

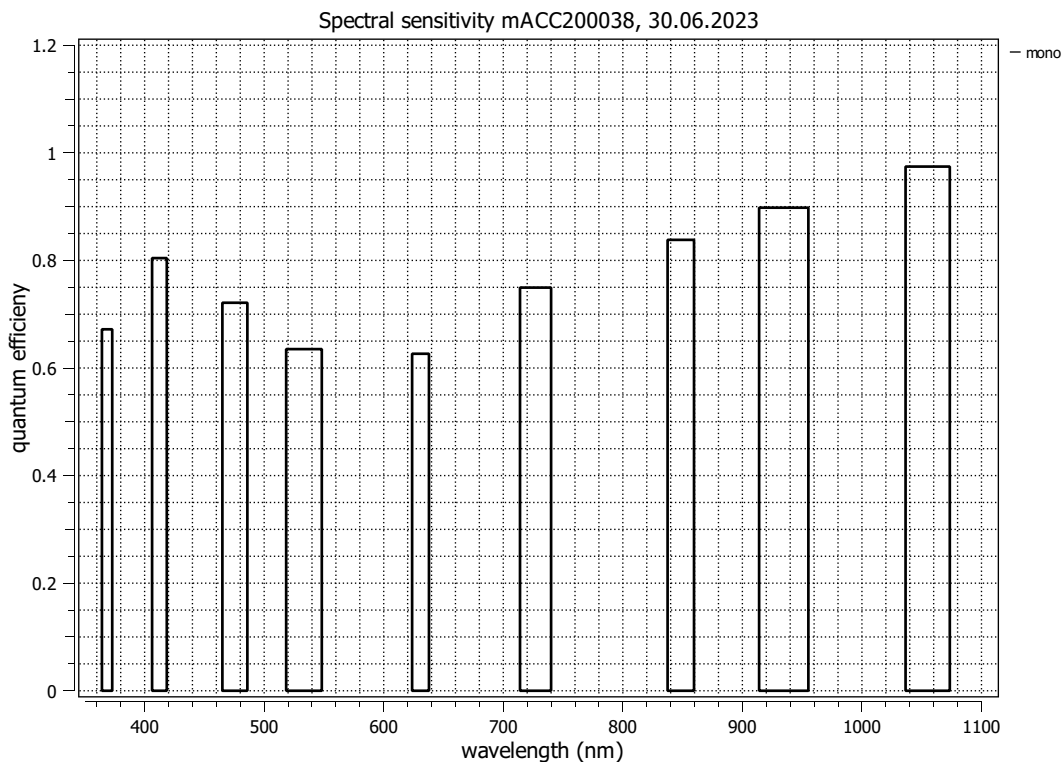
## EMVA 1288 Data Sheet mACC200038

This datasheet describes the specification according to the standard 1288 Release 3.1 issued on 30 December 2016 for "Characterization and Presentation of Specification Data for Image Sensors and Cameras" by the European Machine Vision Association (EMVA), published at <https://www.emva.org/standards-technology/emva-1288/> with proprietary extensions from AEON. The measurements were performed with the AEON ACC2b 14x1 color, Release 9, 13.11.2020, SN 0068(Baumer), software version 2.0.

Measurements performed by Baumer Optronic GmbH. The product features and technical data specified do not express or imply any warranty. Technical modifications subject to change.

Type of data presented	Single	<b>Nr.</b>	<b>Centroid/FWHM</b>	<b>Gain, blacklevel</b>	$t_{exp}$ (ms)
Vendor	Baumer	1	279.5/12.9 nm	1.0 / 15.0	1000
Model	VCXG-14SWIR.XC	2	308.0/11.9 nm	1.0 / 15.0	200
Serial number	700009987367	3	368.6/8.6 nm	1.0 / 15.0	12.0
Sensor diagonal	8.22 mm	4	412.4/12.3 nm	1.0 / 15.0	8.00
Lens category	C-Mount	5	475.5/20.9 nm	1.0 / 15.0	5.00
Resolution	1280 × 1032, 12 bit	6	533.3/29.8 nm	1.0 / 15.0	20.0
Pixel size (h×v)	5.00 μm × 5.00 μm	7	630.8/14.1 nm	1.0 / 15.0	10.0
Sensor	Sony IMX990	8	727.0/26.0 nm	1.0 / 15.0	5.00
Sensor type	CMOS	9	848.5/22.1 nm	1.0 / 15.0	20.0
Shutter type	Global shutter	10	934.6/41.2 nm	1.0 / 15.0	3.00
Overlap cap.	Overlapped	11	1055.0/37.0 nm	1.0 / 15.0	15.0
Max. frame rate	0.0 Hz	12	1167.0/79.0 nm	1.0 / 15.0	30.0
Interface type	GEV	13	1280.0/75.0 nm	1.0 / 15.0	20.0
		14	1526.0/138.0 nm	1.0 / 15.0	30.0

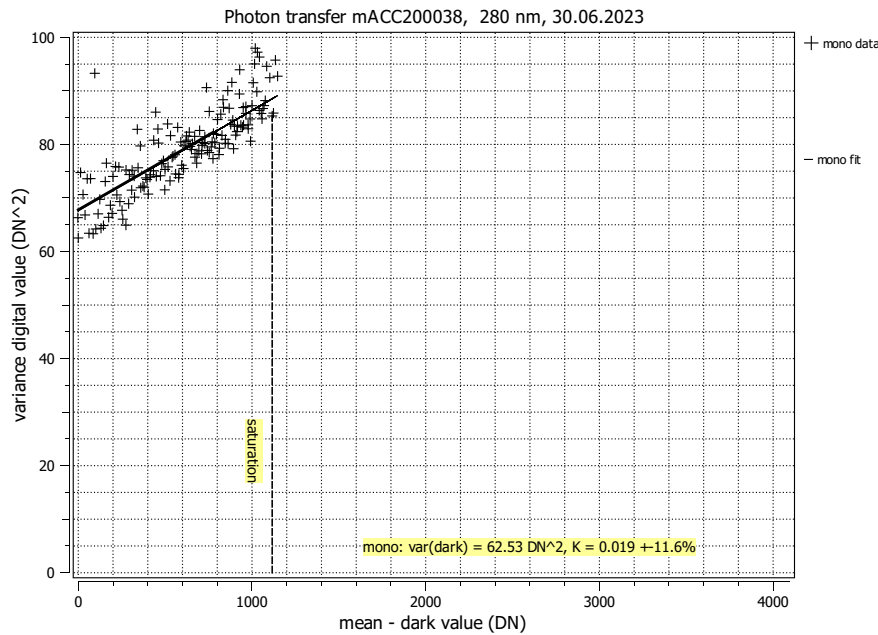
Optional data measured: None



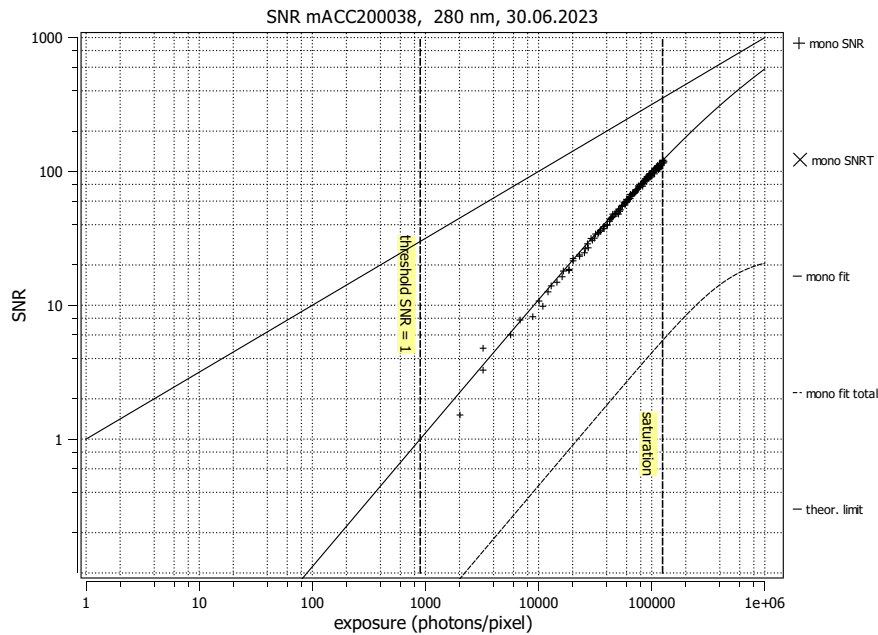
## Summary Sheet for Operation Point 1 at a Wavelength of 280 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	21.8°C
Exposure time	1.000 s	Camera body temperature	22.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	280 nm, 12.9 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  47.0%

#### Overall system gain

$K$  0.01876 DN/e<sup>-</sup>

$1/K$  53.30 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  421 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  7.91 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 242.1

47.7 dB

7.92 bit

$1/\text{SNR}_{\text{max}}$  0.413 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  899 p

