <sup>-</sup>
DSNU <sub>1288, pix</sub>	1.2299	e <sup>-</sup>
PRNU <sub>1288</sub>	0.49721	%
PRNU <sub>1288, col</sub>	0.1187	%
PRNU <sub>1288, row</sub>	0.03654	%
PRNU <sub>1288, pix</sub>	0.48145	%
<b>Linearity error</b>		
LE	0.0009865	%
<b>Dark current</b>		
$\mu_{l, \text{mean}}$	NaN	e <sup>-</sup> /s
$\mu_{l, \text{var}}$	2.7964	e <sup>-</sup> /s

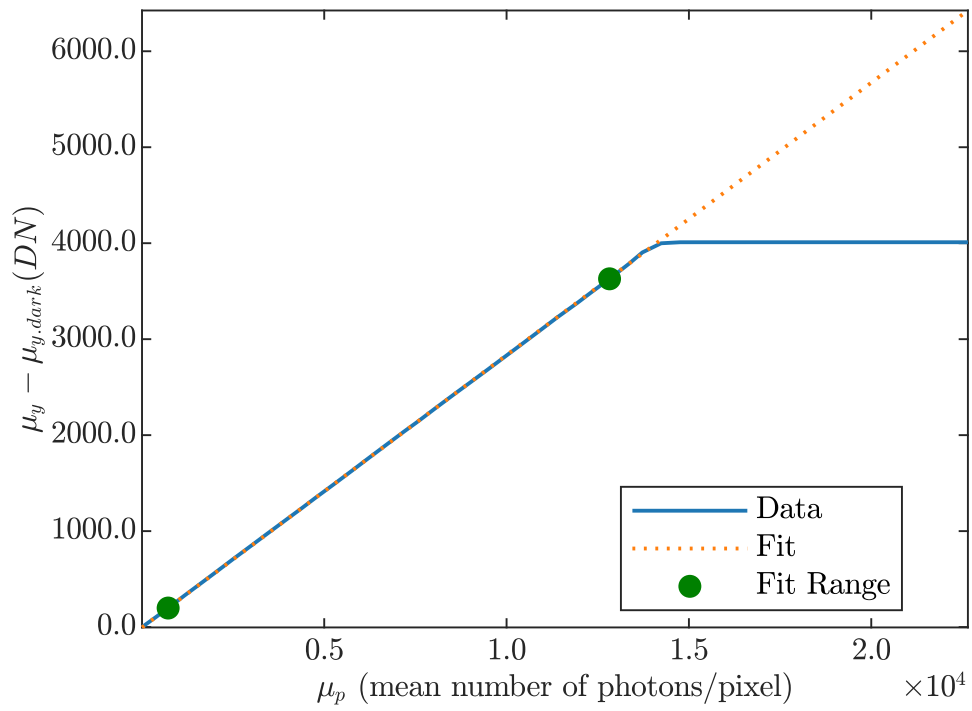
### Stability check



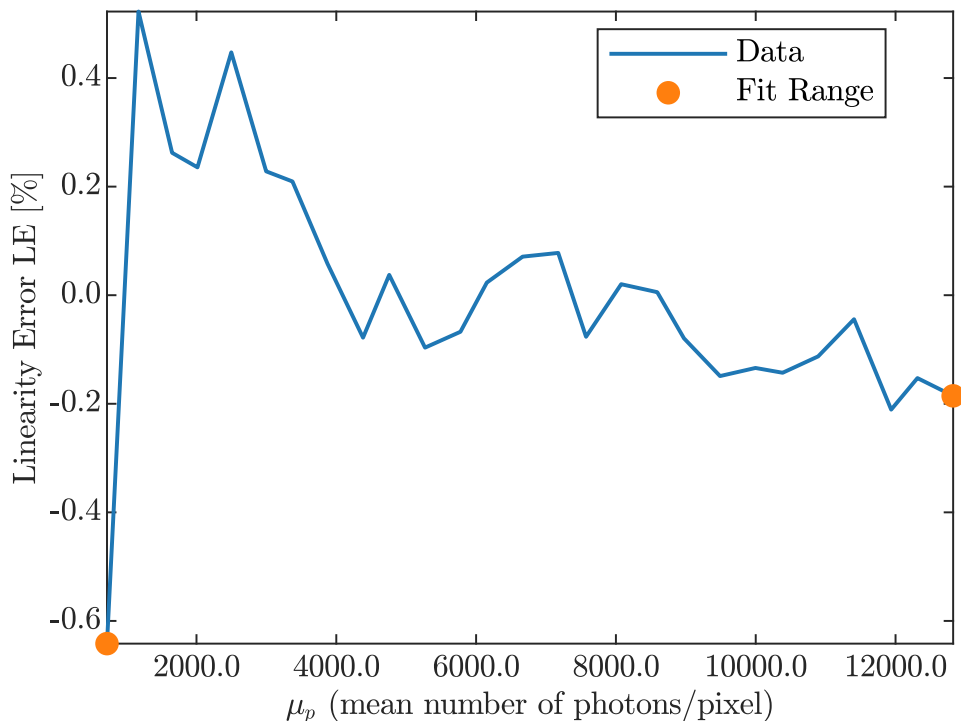
### Sensitivity



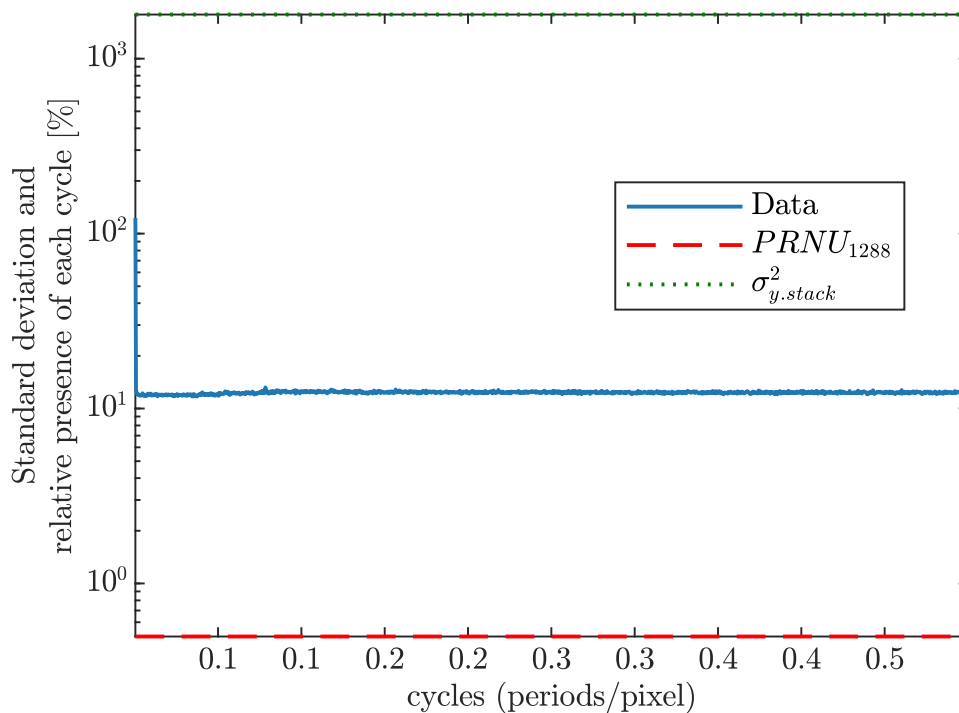
