

LYRA Signal Stability: Report

IED, 20 Sep 2006

(rev. 16 Nov 2006 after comments from JFH,

rev. 04 Dec 2006 after correction from Udo Kroth)

This report is based on data files in the following ADITYA/NOUBLIPA directories:

/projects/lyra/LYRA_Calibration_Data/BESSY_NI/Bessy_NI_March2006/

and

/projects/lyra/LYRA_Calibration_Data/BESSY_GI/Bessy_GI_March2006/

i.e. on the BESSY campaigns of March 2006. The campaigns of 2005 (with higher temperatures) are not yet considered. Do they have to be considered when the on-board temperature is guaranteed to be lower? On the other hand, we are not sure about the final temperature, and we do not know about the (perhaps small) impact of temperature.

Papers considered for this report:

RP-ROB-LYR-0132-NI-March2006.PDF

RP-ROB-LYR-0132-GI-March2006.PDF

Meanwhile I have learned that there are data files in directories

.../PCSivio/NI_Data/

and

.../PCSilvio/GI_Data_Silvio/

with raw data in higher temporal resolution and further information on signal vs. integration time, but I am just starting to gain knowledge how to read and interpret them.

Test runs are grouped by channel and campaign such that they can generally be viewed on the same scale. Each *graphics* page shows various test runs, signal (in nA) vs. time (in s), for one channel (1-1, 1-2, ..., 3-4) and one campaign (NI or GI). The next page shows analyses in more detail, but not necessarily complete. The next page also shows the length of the signal (60 or 600 s, etc) and the sequence in which the LEDs are turned on and off.

On this *data* page, the headline names the channel (filter and detector), the campaign and the wavelength of the beam.

- The first line of each test run paragraph names the data file which was used.
- The second line of the paragraph describes the beam temporal sequence.
- "offset" is the signal before beam.
- Signal "start" can be either slow or immediate.
- "drift" describes the overall signal change during constant beam power.
- Signal "stop" can be either immediate or with a tail.
- "temperature" can be 37, 38, 44, 50 C and can have effects on the offset.
- Effects of "LEDs" are measured as difference to offset, tail, or beam signal, where possible.

In GI campaigns, long-term changes in the beam power were corrected by division through ring current. This does not apply to offset and LED values, thus there are a few differences between the data page and the graphics page now, but without implications for the qualitative behaviour.

All values are in nA, except when stated otherwise. - "Negative" offset or LED current values are due to conversion.

Some assessments are qualitative ("immediate start", "small tail" etc). To quantify these, one could fit the signal

with exponential functions and calculate, e.g., their half-life periods. This might be a worth-while effort.

The "estimated power" in the last line of each run is calculated as follows: maximum signal (i.e. asymptotic value), without LEDs, in nA, minus minimum signal (approx. offset level), in nA, divided by responsivity measured for the wavelength used in the test run, in A/W, equals estimated power, in nW. The responsivity value can be found in the "response" or "linearity" data files (then to be divided by resistance), or in the subdirectory `/projects/lyra/rm/webtable-2/`