$\mu_{p,\text{min},\text{area}}$  35.9 p/ $\mu\text{m}^2$

$\mu_{e,\text{min}}$  422 e<sup>-</sup>

$\mu_{e,\text{min},\text{area}}$  16.9 e<sup>-</sup>/ $\mu\text{m}^2$

#### Saturation capacity

$\mu_{p,\text{sat}}$  124803 p

$\mu_{p,\text{sat},\text{area}}$  4992 p/ $\mu\text{m}^2$

$\mu_{e,\text{sat}}$  58603 e<sup>-</sup>

$\mu_{e,\text{sat},\text{area}}$  2344 e<sup>-</sup>/ $\mu\text{m}^2$

#### Dynamic range

DR 139

42.85 dB

7.12 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 10442 e<sup>-</sup>

196 DN

PRNU<sub>1288</sub> 4.30 %

#### Linearity error

LE<sub>min</sub> -7.17%

LE<sub>max</sub> 8.99%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

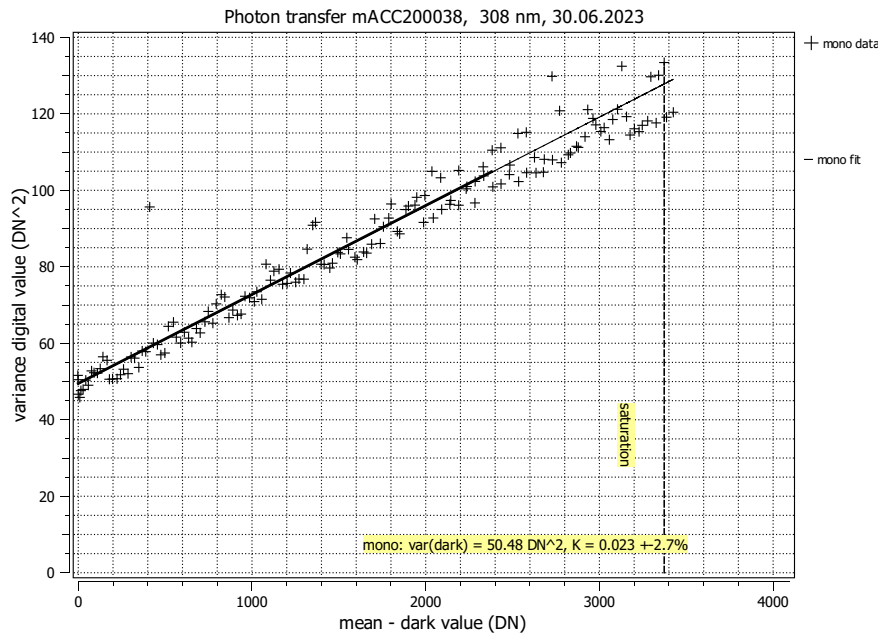
$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

$T_d$  — °C

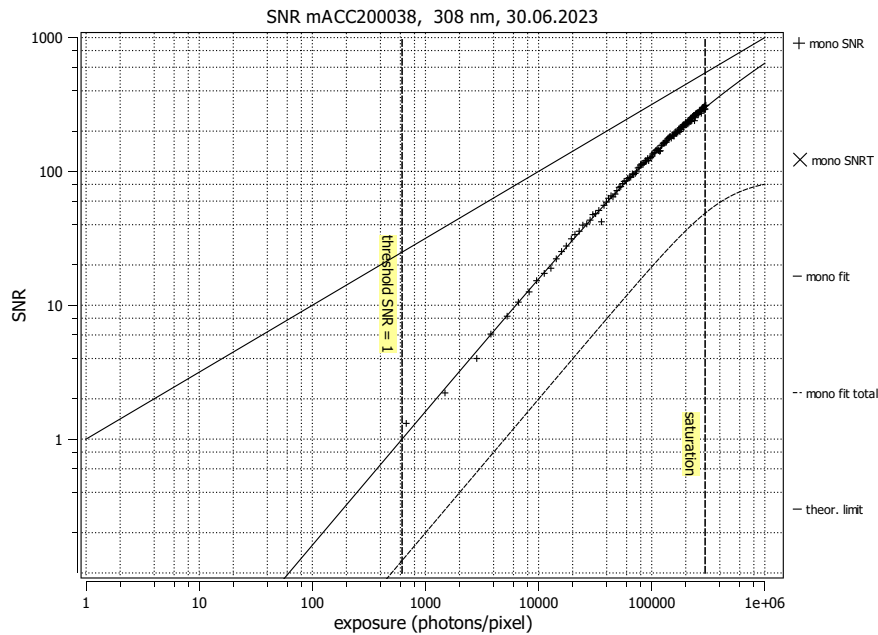
## Summary Sheet for Operation Point 2 at a Wavelength of 308 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.0°C
Exposure time	200.000 ms	Camera body temperature	22.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	308 nm, 11.9 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  49.2%

#### Overall system gain

$K$  0.023261 DN/e<sup>-</sup>

1/ $K$  42.99 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  305 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  7.10 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 382.2

51.6 dB

8.58 bit

1/SNR<sub>max</sub> 0.262 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  621 p

$\mu_{p,\text{min},\text{area}}$  24.9 p/ $\mu\text{m}^2$

$\mu_{e,\text{min}}$  306 e<sup>-</sup>

$\mu_{e,\text{min},\text{area}}$  12.2 e<sup>-</sup>/ $\mu\text{m}^2$

#### Saturation capacity

$\mu_{p,\text{sat}}$  296649 p

$\mu_{p,\text{sat},\text{area}}$  11866 p/ $\mu\text{m}^2$

$\mu_{e,\text{sat}}$  146065 e<sup>-</sup>

$\mu_{e,\text{sat},\text{area}}$  5843 e<sup>-</sup>/ $\mu\text{m}^2$

#### Dynamic range

DR 477

53.58 dB

8.90 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 2453 e<sup>-</sup>

57.1 DN

PRNU<sub>1288</sub> 1.13 %

#### Linearity error

LE<sub>min</sub> -2.07%

LE<sub>max</sub> 1.61%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

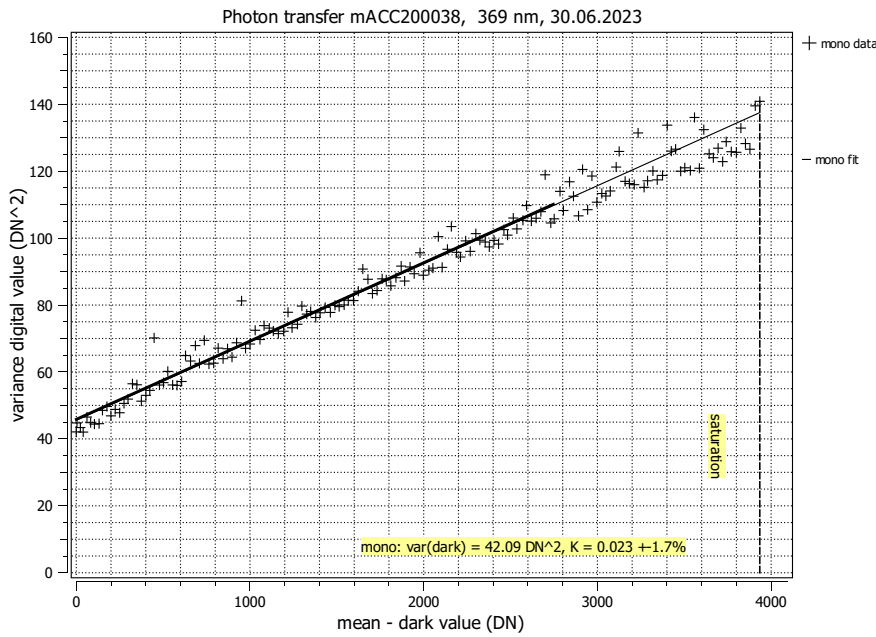
$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

$T_d$  — °C

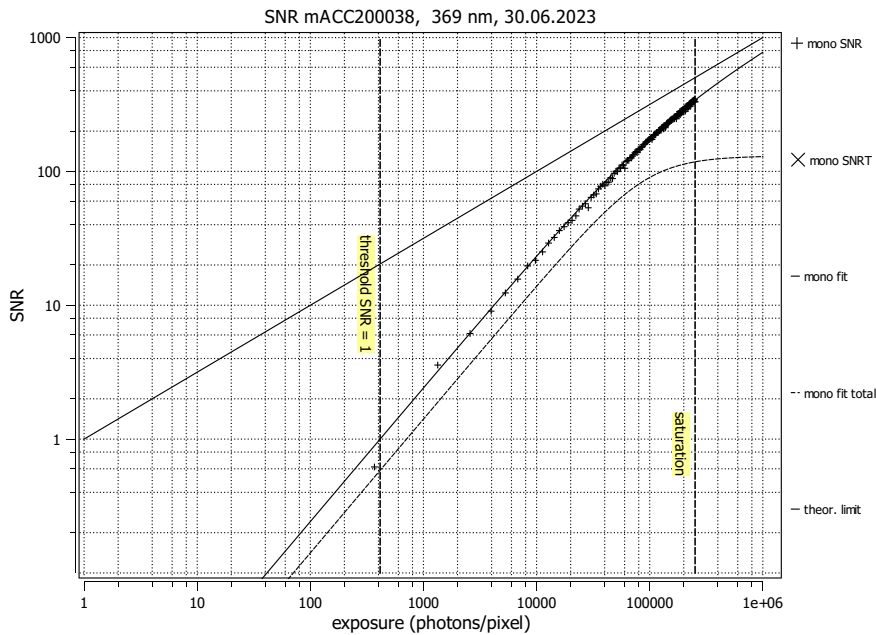
## Summary Sheet for Operation Point 3 at a Wavelength of 369 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.0°C
Exposure time	12.000 ms	Camera body temperature	22.8°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	369 nm, 8.6 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  67.2%