### Linearity



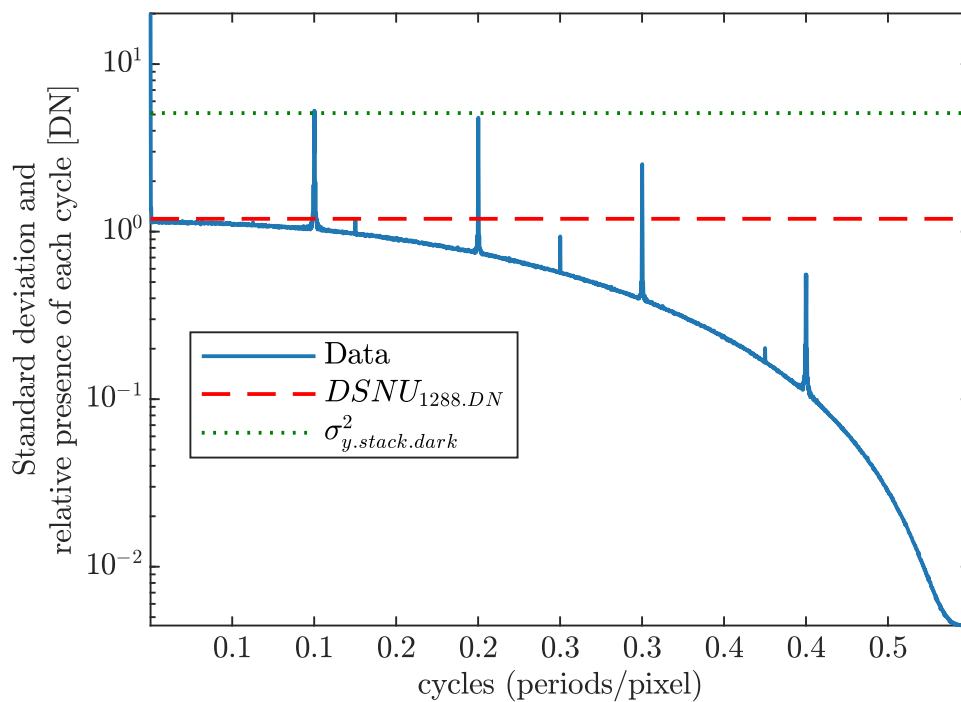
### Deviation Linearity



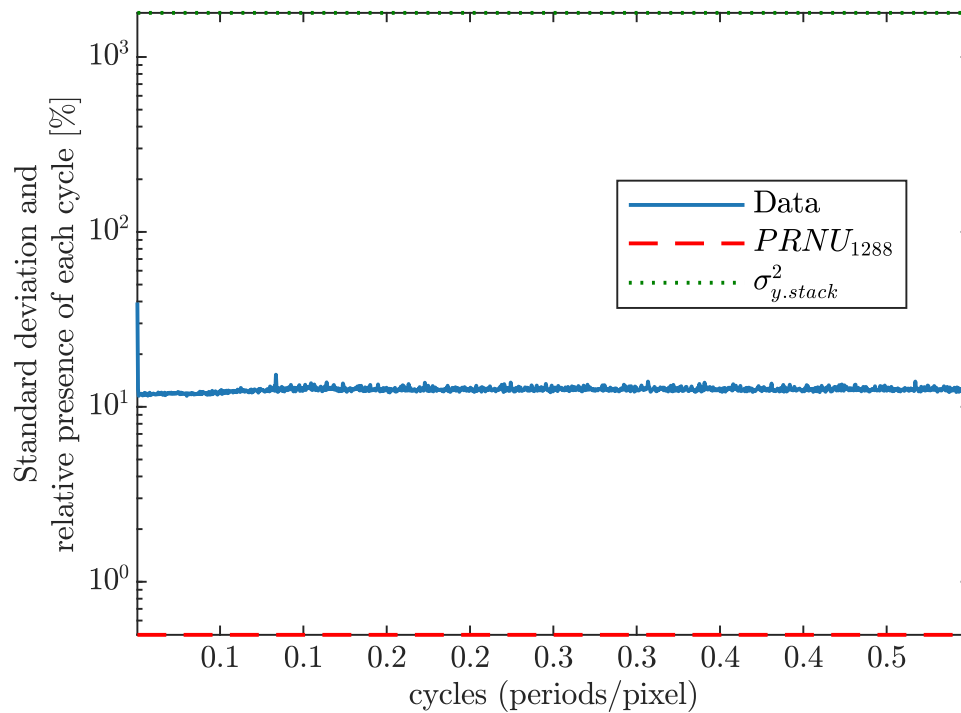
### Horizontal Spectrogram PRNU



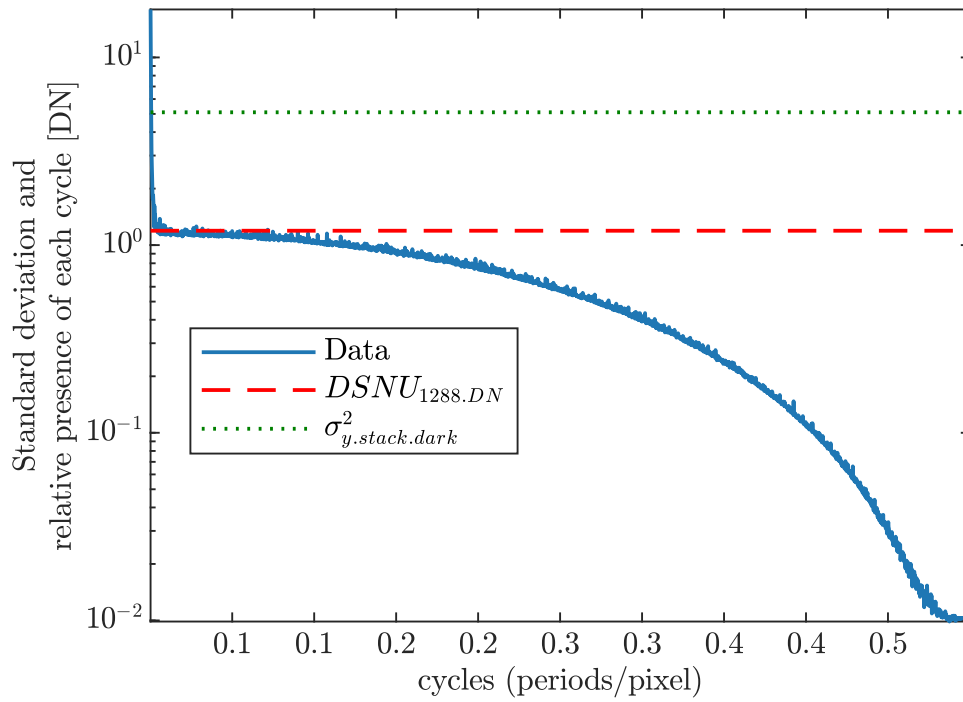
### Horizontal Spectrogram DSNU



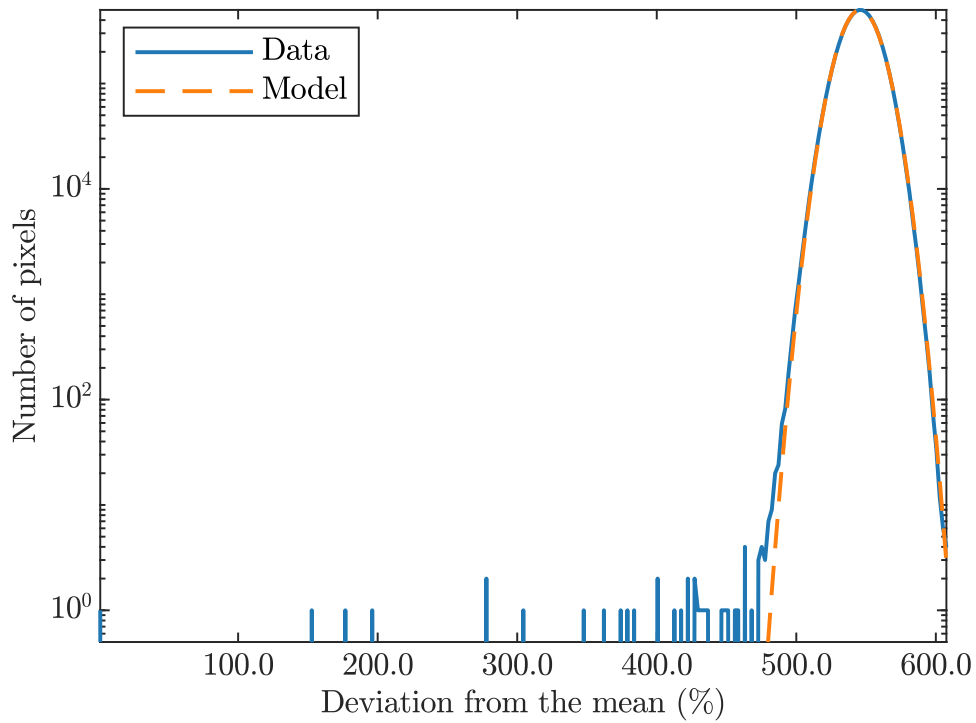
### Vertical Spectrogram PRNU



### Vertical Spectrogram DSNU

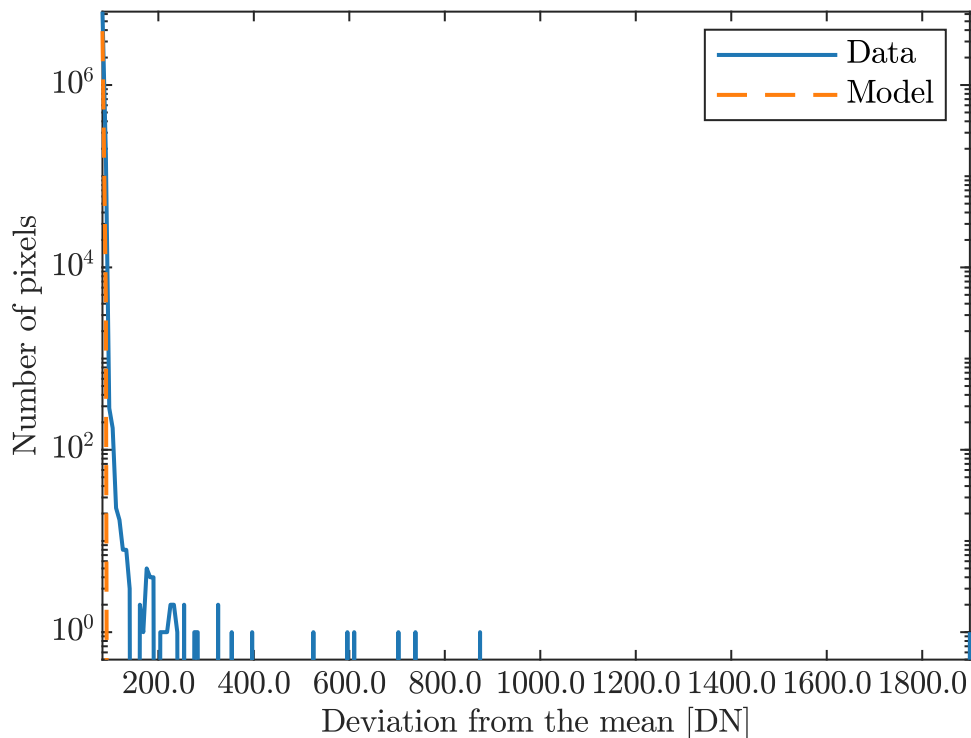


### Logarithmic Histogram PRNU

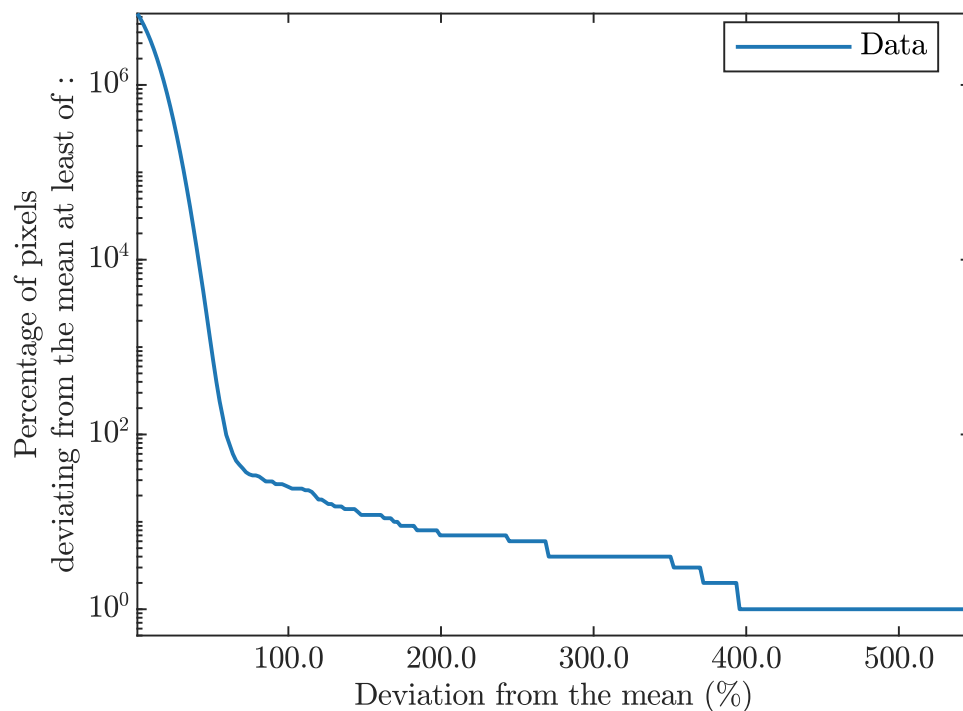




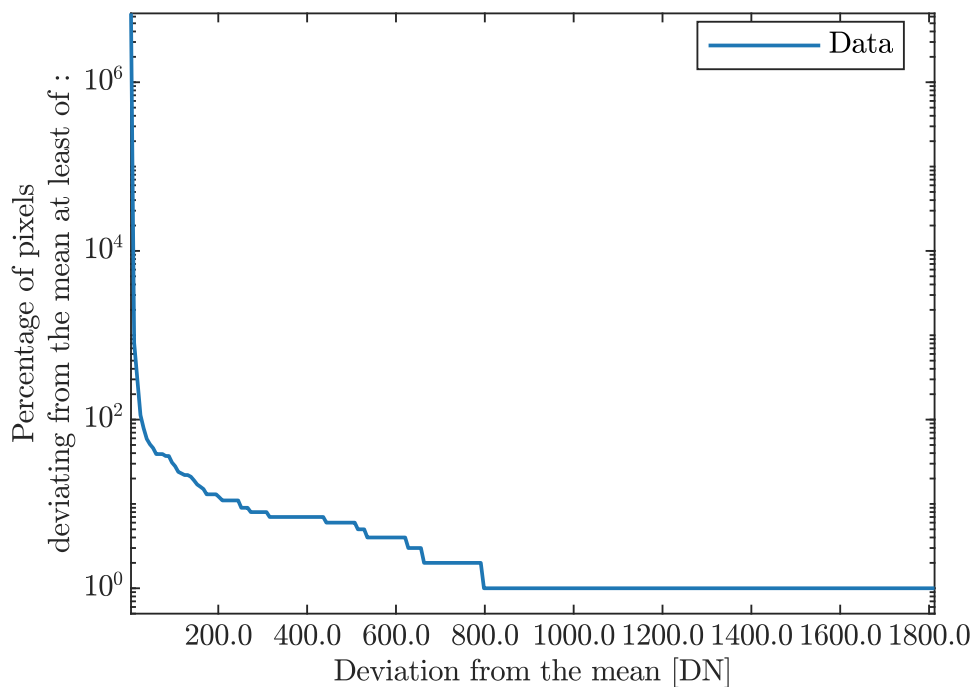
### Logarithmic Histogram DSNU



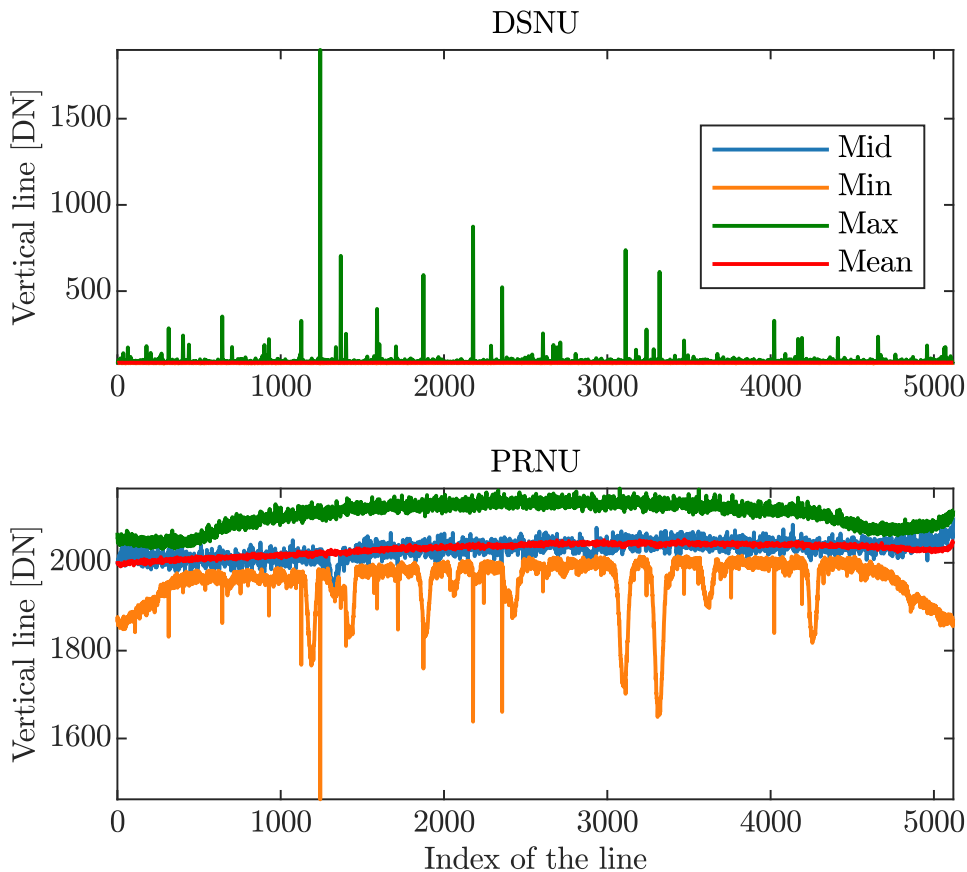