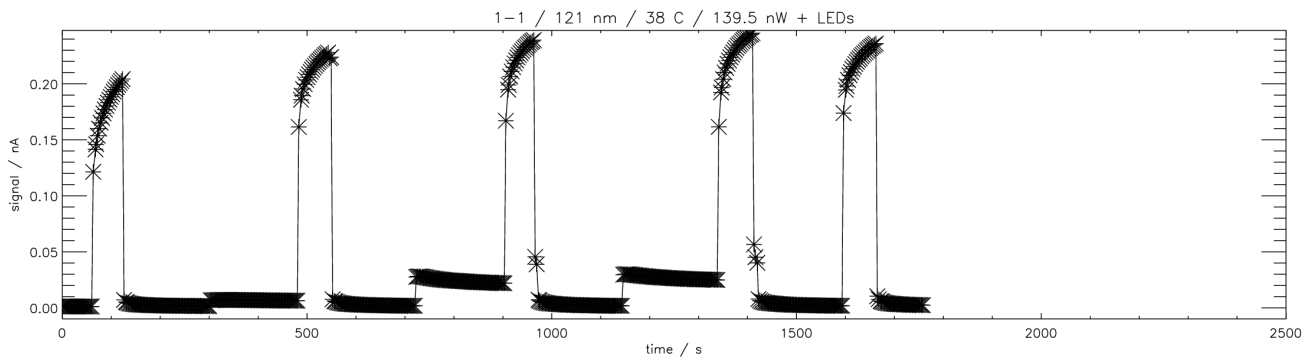
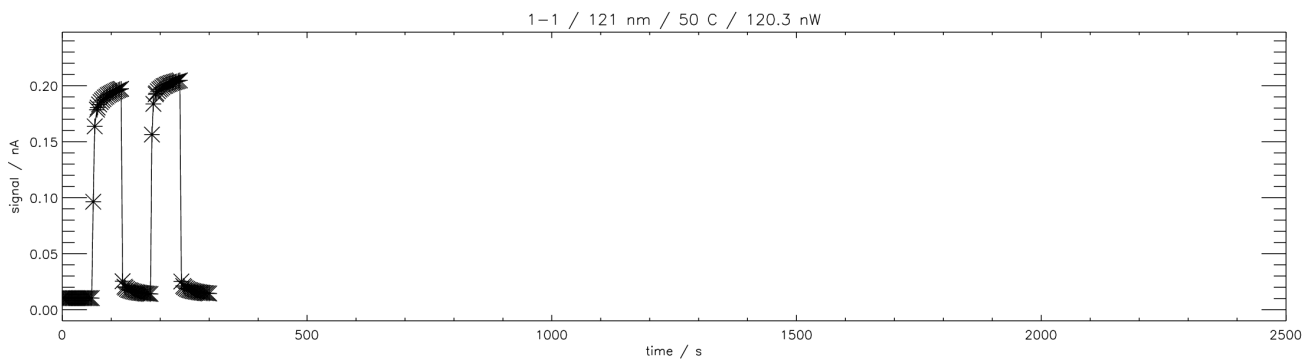
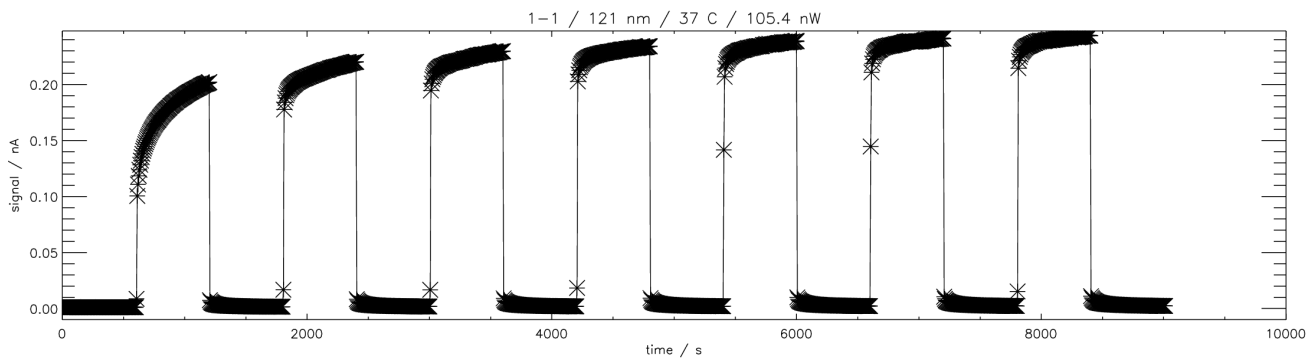
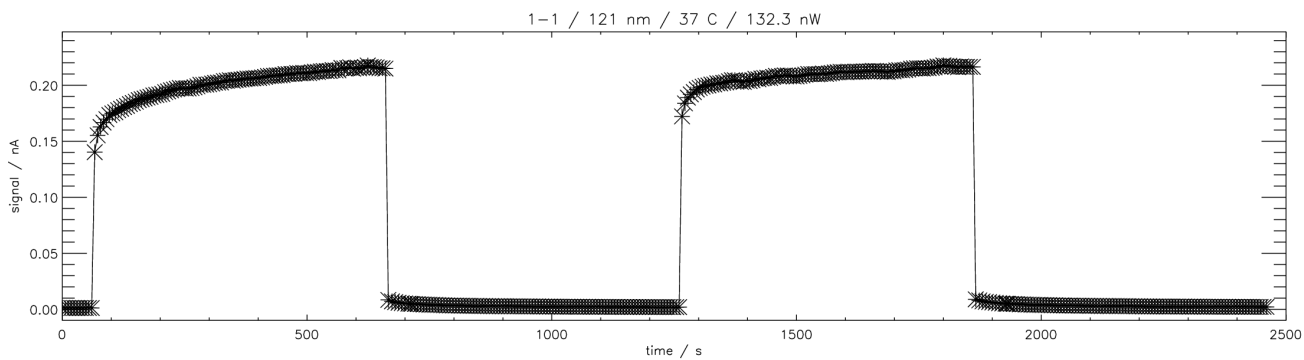
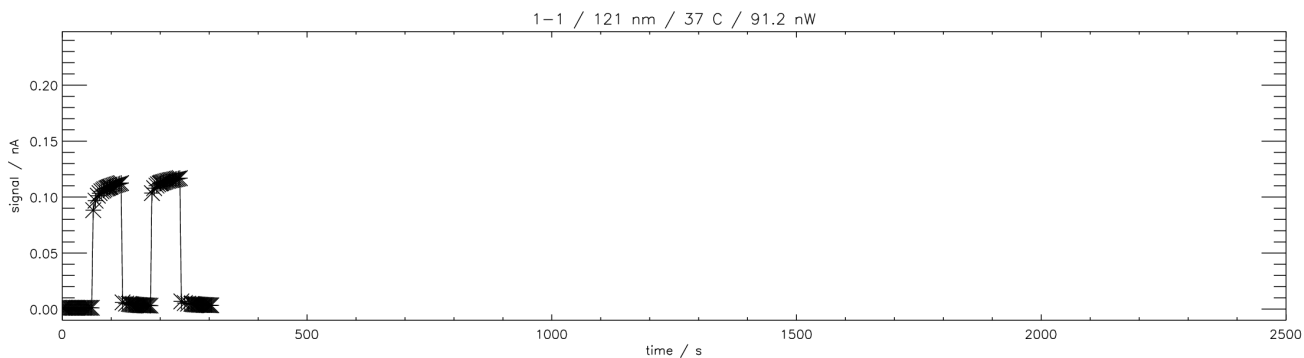
In the case of the NI campaign, the estimated value can be compared to the measured power. For the GI campaign, the latter value was not recorded.