#### Overall system gain

$K$  0.023373 DN/e<sup>-</sup>

1/ $K$  42.78 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  277 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  6.49 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 411.5

52.3 dB

8.68 bit

1/SNR<sub>max</sub> 0.243%

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  414 p

$\mu_{p,\text{min,area}}$  16.6 p/ $\mu\text{m}^2$

$\mu_{e,\text{min}}$  278 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  11.1 e<sup>-</sup>/ $\mu\text{m}^2$

#### Saturation capacity

$\mu_{p,\text{sat}}$  251971 p

$\mu_{p,\text{sat,area}}$  10079 p/ $\mu\text{m}^2$

$\mu_{e,\text{sat}}$  169313 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  6773 e<sup>-</sup>/ $\mu\text{m}^2$

#### Dynamic range

DR 609

55.69 dB

9.25 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 386 e<sup>-</sup>

9.02 DN

PRNU<sub>1288</sub> 0.762%

#### Linearity error

LE<sub>min</sub> -0.73%

LE<sub>max</sub> 0.59%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

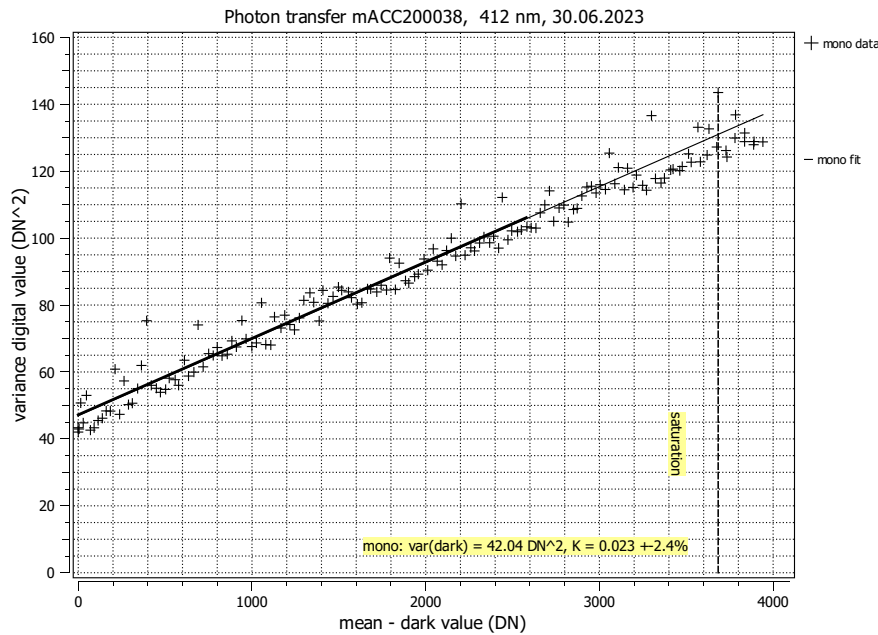
$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

$T_d$  — °C

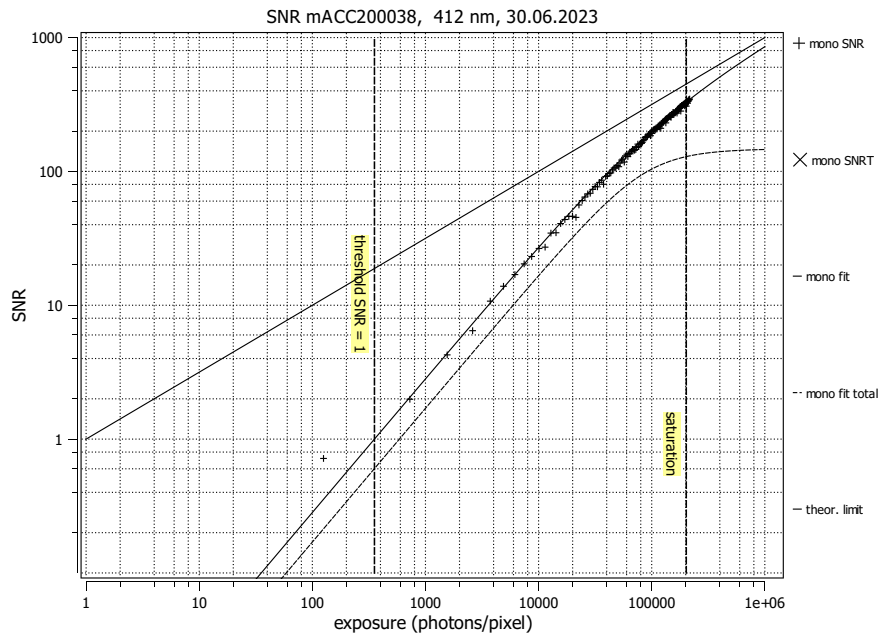
## Summary Sheet for Operation Point 4 at a Wavelength of 412 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.0°C
Exposure time	8.000 ms	Camera body temperature	22.8°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	412 nm, 12.3 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  80.4%

#### Overall system gain

$K$  0.022813 DN/e<sup>-</sup>

$1/K$  43.83 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  284 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  6.48 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 403.2

52.1 dB

8.66 bit

$1/\text{SNR}_{\text{max}}$  0.248 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  354 p

$\mu_{p,\text{min.area}}$  14.2 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  285 e<sup>-</sup>

$\mu_{e,\text{min.area}}$  11.4 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  202105 p

$\mu_{p,\text{sat.area}}$  8084 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  162552 e<sup>-</sup>

$\mu_{e,\text{sat.area}}$  6502 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 571

55.13 dB

9.16 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 378 e<sup>-</sup>

8.61 DN

PRNU<sub>1288</sub> 0.674 %

#### Linearity error

LE<sub>min</sub> -1.25%

LE<sub>max</sub> 0.82%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

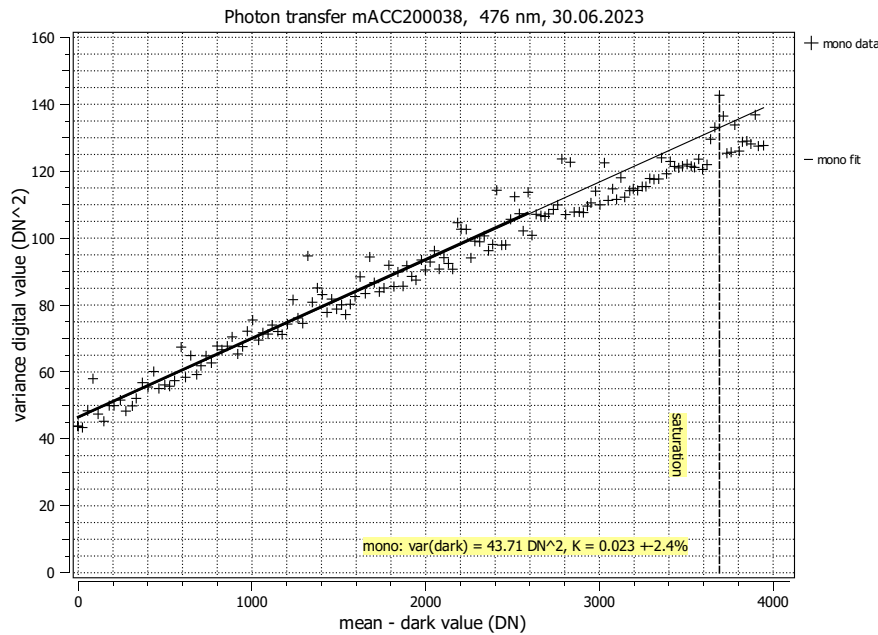
$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

$T_d$  — °C

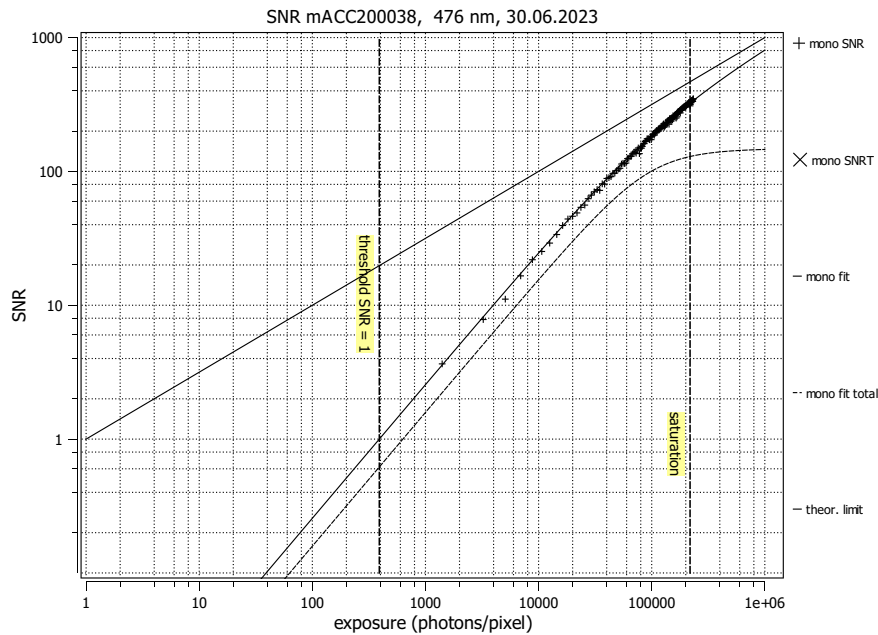
## Summary Sheet for Operation Point 5 at a Wavelength of 476 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.0°C
Exposure time	5.000 ms	Camera body temperature	22.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	476 nm, 20.9 nm