### Accumulated Log Histogram PRNU



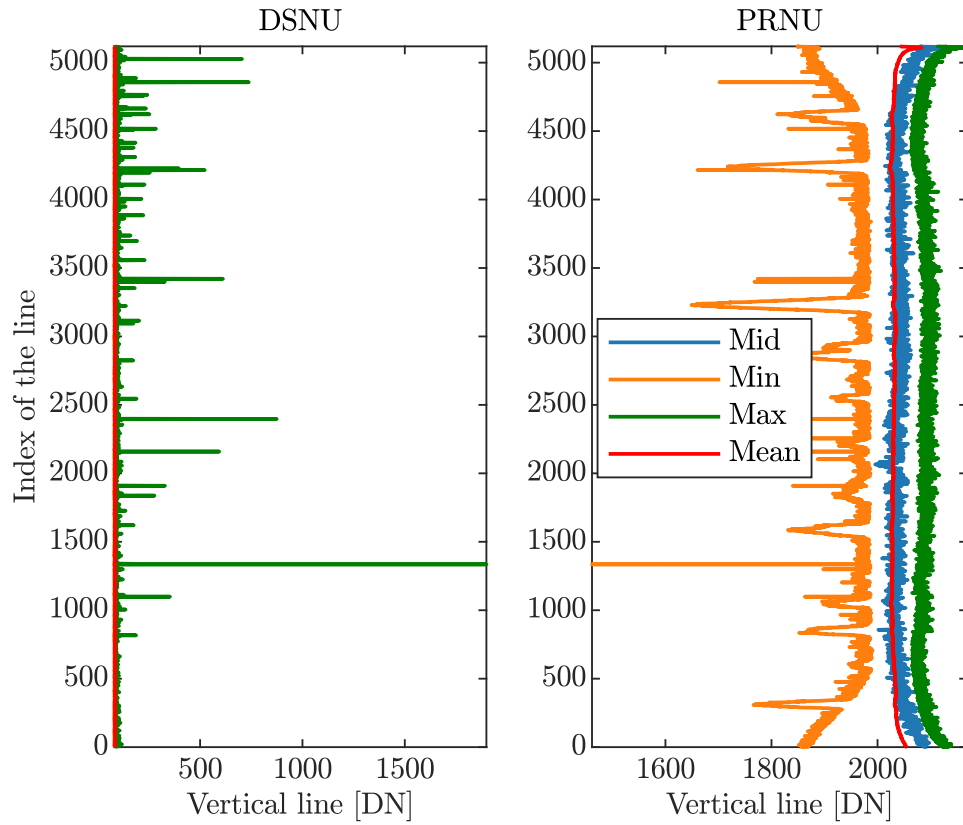
### Accumulated Log Histogram DSNU



### Horizontal Profile



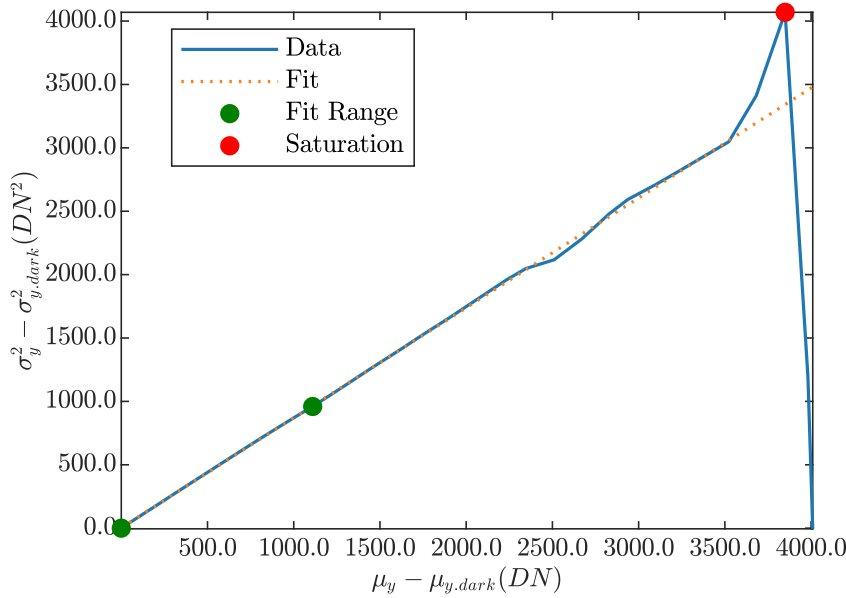
### Vertical Profile



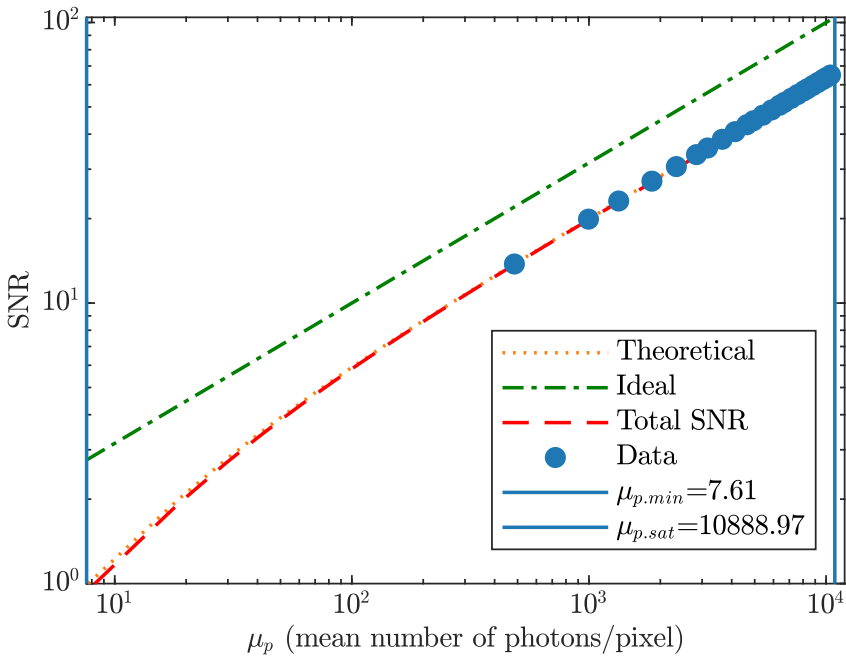
Summary Sheet for Operation Point 3 at a Wavelength of 448 nm

Camera setting		Operation point parameters	
Gain	2.5	Environmental temperature	23.25
Black level	-1032	Camera body temperature	23.37
		Sensor temperature	53.799
		Processor temperature	65