A data fault in the forth run (incl. visual LED) of channel 3-1 was removed after feed-back from U. Kroth, PTB.

At first glance, one general result is that the PIN and AXUV detectors respond immediately, while the MSM detectors react with slow starts, tails and drifts. The velocity of the "slow" increase after the start could depend on the beam power, but also signal history, i.e. the time elapsed after the last "on" signal. - Due to the slow start and the upward drift, short test runs appear to underestimate, long tests runs to overestimate the beam power.

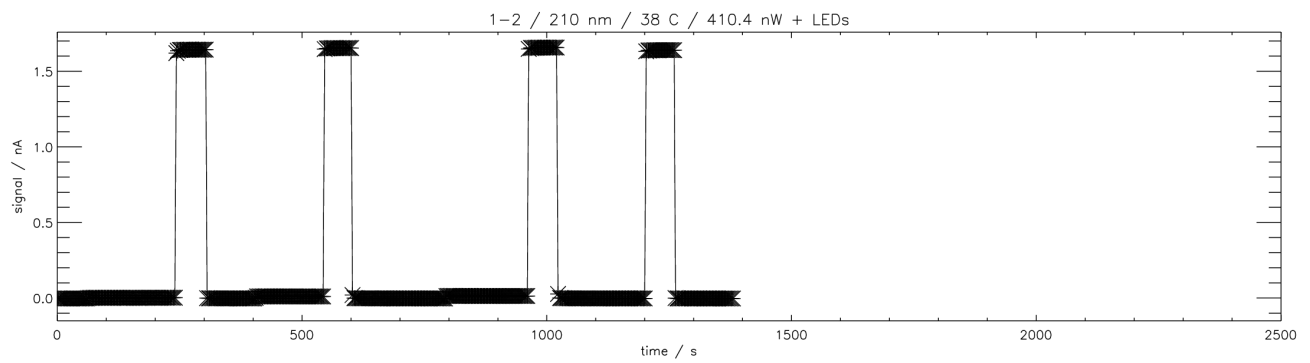
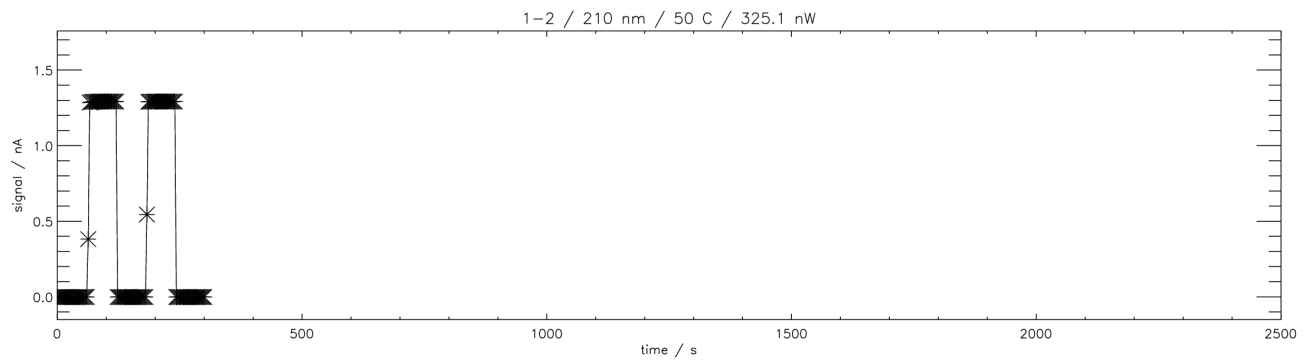
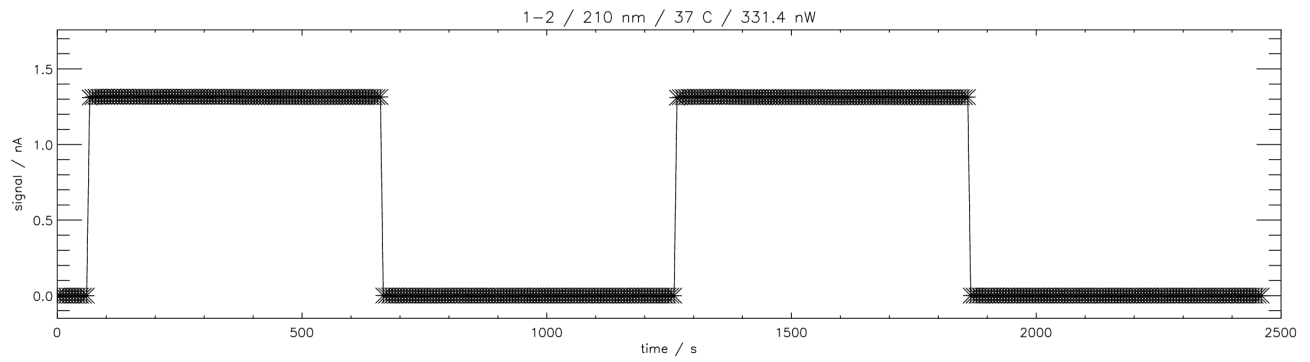
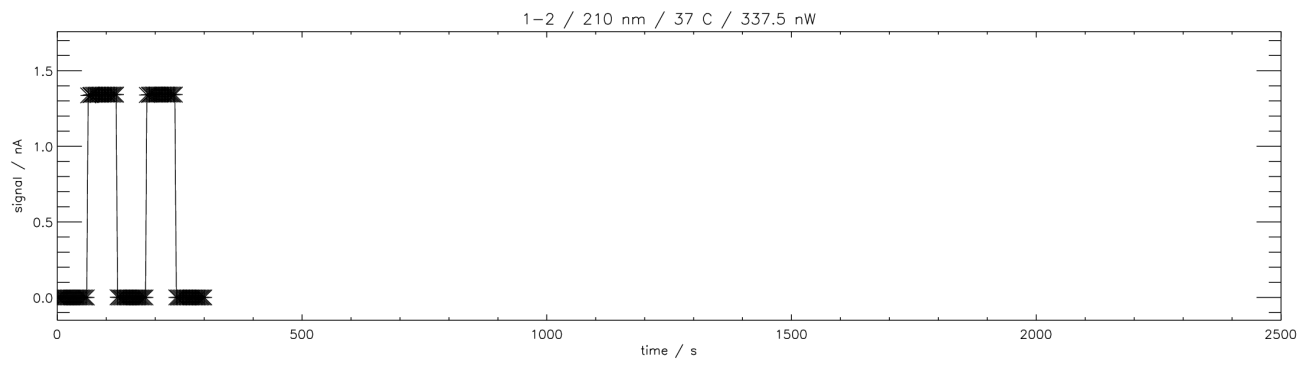
Another general result is that temperature has an influence on the signal offset.