### Photon Transfer



### Signal-to-Noise Ratio

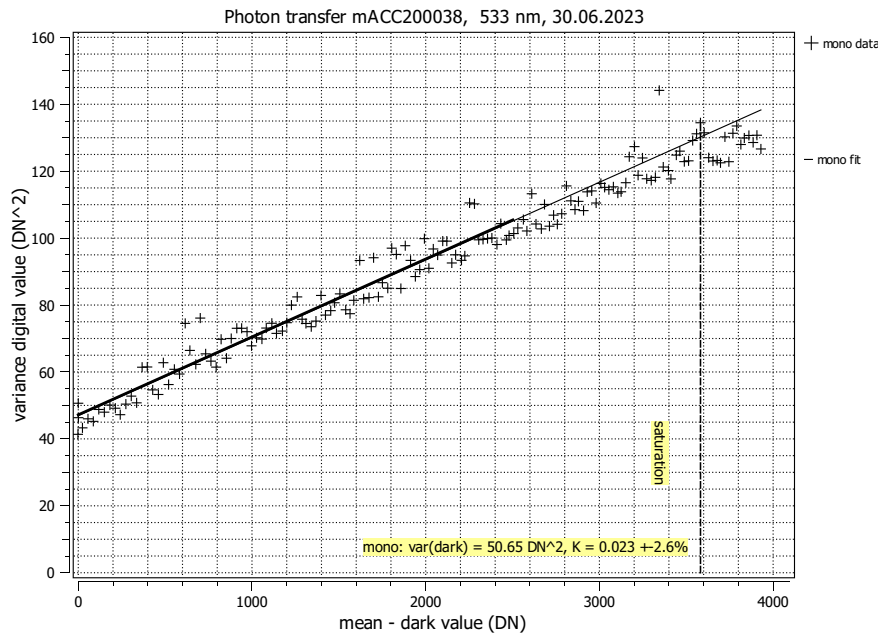


<b>Quantum efficiency</b>	
$\eta$	72.1%
<b>Overall system gain</b>	
$K$	0.023489 DN/e <sup>-</sup>
$1/K$	42.57 e <sup>-</sup> /DN
<b>Temporal dark noise</b>	
$\sigma_d$	281 e <sup>-</sup>
$\sigma_{y,\text{dark}}$	6.61 DN
<b>Signal-to-noise ratio</b>	
$\text{SNR}_{\text{max}}$	396.8
	52.0 dB
	8.63 bit
$1/\text{SNR}_{\text{max}}$	0.252 %
<b>Absolute sensitivity threshold</b>	
$\mu_{p,\text{min}}$	391 p
$\mu_{p,\text{min.area}}$	15.6 p/ $\mu\text{m}^2$
$\mu_{e,\text{min}}$	282 e <sup>-</sup>
$\mu_{e,\text{min.area}}$	11.3 e <sup>-</sup> / $\mu\text{m}^2$
<b>Saturation capacity</b>	
$\mu_{p,\text{sat}}$	218321 p
$\mu_{p,\text{sat.area}}$	8733 p/ $\mu\text{m}^2$
$\mu_{e,\text{sat}}$	157474 e <sup>-</sup>
$\mu_{e,\text{sat.area}}$	6299 e <sup>-</sup> / $\mu\text{m}^2$
<b>Dynamic range</b>	
DR	559
	54.94 dB
	9.13 bit
<b>Spatial nonuniformities</b>	
DSNU <sub>1288</sub>	358 e <sup>-</sup>
	8.40 DN
PRNU <sub>1288</sub>	0.672 %
<b>Linearity error</b>	
LE <sub>min</sub>	-2.04%
LE <sub>max</sub>	1.86%
<b>Dark current</b>	
$\mu_{c,\text{mean}}$	— e <sup>-</sup> /s
	— DN/s
$\mu_{c,\text{var}}$	— e <sup>-</sup> /s
$T_d$	— °C

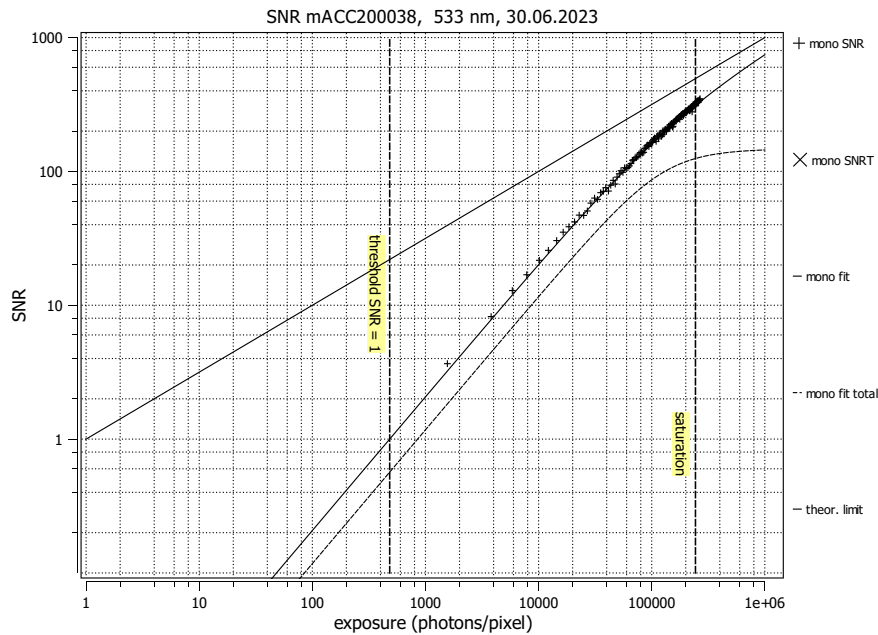
## Summary Sheet for Operation Point 6 at a Wavelength of 533 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.1°C
Exposure time	20.000 ms	Camera body temperature	22.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	533 nm, 29.8 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  63.5%

#### Overall system gain

$K$  0.023248 DN/e<sup>-</sup>

1/ $K$  43.01 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  306 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  7.12 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 393.4

51.9 dB

8.62 bit

1/SNR<sub>max</sub> 0.254 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  483 p

$\mu_{p,\text{min.area}}$  19.3 p/ $\mu\text{m}^2$

$\mu_{e,\text{min}}$  307 e<sup>-</sup>

$\mu_{e,\text{min.area}}$  12.3 e<sup>-</sup>/ $\mu\text{m}^2$

#### Saturation capacity

$\mu_{p,\text{sat}}$  243716 p

$\mu_{p,\text{sat.area}}$  9749 p/ $\mu\text{m}^2$

$\mu_{e,\text{sat}}$  154786 e<sup>-</sup>

$\mu_{e,\text{sat.area}}$  6191 e<sup>-</sup>/ $\mu\text{m}^2$

#### Dynamic range

DR 505

54.06 dB

8.98 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 446 e<sup>-</sup>

10.4 DN

PRNU<sub>1288</sub> 0.674 %

#### Linearity error

LE<sub>min</sub> -0.96%

LE<sub>max</sub> 0.84%

#### Dark current

$\mu_{c,\text{mean}}$  1957 e<sup>-</sup>/s

36.7 DN/s

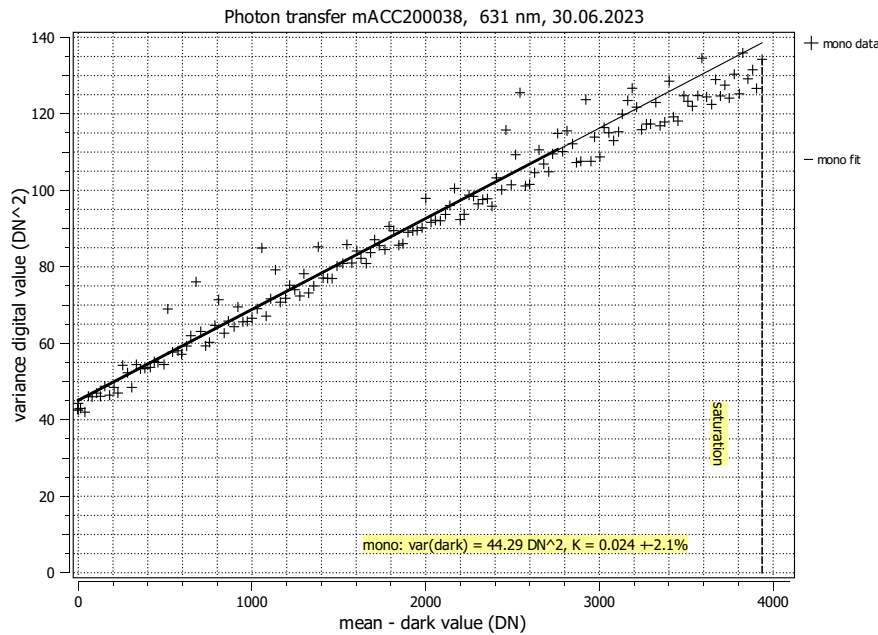
$\mu_{c,\text{var}}$  -3143 e<sup>-</sup>/s