Photon Transfer



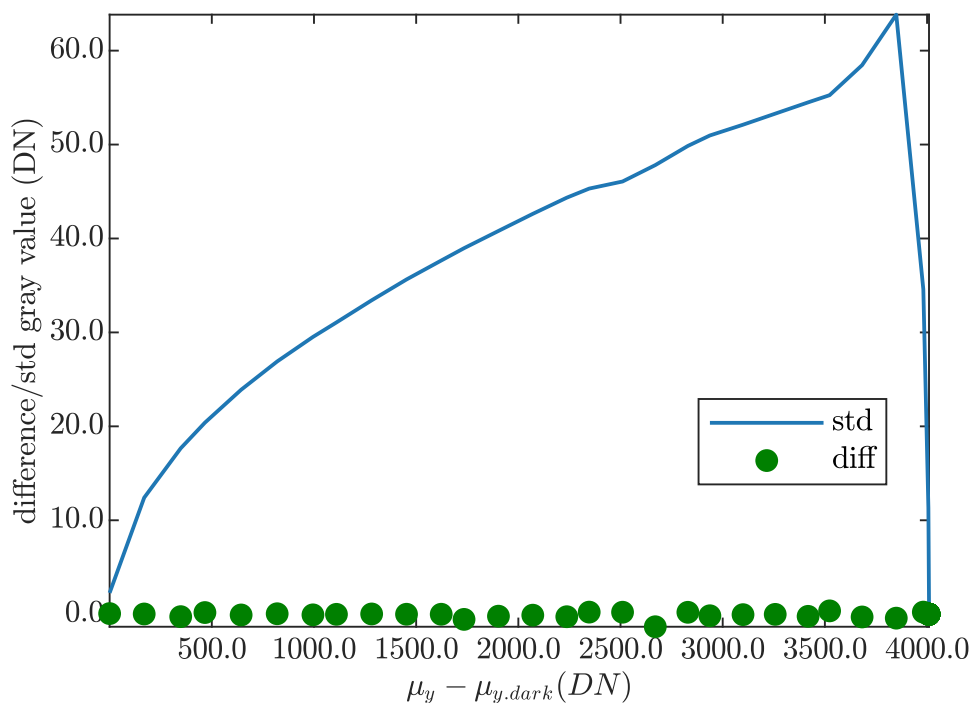
Signal-to-Noise Ratio



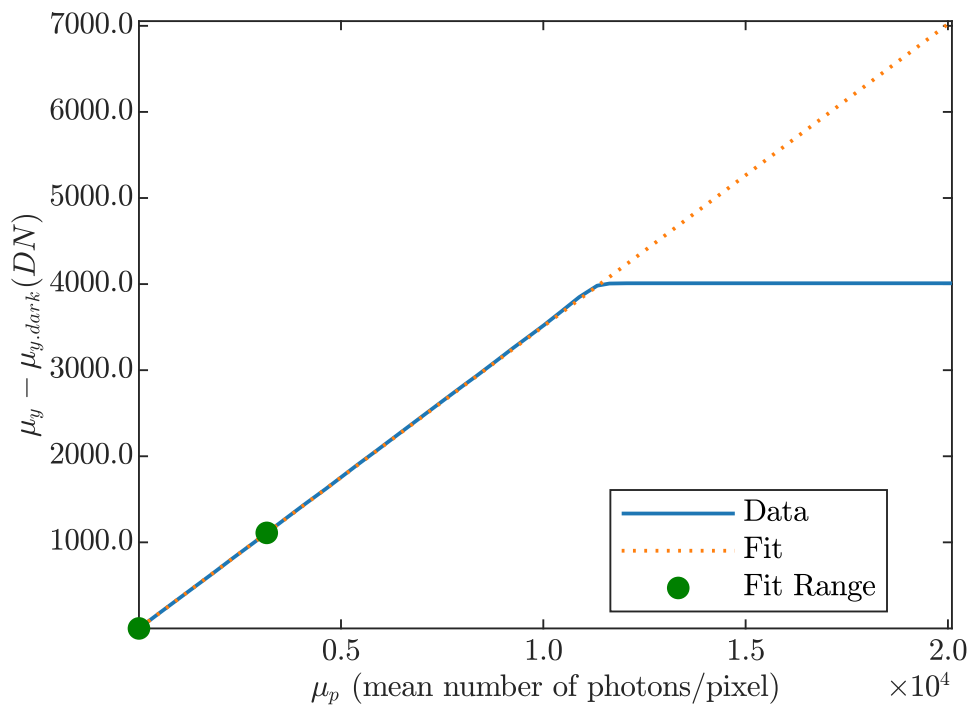
Performance

Quantum efficiency	
$\eta$	40.492 %
System gain	
K	0.86711 DN/e <sup>-</sup>
1/K	1.1533 e <sup>-</sup> /DN
Temporal dark noise	
$\sigma_d$	2.559 e <sup>-</sup>
$\sigma_{y,dark}$	2.2376 DN
Signal-to-noise ratio	
SNR <sub>max</sub>	66.4015
	36.4436 dB
	6.0531 bit
1/SNR <sub>max</sub>	1.506 %
Absolute sensitivity threshold	
$\mu_{e,min}$	3.0806 e <sup>-</sup>
$\mu_{e,min,area}$	0.49289 e <sup>-</sup> /μm <sup>2</sup>
Saturation capacity	
$\mu_{e,sat}$	4409.1642 e <sup>-</sup>
$\mu_{e,sat,area}$	705.4663 e <sup>-</sup> /μm <sup>2</sup>
Dynamic range	
DR	1431.2823
	63.1145 dB
	10.4831 bit
Spatial nonuniformities	
DSNU <sub>1288</sub>	1.0373 e <sup>-</sup>
DSNU <sub>1288,col</sub>	0.49586 e <sup>-</sup>
DSNU <sub>1288,row</sub>	0.3737 e <sup>-</sup>
DSNU <sub>1288,pix</sub>	0.83098 e <sup>-</sup>
PRNU <sub>1288</sub>	0.50758 %
PRNU <sub>1288,col</sub>	0.11951 %
PRNU <sub>1288,row</sub>	0.019527 %
PRNU <sub>1288,pix</sub>	0.49292 %
Linearity error	
LE	0.00025747 %
Dark current	
$\mu_{l,mean}$	NaN e <sup>-</sup> /s
$\mu_{l,var}$	2.7964 e <sup>-</sup> /s