Other interesting results are the signal values caused by the various LEDs.



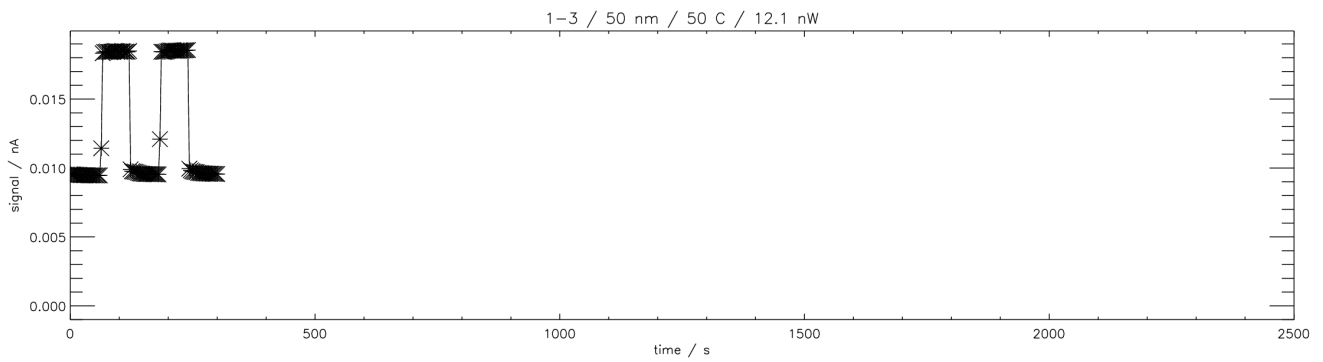
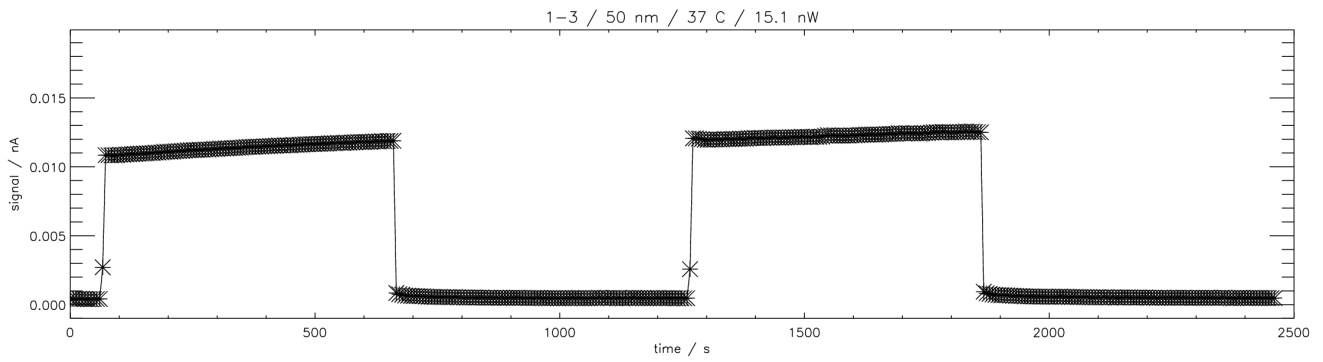
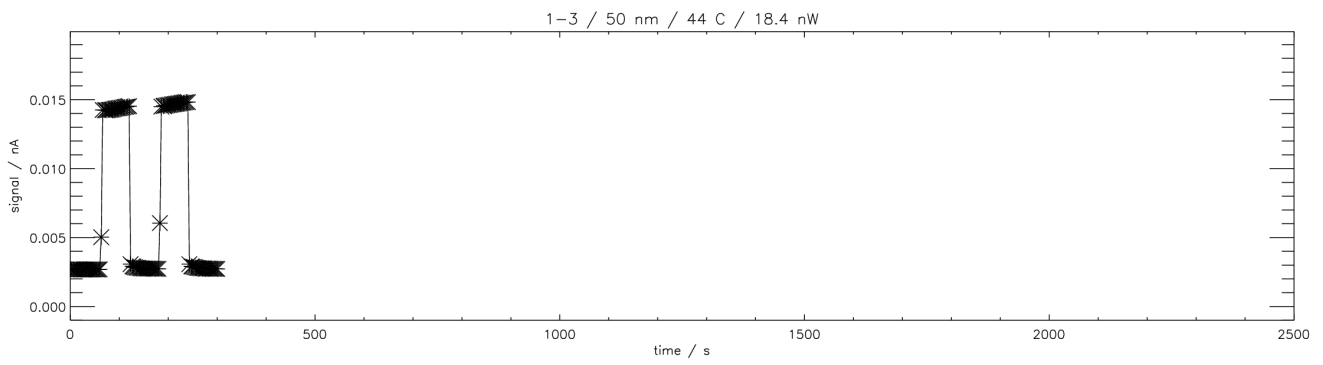
Channel 1-1 (Ly XN + MSM12), NI, 121.6 nm