$T_d$  — °C

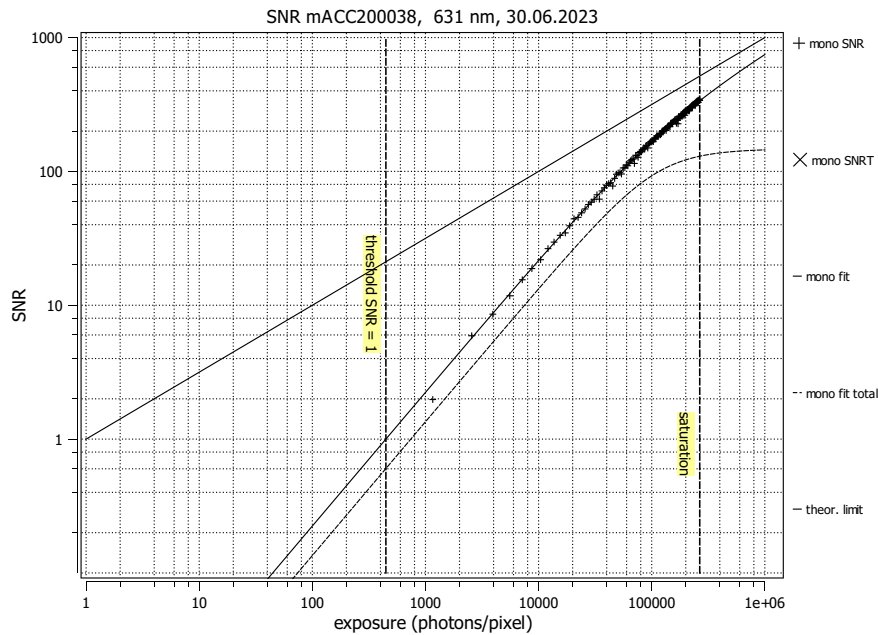
## Summary Sheet for Operation Point 7 at a Wavelength of 631 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.2°C
Exposure time	10.000 ms	Camera body temperature	22.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	631 nm, 14.1 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  62.6%

#### Overall system gain

$K$  0.023815 DN/e<sup>-</sup>

1/ $K$  41.99 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  279 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  6.65 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 408.1

52.2 dB

8.67 bit

1/SNR<sub>max</sub> 0.245%

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  447 p

$\mu_{p,\text{min},\text{area}}$  17.9 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  280 e<sup>-</sup>

$\mu_{e,\text{min},\text{area}}$  11.2 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  265837 p

$\mu_{p,\text{sat},\text{area}}$  10633 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  166543 e<sup>-</sup>

$\mu_{e,\text{sat},\text{area}}$  6662 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 595

55.49 dB

9.22 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 371 e<sup>-</sup>

8.83 DN

PRNU<sub>1288</sub> 0.674%

#### Linearity error

LE<sub>min</sub> -1.99%

LE<sub>max</sub> 0.85%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

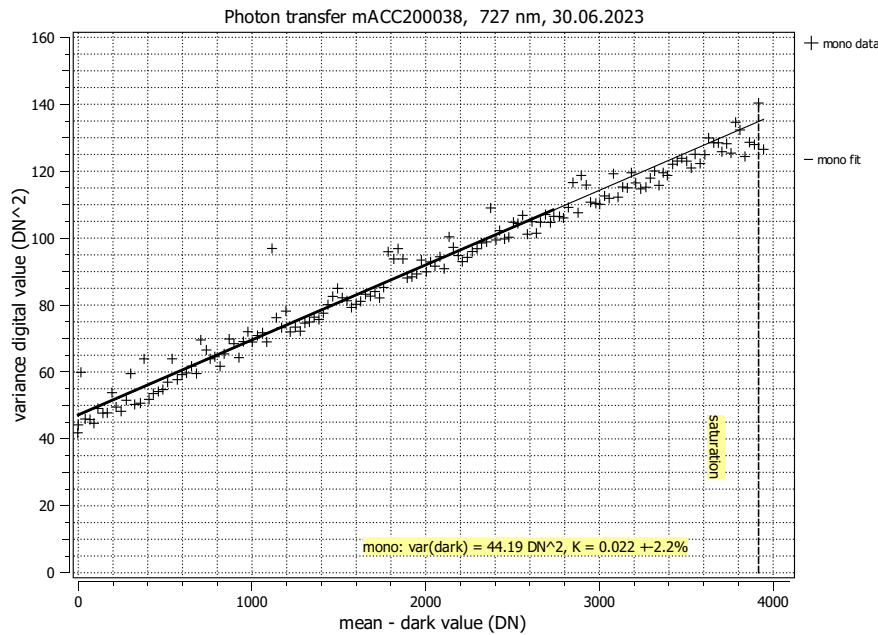
$T_d$  — °C



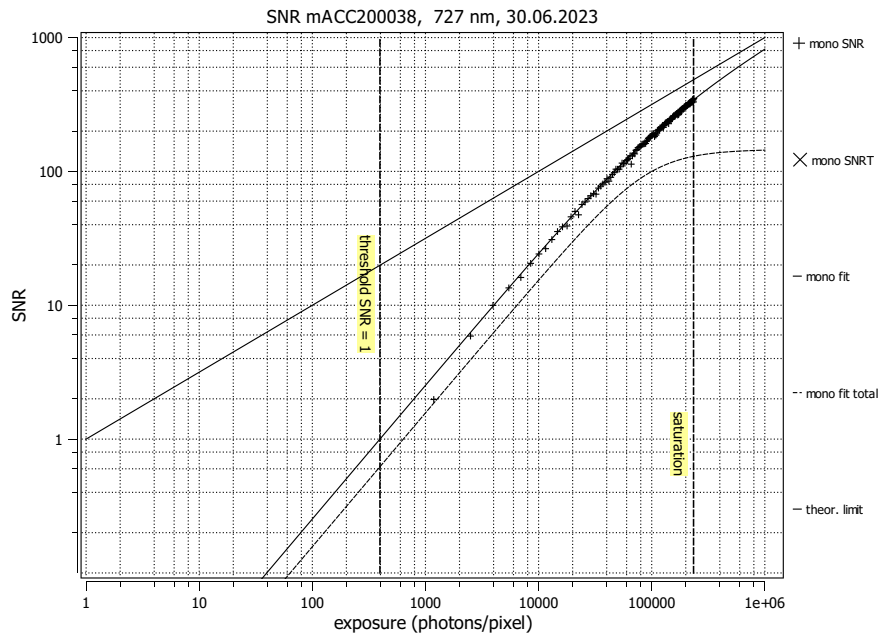
## Summary Sheet for Operation Point 8 at a Wavelength of 727 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.1°C
Exposure time	5.000 ms	Camera body temperature	22.8°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	727 nm, 26.0 nm