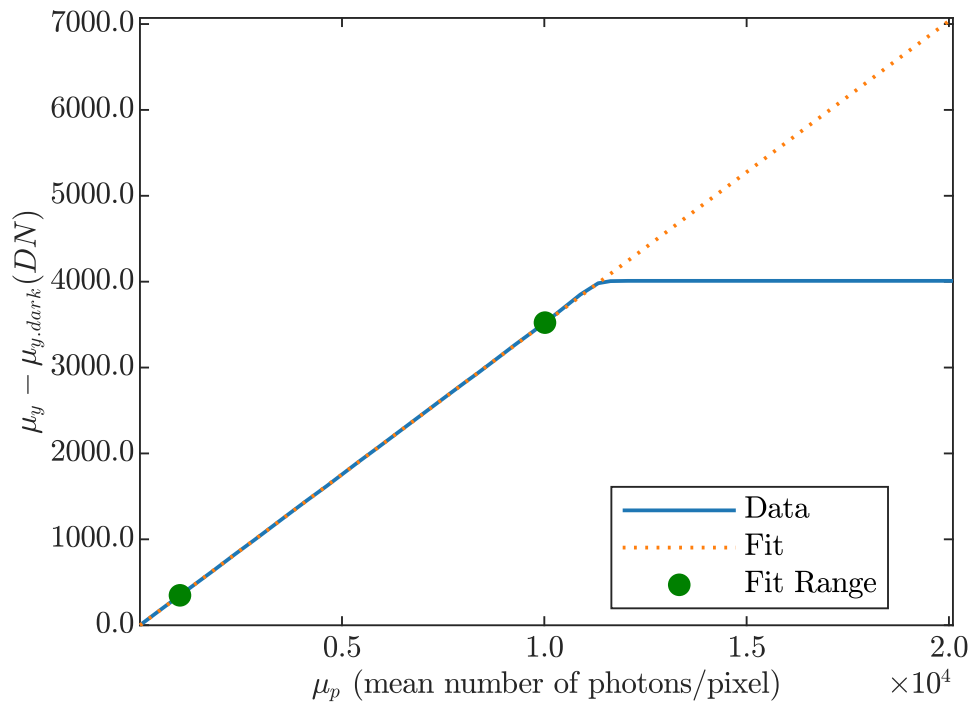
### Stability check



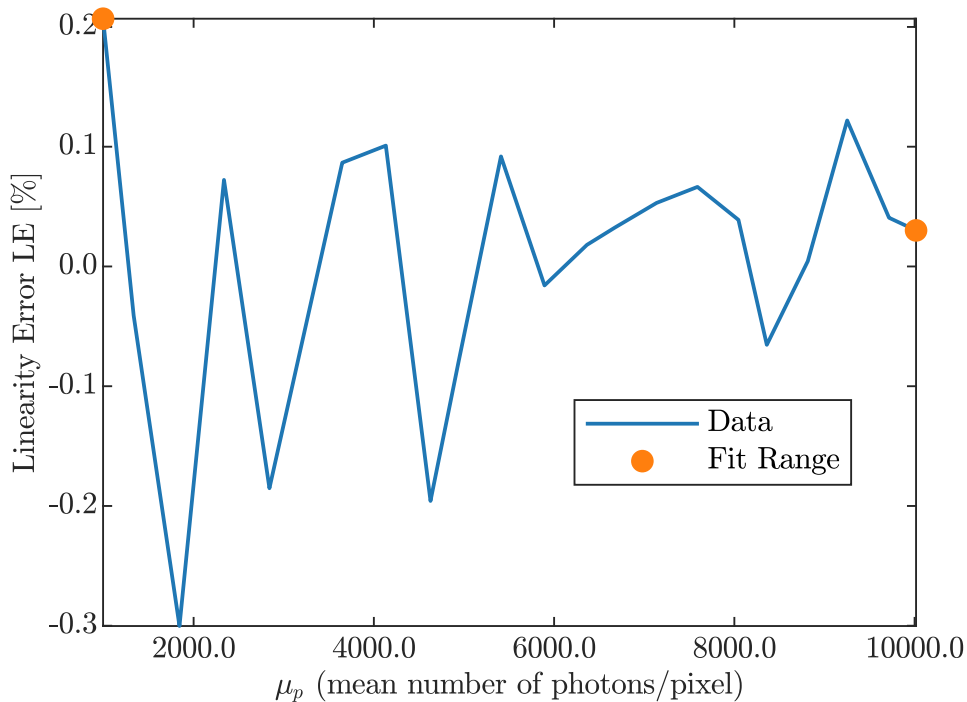
### Sensitivity



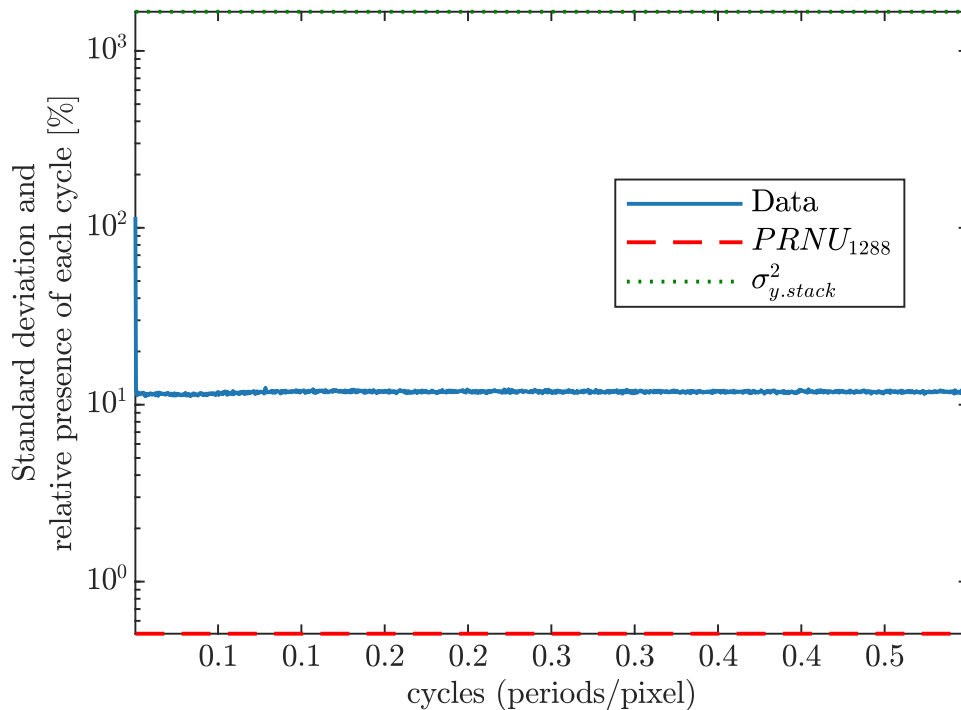
### Linearity



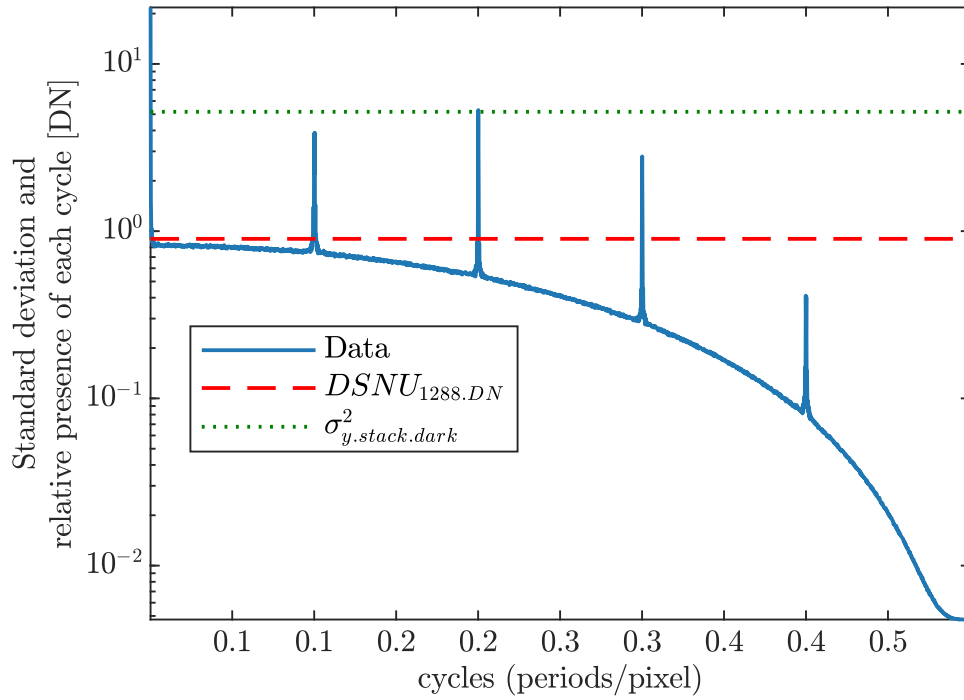
### Deviation Linearity



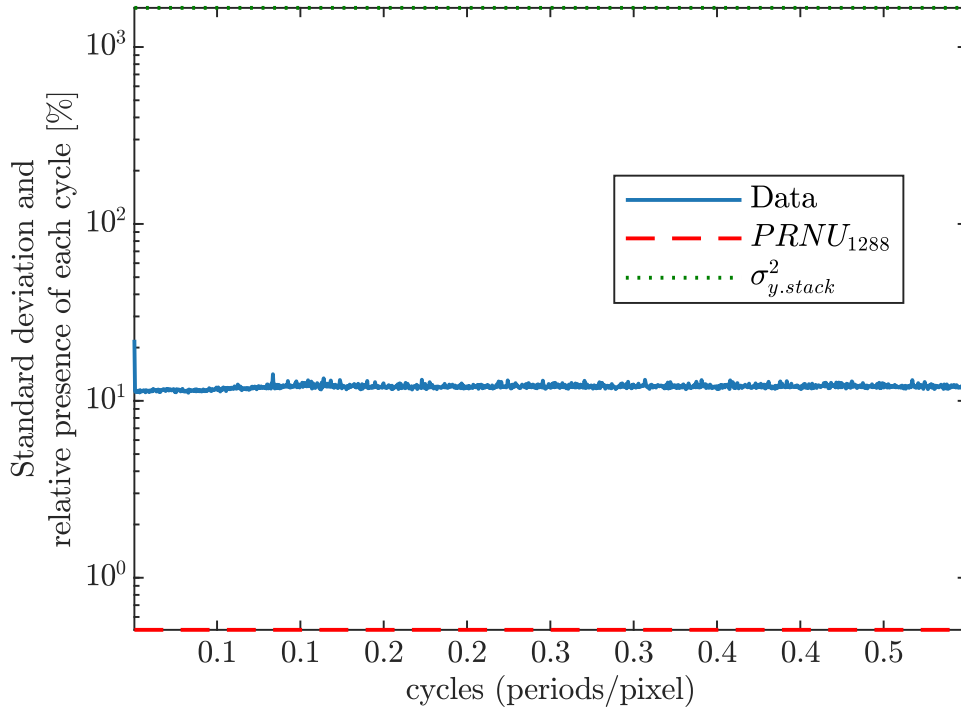