- (1) `.../CH1-1/Stability/LYRA_1-1_stab_short_121nm.asc`
(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.001
start : slow, via 0.088 to 0.113, via 0.104 to 0.117 within 60 s
drift : upward tendency
stop : tail, via 0.006 to 0.003 within 60 s
temperature: 37 C
LEDs : no
power : $(0.117-0.001)/0.00145 = 80.0$ nW estimated vs. 91.2 nW recorded
- (2) `.../CH1-1/Stability/LYRA_1-1_stab_long_121nm.asc`
(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : 0.001
start : slow, via 0.140 to 0.215, via 0.172 to 0.216 within 600s
drift : upward tendency
stop : tail, via 0.008 to 0.002 within 600 s
temperature: 37 C
LEDs : no
power : $(0.218-0.001)/0.00145 = 149.7$ nW estimated vs. 132.3 nW recorded
- (3) `.../CH1-1/Stability/LYRA_1-1_stab_extralong_121nm.asc`
(600 s off, 600 s on, 600 s off, repeated 7 times)
offset : 0.001
start : slow, via 0.100 to 0.202 (begin), via 0.215 to 0.244 (end)
within 600 s
drift : upward tendency
stop : tail, via 0.007 to 0.002 (begin), via 0.011 to 0.002 (end)
within 600 s
temperature: 37 C
LEDs : no
power : $(0.244-0.001)/0.00145 = 167.6$ nW estimated vs. 105.4 nW recorded
- (4) `.../CH1-1/Temperature/LYRA_1-1_stab_50C_121nm.asc`
(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.010
start : slow, via 0.179 to 0.197, via 0.184 to 0.205 within 60 s
drift : upward tendency
stop : tail, via 0.025 to 0.014 within 60 s
temperature: 50 C, effect on offset
LEDs : no
power : $(0.205-0.010)/0.00145 = 134.5$ nW estimated vs. 120.3 nW recorded
- (5) `.../CH1-1/LEDS/LEDS_1-1_121nm_IIU.asc`
(60 s off, 60 s on, 180 s off, 180 s off+visLED, 60 s on+visLED, 180 s off,
180 s off+uvLED, 60 s on+uvLED, 180 s off, 180 s off+visLED+uvLED,
60 s on+visLED+uvLED, 180 s off, 60 s on, 100 s off)
offset : 0.001
start : slow, 0.121 to 0.204, (vis)0.161 to 0.224, (uv)0.167 to 0.239,
(vis+uv)0.162 to 0.245, 0.174 to 0.236 within 60 s
drift : upward tendency, LEDs: downward tendency
stop : tail, via 0.008 to 0.002 within 180 s
temperature: 38 C
LEDs : (vis)0.005 to 0.004, (uv)0.026 to 0.022, (vis+uv)0.028 to 0.023
within 180 s, assuming an offset caused by signal tail of 0.002,
effect slightly less than additiv
power : $(0.236-0.001)/0.00145 = 162.1$ nW estimated vs. 139.5 nW recorded