### Photon Transfer



### Signal-to-Noise Ratio

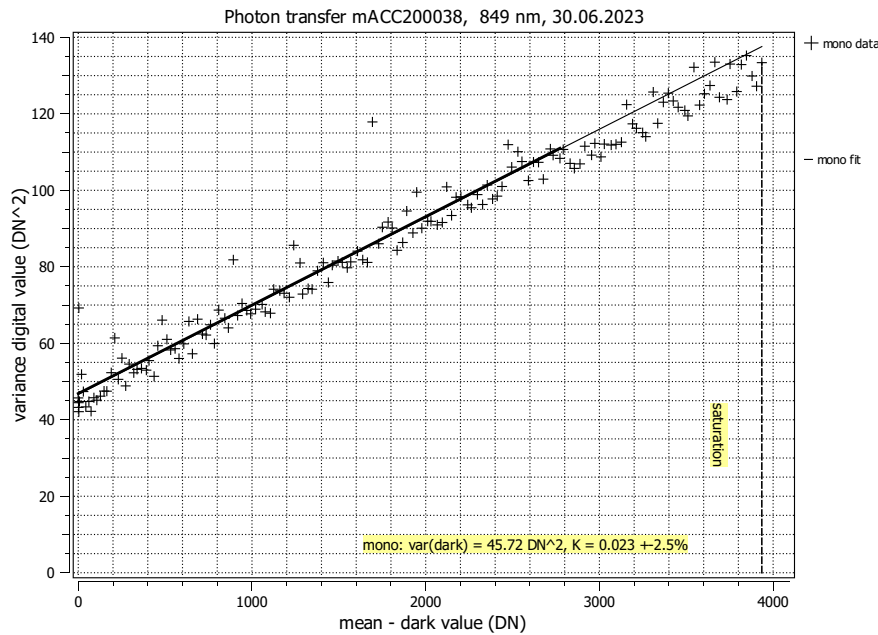


<b>Quantum efficiency</b>	
$\eta$	74.9%
<b>Overall system gain</b>	
$K$	0.022447 DN/e <sup>-</sup>
$1/K$	44.55 e <sup>-</sup> /DN
<b>Temporal dark noise</b>	
$\sigma_d$	296 e <sup>-</sup>
$\sigma_{y,\text{dark}}$	6.65 DN
<b>Signal-to-noise ratio</b>	
SNR <sub>max</sub>	419.1
	52.4 dB
	8.71 bit
$1/\text{SNR}_{\text{max}}$	0.239%
<b>Absolute sensitivity threshold</b>	
$\mu_{p,\text{min}}$	396 p
$\mu_{p,\text{min,area}}$	15.8 p/μm <sup>2</sup>
$\mu_{e,\text{min}}$	297 e <sup>-</sup>
$\mu_{e,\text{min,area}}$	11.9 e <sup>-</sup> /μm <sup>2</sup>
<b>Saturation capacity</b>	
$\mu_{p,\text{sat}}$	234404 p
$\mu_{p,\text{sat,area}}$	9376 p/μm <sup>2</sup>
$\mu_{e,\text{sat}}$	175675 e <sup>-</sup>
$\mu_{e,\text{sat,area}}$	7027 e <sup>-</sup> /μm <sup>2</sup>
<b>Dynamic range</b>	
DR	592
	55.45 dB
	9.21 bit
<b>Spatial nonuniformities</b>	
DSNU <sub>1288</sub>	374 e <sup>-</sup>
	8.39 DN
PRNU <sub>1288</sub>	0.681%
<b>Linearity error</b>	
LE <sub>min</sub>	-1.58%
LE <sub>max</sub>	1.12%
<b>Dark current</b>	
$\mu_{c,\text{mean}}$	— e <sup>-</sup> /s
	— DN/s
$\mu_{c,\text{var}}$	— e <sup>-</sup> /s
$T_d$	— °C

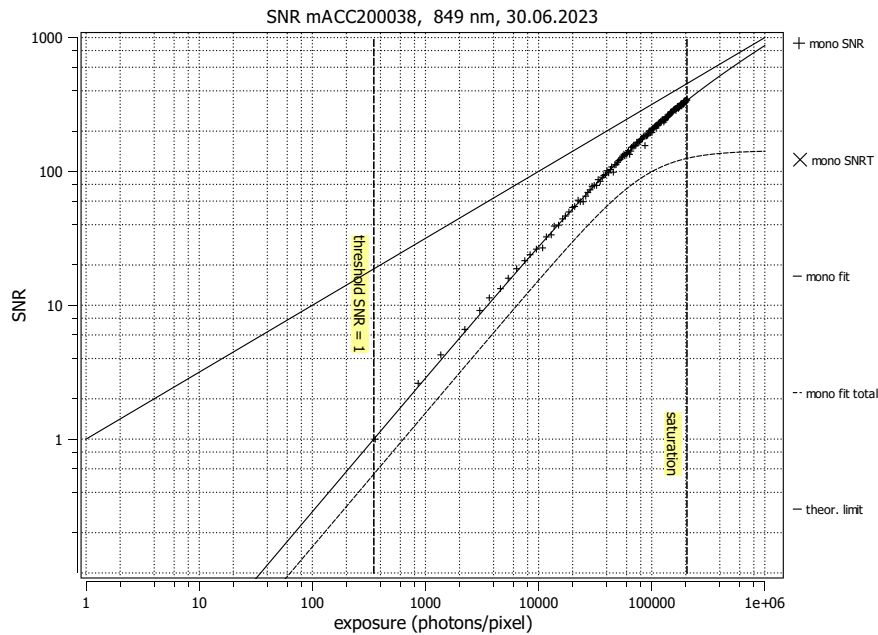
## Summary Sheet for Operation Point 9 at a Wavelength of 849 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.1°C
Exposure time	20.000 ms	Camera body temperature	23.0°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	849 nm, 22.1 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  83.8%

#### Overall system gain

$K$  0.023114 DN/e<sup>-</sup>

1/ $K$  43.26 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  292 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  6.76 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 414.5

52.3 dB

8.70 bit

1/SNR<sub>max</sub> 0.241 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  350 p

$\mu_{p,\text{min,area}}$  14.0 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  293 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  11.7 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  204938 p

$\mu_{p,\text{sat,area}}$  8198 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  171783 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  6871 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 586

55.36 dB

9.20 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 448 e<sup>-</sup>

10.3 DN

PRNU<sub>1288</sub> 0.695 %

#### Linearity error

LE<sub>min</sub> -2.07%

LE<sub>max</sub> 1.10%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

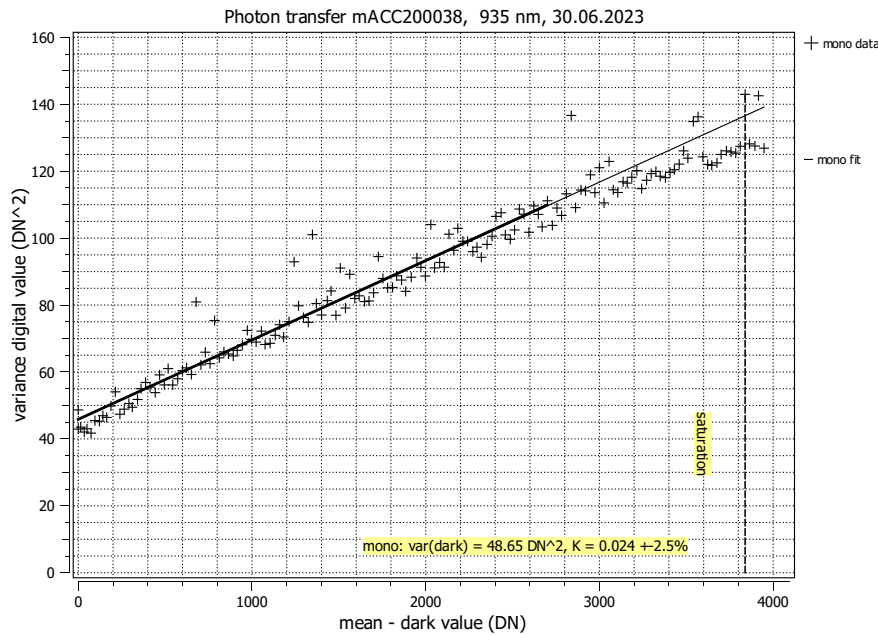
$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

$T_d$  — °C

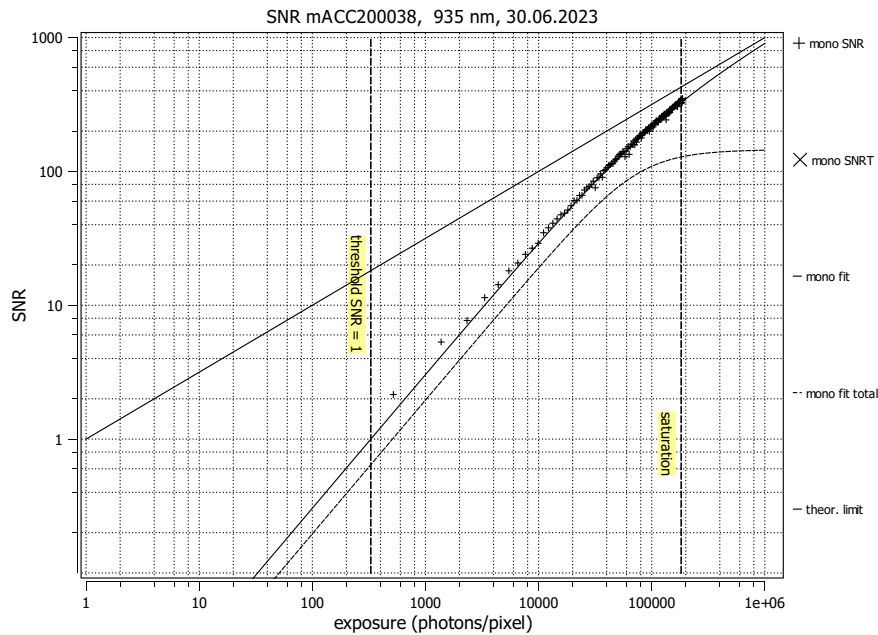
## Summary Sheet for Operation Point 10 at a Wavelength of 935 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.2°C
Exposure time	3.000 ms	Camera body temperature	22.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	935 nm, 41.2 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  89.8%

#### Overall system gain

$K$  0.023662 DN/e<sup>-</sup>

1/ $K$  42.26 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  295 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  6.98 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 404.5

52.1 dB

8.66 bit

1/SNR<sub>max</sub> 0.247%

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  329 p

$\mu_{p,\text{min,area}}$  13.2 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  295 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  11.8 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  182160 p

$\mu_{p,\text{sat,area}}$  7286 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  163585 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  6543 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 554