### Horizontal Spectrogram PRNU



### Horizontal Spectrogram DSNU

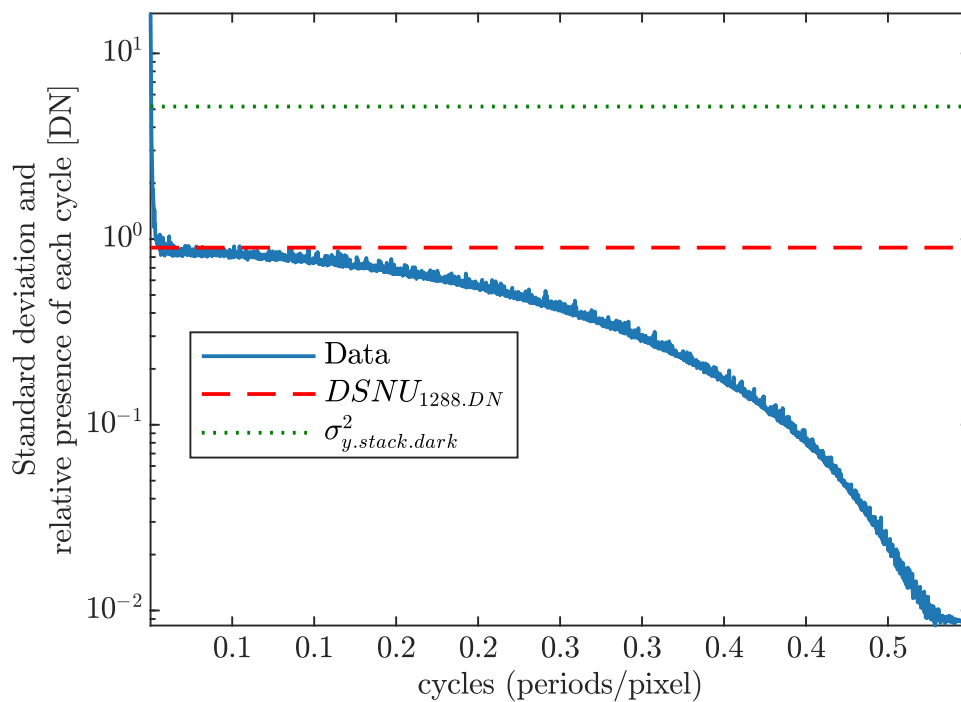


### Vertical Spectrogram PRNU

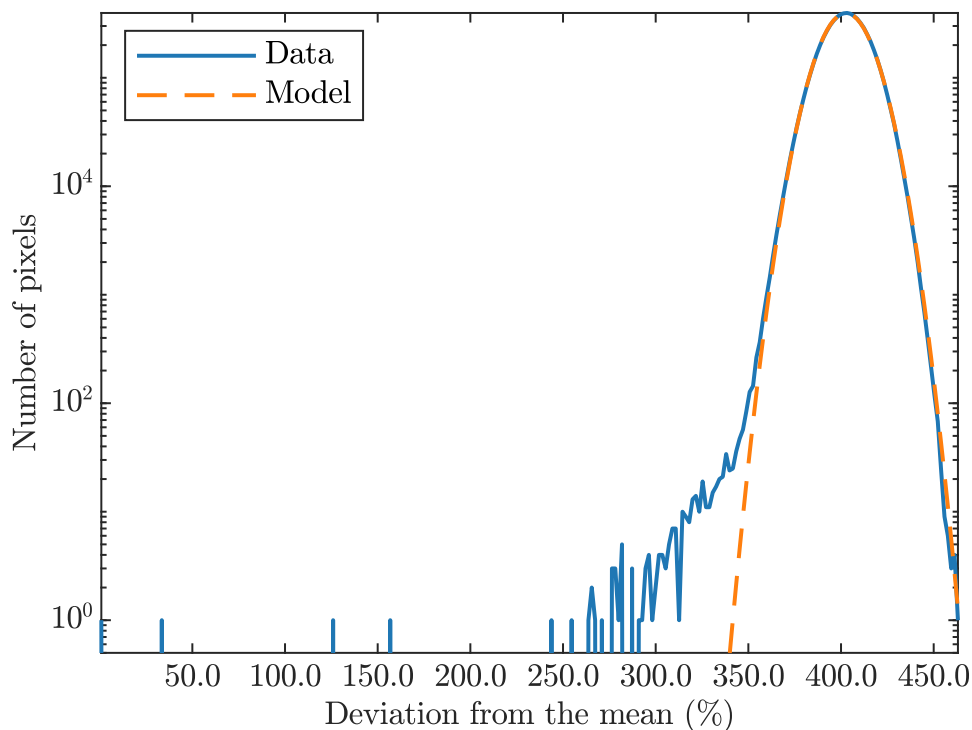




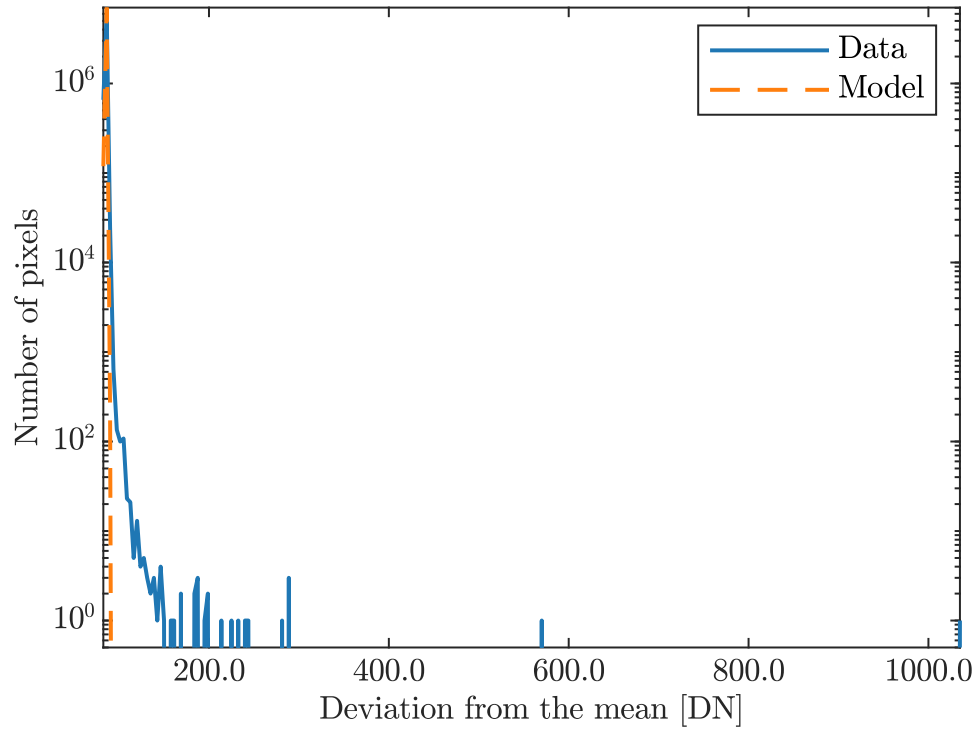
### Vertical Spectrogram DSNU



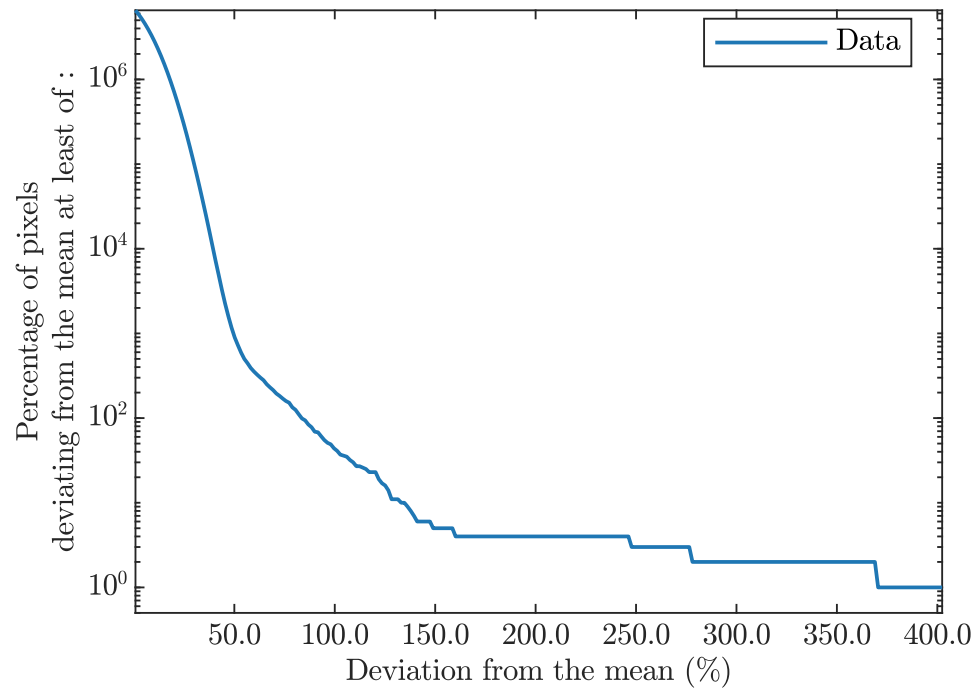