Channel 1-2 (Herzberg + PIN10), NI, 210 nm

- (1) **.../CH1-2/Stability/LYRA_1-2_stab_short_210nm.asc**
(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.000
start : almost immediate, via 1.337 to 1.342, via 1.339 to 1.343
drift : no
stop : almost immediate, via 0.001 to 0.000
temperature: 37 C
LEDs : no
power : $(1.343-0.000)/0.00411 = 326.8$ nW estimated vs. 337.5 nW recorded
- (2) **.../CH1-2/Stability/LYRA_1-2_stab_long_210nm.asc**
(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : 0.000
start : almost immediate, via 1.311 to 1.316, via 1.310 to 1.315
drift : almost no (less than -0.3% within 600 s)
stop : almost immediate, via 0.001 to 0.000
temperature: 37 C
LEDs : no
power : $(1.316-0.000)/0.00411 = 320.2$ nW estimated vs. 331.4 nW recorded
- (3) **.../CH1-2/Temperature/LYRA_1-2_stab_50C_210nm.asc**
(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : -0.002
start : almost immediate, via 0.381 to 1.291, via 0.544 to 1.292
drift : no
stop : immediate
temperature: 50 C, effect on offset(?) and on start(?)
LEDs : no
power : $(1.292+0.002)/0.00411 = 314.8$ nW estimated vs. 325.1 nW recorded
- (4) **.../CH1-2/Leds/LEDs_1-2_210nm_IIU.asc**
(60 s off, 180 s off+visLED, 60 s on+visLED, 100 s off, 140 s off+uvLED, 60 s on+uvLED, 180 s off, 180 s off+visLED+uvLED, 60 s on+visLED+uvLED, 180 s off, 60 s on, 120 s off)
offset : -0.003
start : almost immediate, to (vis)1.643, to (uv)1.653, to (vis+uv)1.656, to 1.639
drift : no, LEDs: no
stop : almost immediate, via (vis)-0.001, (uv)0.020, (vis+uv)0.027, -0.001 to -0.003
temperature: 38 C
LEDs : (vis)0.004, (uv)0.014, (vis+uv)0.016, assuming an offset of -0.003
effect: additiv
power : $(1.639+0.003)/0.00411 = 399.5$ nW estimated vs. 410.4 nW recorded