54.87 dB

9.11 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 351 e<sup>-</sup>

8.30 DN

PRNU<sub>1288</sub> 0.684%

#### Linearity error

LE<sub>min</sub> -1.43%

LE<sub>max</sub> 1.14%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

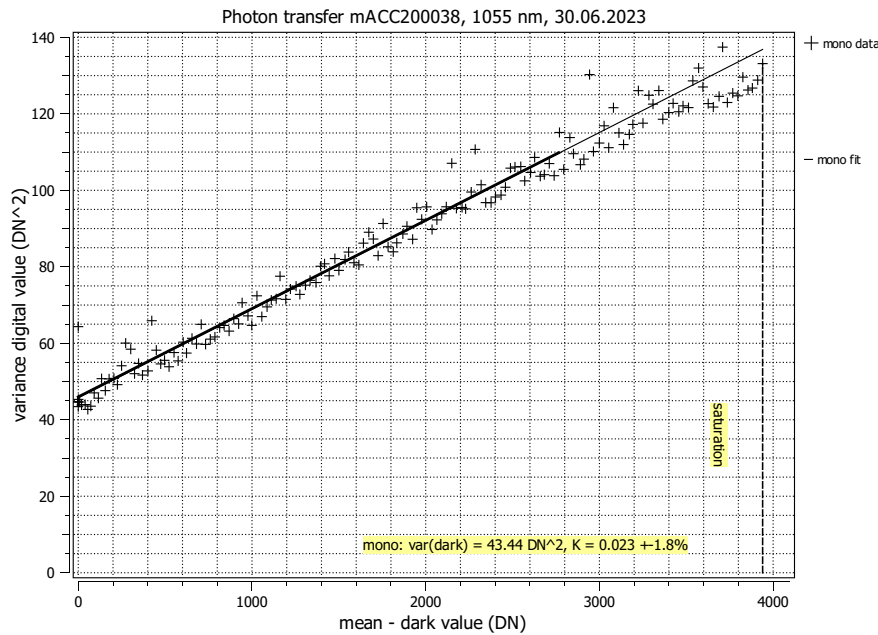
$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

$T_d$  — °C

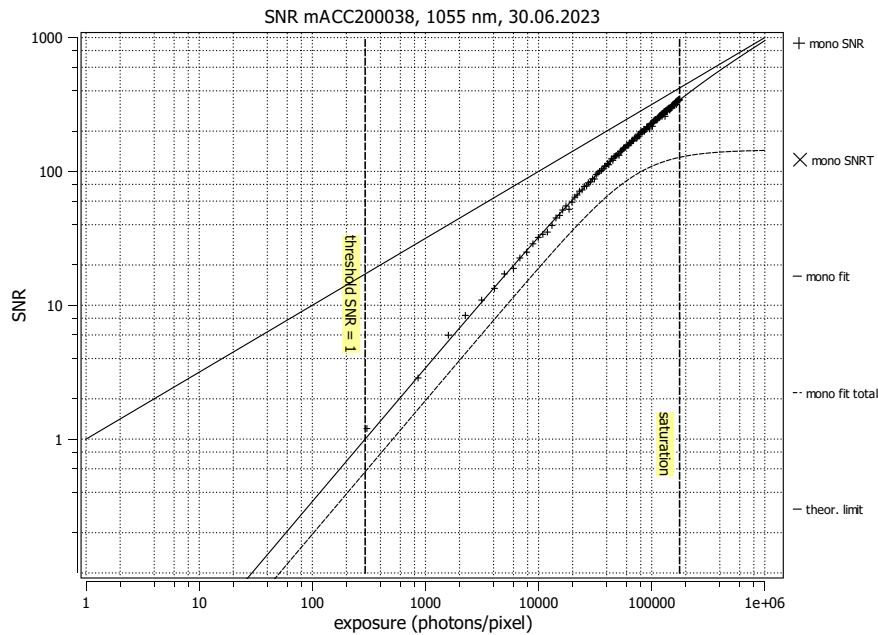
## Summary Sheet for Operation Point 11 at a Wavelength of 1055 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.2°C
Exposure time	15.000 ms	Camera body temperature	22.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	1055 nm, 37.0 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  97.4%

#### Overall system gain

$K$  0.023122 DN/e<sup>-</sup>

1/ $K$  43.25 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  285 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  6.59 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 414.6

52.4 dB

8.70 bit

1/SNR<sub>max</sub> 0.241 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  293 p

$\mu_{p,\text{min,area}}$  11.7 p/ $\mu\text{m}^2$

$\mu_{e,\text{min}}$  286 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  11.4 e<sup>-</sup>/ $\mu\text{m}^2$

#### Saturation capacity

$\mu_{p,\text{sat}}$  176433 p

$\mu_{p,\text{sat,area}}$  7057 p/ $\mu\text{m}^2$

$\mu_{e,\text{sat}}$  171924 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  6877 e<sup>-</sup>/ $\mu\text{m}^2$

#### Dynamic range

DR 602

55.59 dB

9.23 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 412 e<sup>-</sup>

9.52 DN

PRNU<sub>1288</sub> 0.688 %

#### Linearity error

LE<sub>min</sub> -1.47%

LE<sub>max</sub> 0.99%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

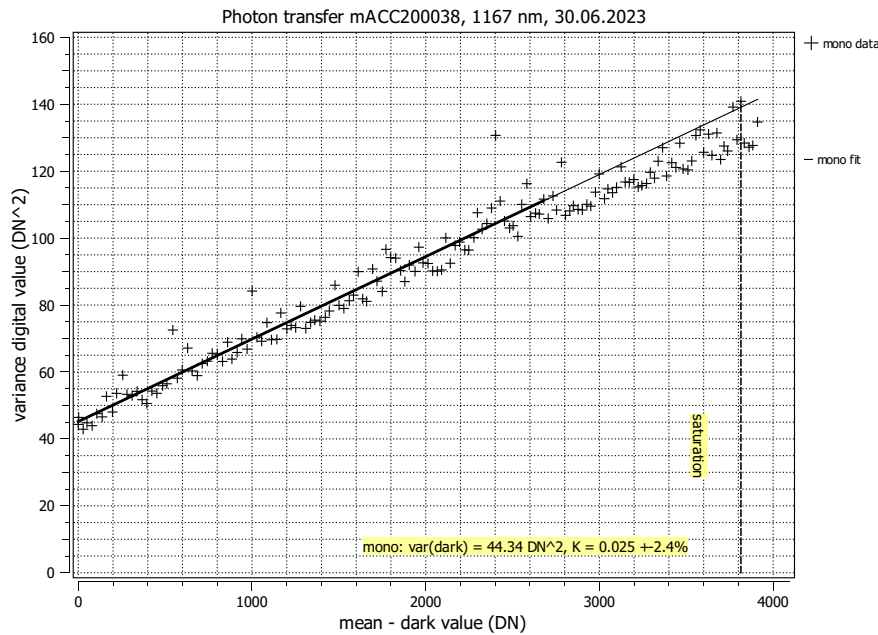
$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

$T_d$  — °C

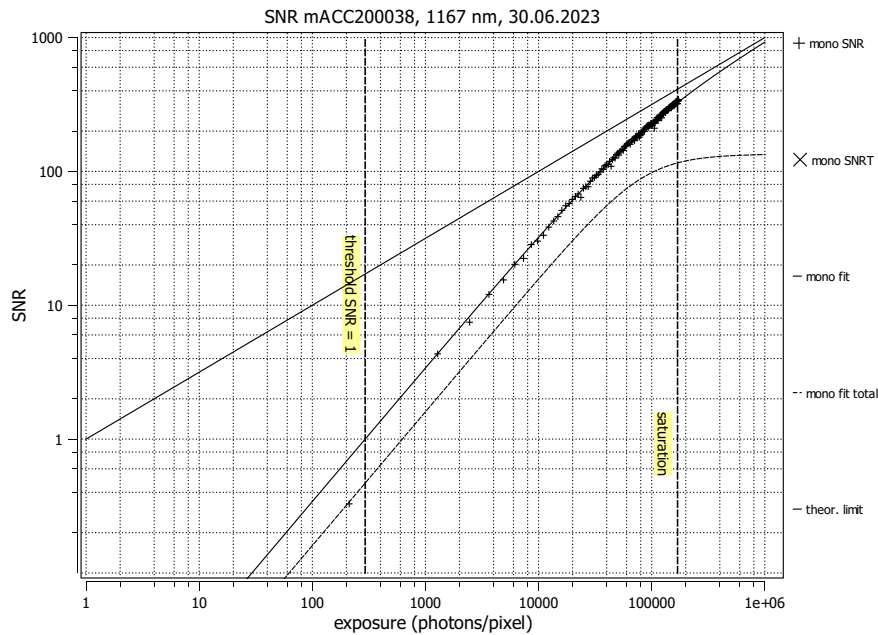
## Summary Sheet for Operation Point 12 at a Wavelength of 1167 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.2°C
Exposure time	30.000 ms	Camera body temperature	23.0°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	1167 nm, 79.0 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  92.3%

#### Overall system gain

$K$  0.024655 DN/e<sup>-</sup>

1/ $K$  40.56 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  270 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  6.66 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 395.3

51.9 dB

8.63 bit

1/SNR<sub>max</sub> 0.253%

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  293 p

$\mu_{p,\text{min,area}}$  11.7 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  271 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  10.8 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  169257 p

$\mu_{p,\text{sat,area}}$  6770 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  156255 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  6250 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 578