### Logarithmic Histogram PRNU



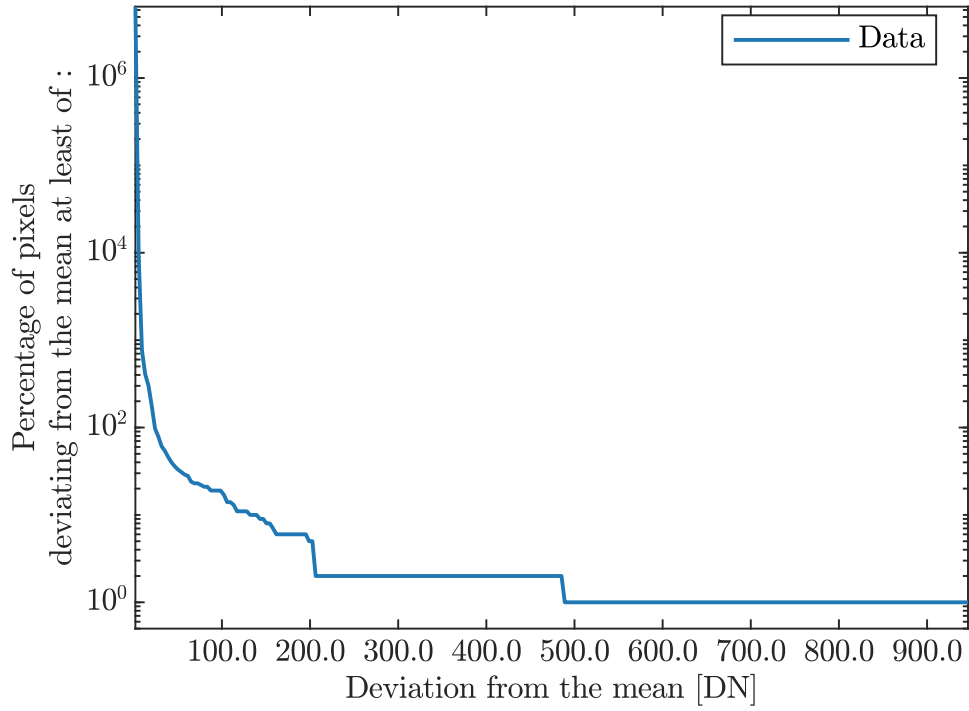
### Logarithmic Histogram DSNU



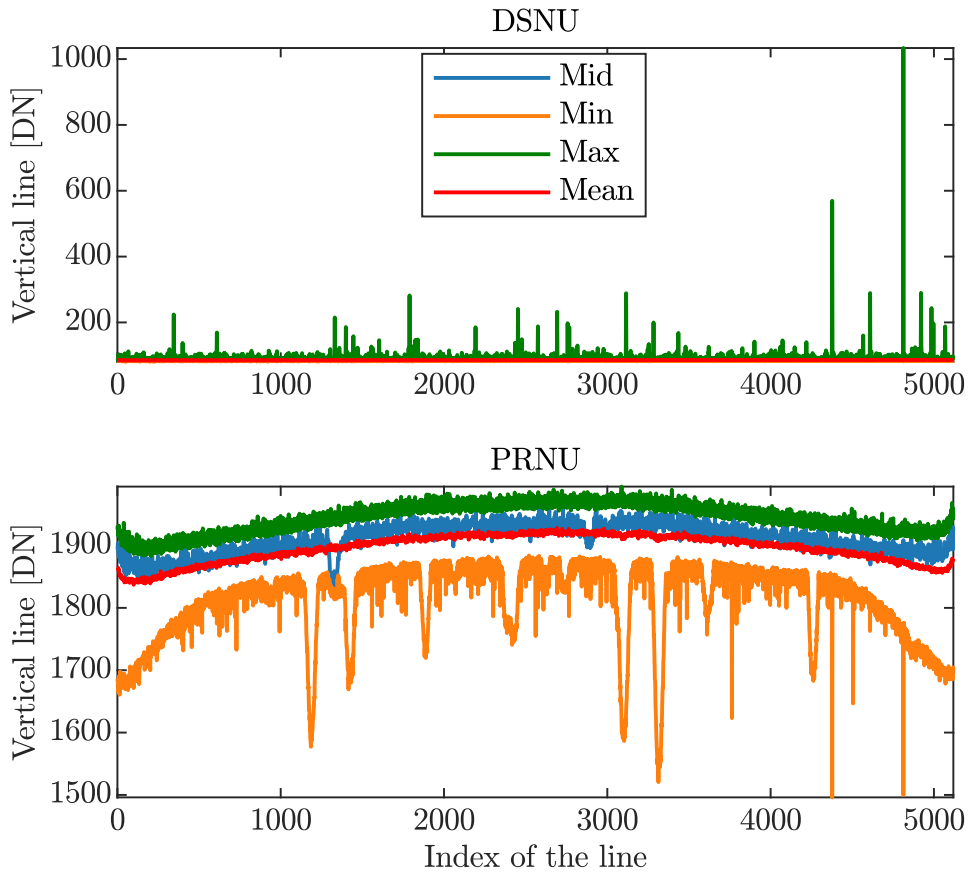
### Accumulated Log Histogram PRNU



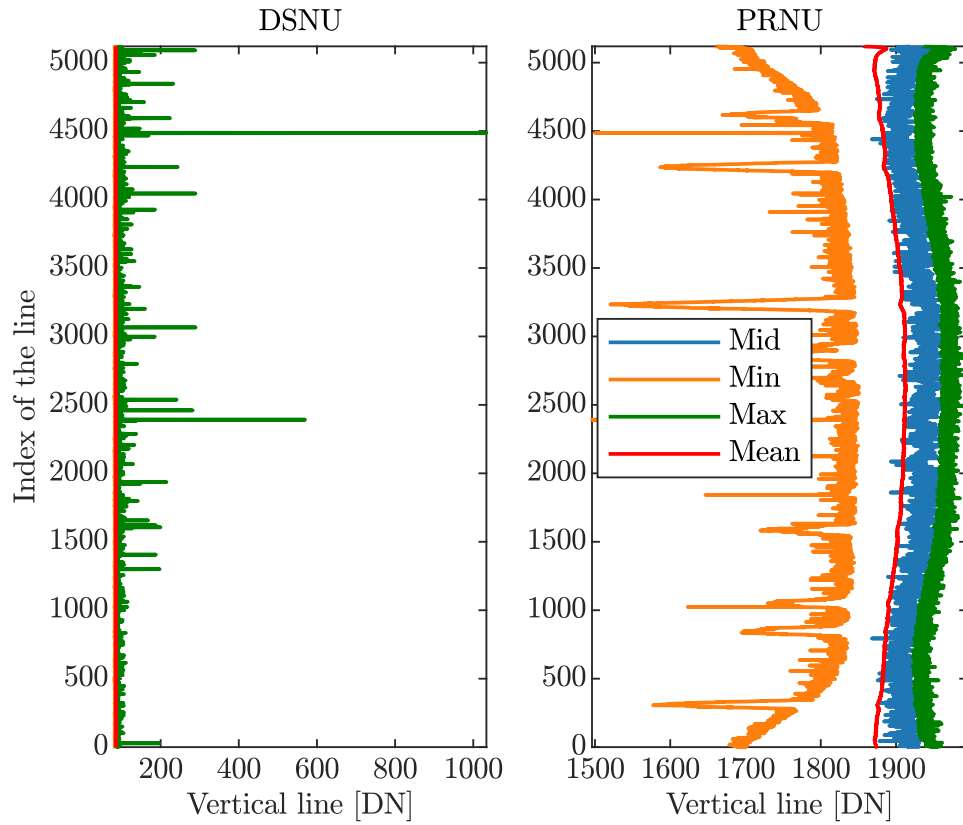
### Accumulated Log Histogram DSNU



### Horizontal