Channel 1-3 (Aluminium + MSM11), NI, 50 nm

(1) .../CH1-3/Stability/LYRA_1-3_stab_short_50nm_44C.asc

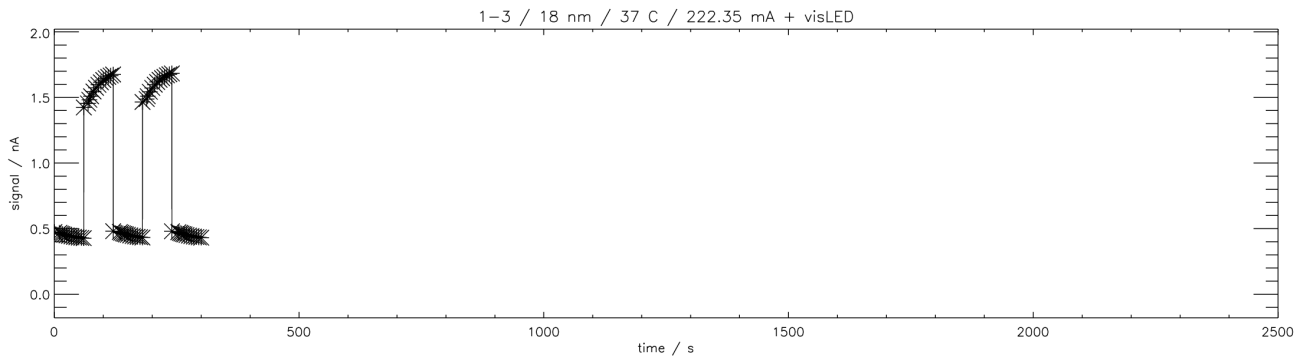
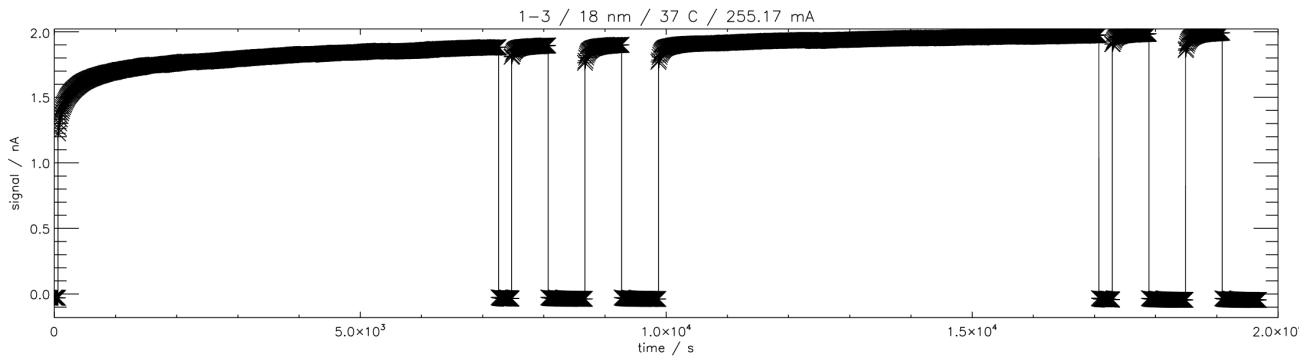
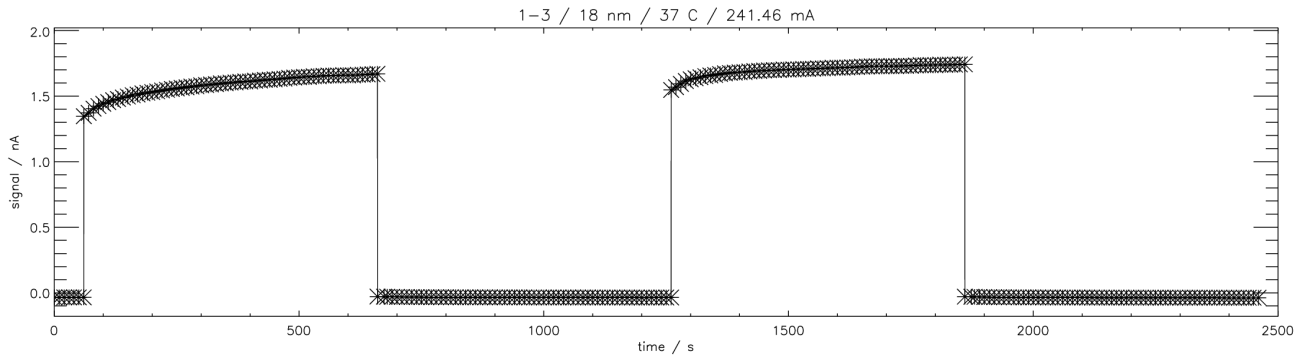
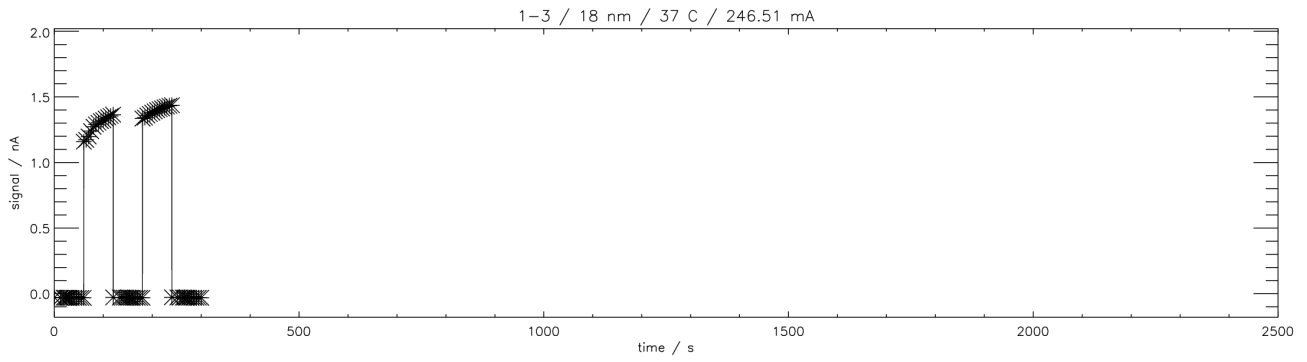
(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.0027
start : almost immediate, via 0.0050 to 0.0143, via 0.0061 to 0.0145
drift : small upward tendency
stop : small tail, via 0.0030 to 0.0027 within 48 s
temperature: 44 C, effect on offset
LEDs : no
power : $(0.0148-0.0027)/0.000611 = 19.8$ nW estimated vs. 18.4 nW recorded

(2) .../CH1-3/Stability/LYRA_1-3_stab_long_50nm.asc

(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : 0.0004
start : almost immediate, via 0.0027 to 0.0108, via 0.0026 to 0.0120
drift : small upward tendency
stop : small tail, via 0.0008 to 0.0005 within 100-200 s
temperature: 37 C
LEDs : no
power : $(0.0125-0.0004)/0.000611 = 19.8$ nW estimated vs. 15.1 nW recorded

(3) .../CH1-3/Temperature/LYRA_1-3_stab_50C_50nm.asc

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.0095
start : almost immediate, via 0.0114 to 0.0184, via 0.0121 to 0.0185
drift : small upward tendency
stop : small tail, via 0.0099 to 0.0095 within 48 s
temperature: 50 C, effect on offset
LEDs : no
power : $(0.0185-0.0095)/0.000611 = 14.7$ nW estimated vs. 12.1 nW recorded