55.23 dB

9.17 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 509 e<sup>-</sup>

12.5 DN

PRNU<sub>1288</sub> 0.739%

#### Linearity error

LE<sub>min</sub> -1.97%

LE<sub>max</sub> 1.02%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

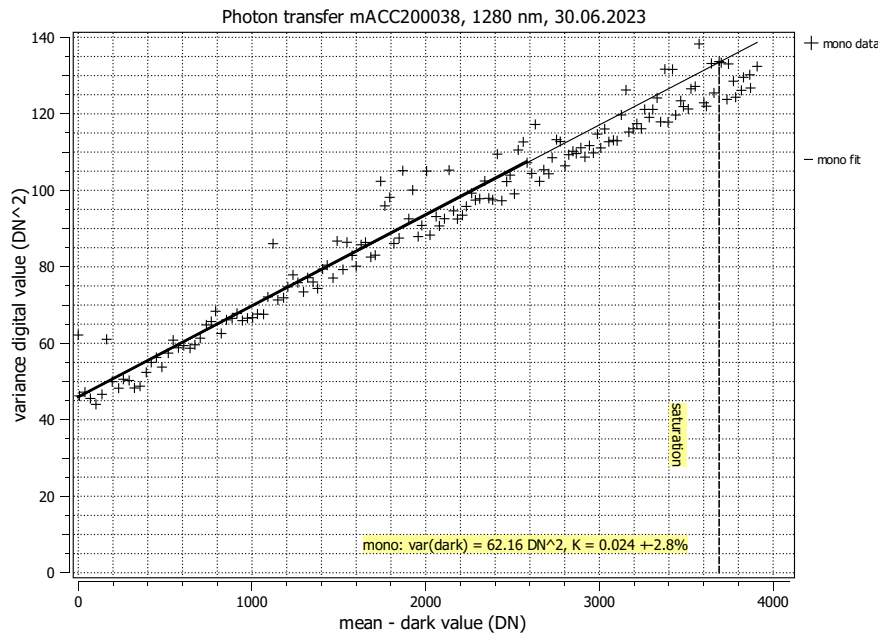
$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

$T_d$  — °C

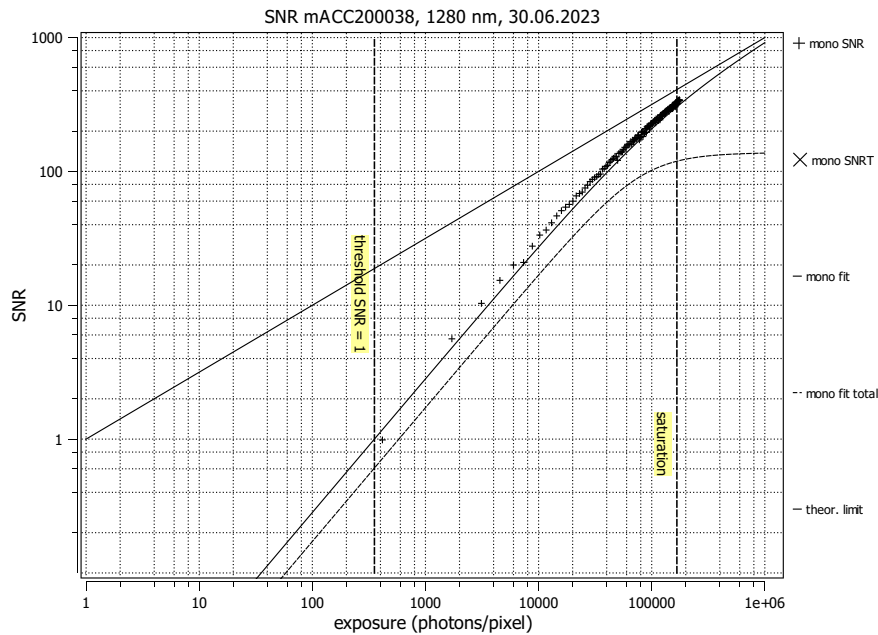
## Summary Sheet for Operation Point 13 at a Wavelength of 1280 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	22.2°C
Exposure time	20.000 ms	Camera body temperature	23.0°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	1280 nm, 75.0 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  93.9%

#### Overall system gain

$K$  0.023757 DN/e<sup>-</sup>

1/ $K$  42.09 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  332 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  7.88 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 396.0

52.0 dB

8.63 bit

1/SNR<sub>max</sub> 0.252 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  354 p

$\mu_{p,\text{min.area}}$  14.2 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  332 e<sup>-</sup>

$\mu_{e,\text{min.area}}$  13.3 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  166973 p

$\mu_{p,\text{sat.area}}$  6679 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  156852 e<sup>-</sup>

$\mu_{e,\text{sat.area}}$  6274 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 472

53.48 dB

8.88 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 434 e<sup>-</sup>

10.3 DN

PRNU<sub>1288</sub> 0.720 %

#### Linearity error

LE<sub>min</sub> -1.98%

LE<sub>max</sub> 1.15%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

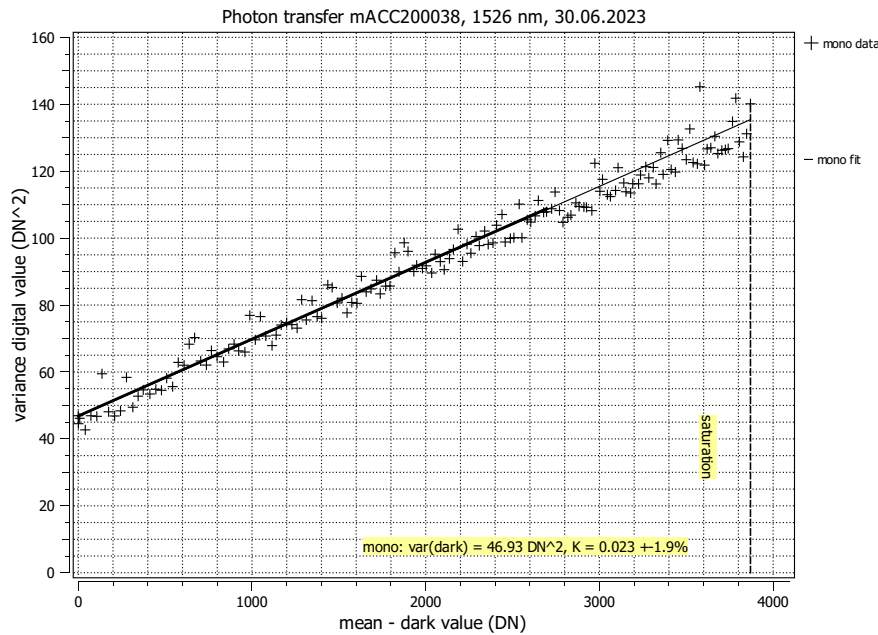
$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

$T_d$  — °C

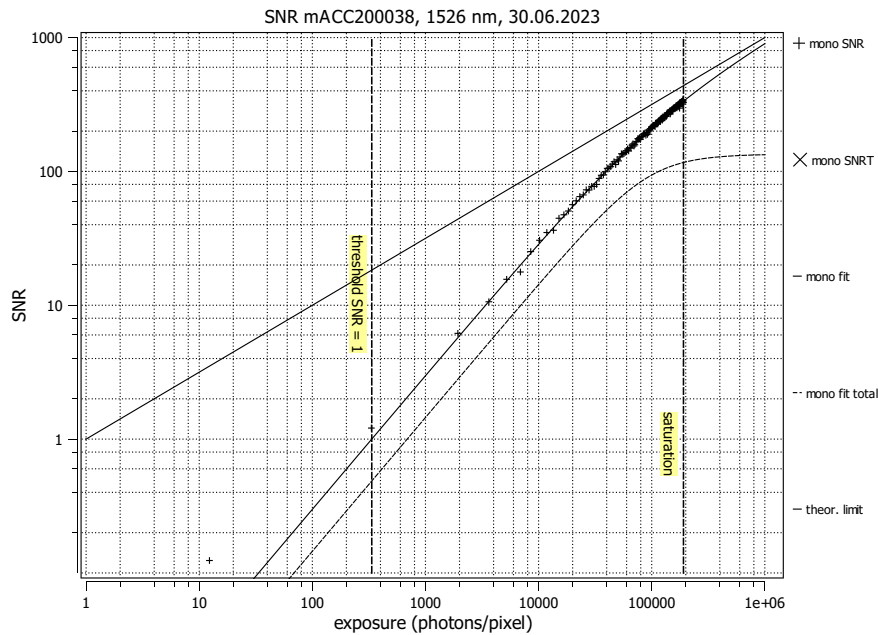
## Summary Sheet for Operation Point 14 at a Wavelength of 1526 nm

Type of data	Single	Gain, black-level	1.0 / 15.0
Exposure control	By irradiance	Environmental temperature	21.9°C
Exposure time	30.000 ms	Camera body temperature	22.6°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono12	Wavelength, centr., FWHM	1526 nm, 138.0 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  89.2%

#### Overall system gain

$K$  0.02295 DN/e<sup>-</sup>

1/ $K$  43.57 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  298 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  6.85 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 412.7

52.3 dB

8.69 bit

1/SNR<sub>max</sub> 0.242 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  335 p

$\mu_{p,\text{min,area}}$  13.4 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  299 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  12.0 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  190910 p

$\mu_{p,\text{sat,area}}$  7636 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  170300 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  6812 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 570

55.11 dB

9.15 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 537 e<sup>-</sup>

12.3 DN

PRNU<sub>1288</sub> 0.739 %

#### Linearity error

LE<sub>min</sub> -1.33%

LE<sub>max</sub> 0.96%

#### Dark current

$\mu_{c,\text{mean}}$  — e<sup>-</sup>/s

— DN/s

$\mu_{c,\text{var}}$  — e<sup>-</sup>/s

$T_d$  — °C