Profile

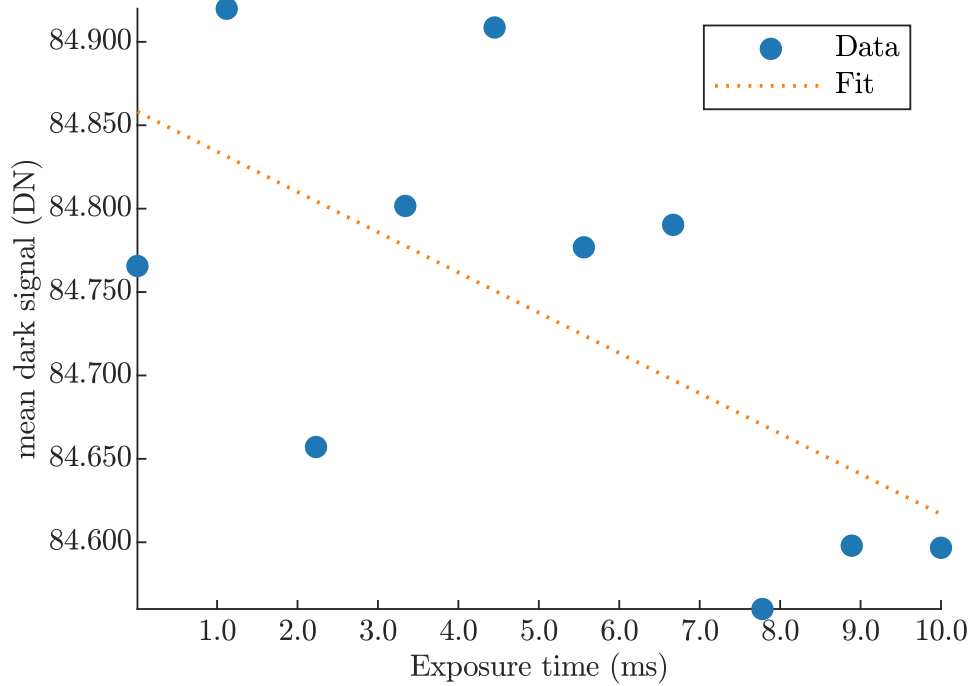


### Vertical Profile

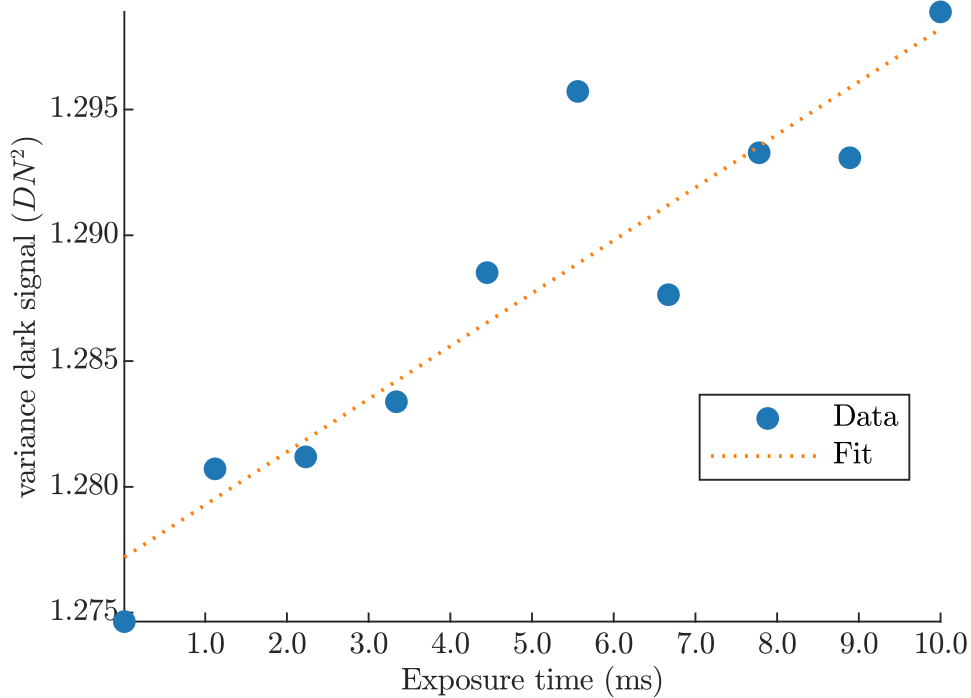


**Dark Current**

**Dark Current from Mean**



**Dark Current from Variance**



International Distributors



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