Channel 1-3 (Aluminium + MSM11), GI, 18 nm

(4) .../CH1-3/LYRA_1-3_Al_stability-short.txt

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : -0.007
start : slow, via 1.159 to 1.364, via 1.335 to 1.437 within 60 s
drift : upward tendency, offset: downward tendency
stop : almost immediate, via -0.028, then drifting down
temperature: 37 C
LEDs : no
power : $(1.437+0.030)/0.00940 = 156.1$ nW estimated

(5) .../CH1-3/LYRA_1-3_Al_stability-long.txt

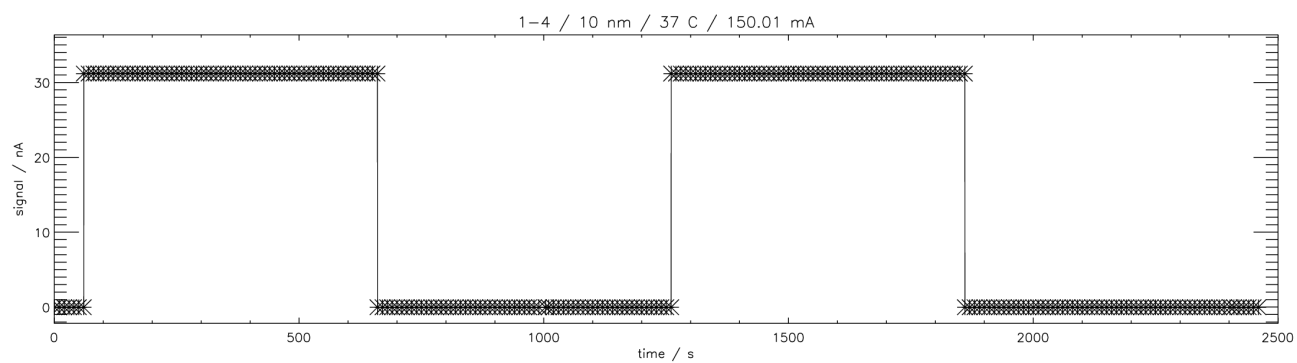
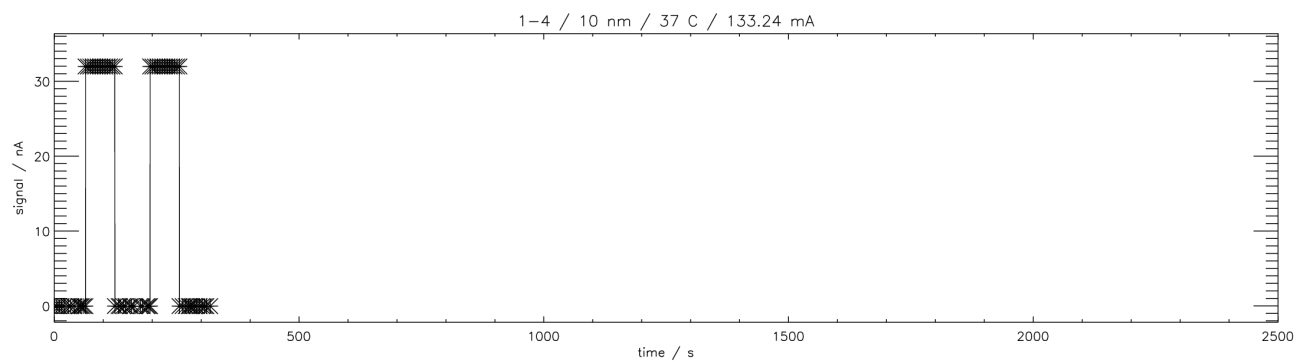
(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : -0.008
start : slow, via 1,347 to 1.670, via 1.547 to 1.742 within 600 s
drift : upward tendency, offset: downward tendency
stop : almost immediate, via -0.028, then drifting down
temperature: 37 C
LEDs : no
power : $(1.742+0.035)/0.00940 = 189.0$ nW estimated

(6) .../CH1-3/LYRA_1-3_Al_stability-extra-long.txt

(60 s off, 7200 s on, 120 s off, 600 s on, 600 s off, 600 s on, 600 s off,
1x repeated)
offset : -0.007
start : slow, via 1.347 to 1.882 within 7200 s, via 1.808 to 1.896,
via 1.763 to 1.900 within 600 s, via 1.770 to 1.975 within 7200 s,
via 1.905 to 1.984, via 1.859 to 1.992 within 600 s
drift : upward tendency, offset: downward tendency
stop : almost immediate, via -0.026 (later -0.032), then drifting down
temperature: 37
LEDs : no
power : $(1.992+0.028)/0.00940 = 214.9$ nW estimated

(7) .../CH1-3/LYRA_1-3_Al_stability-short_with-visLEDs.txt

(60s off+visLED, 60 s on+visLED, 60 s off+visLED, 60 s on+visLED, 60 s off+visLED)
offset+LED : around 0.100 (0.106 to 0.095)
start : slow, via (vis)1.423 to 1.675, via (vis)1.465 to 1.683 within 60 s
drift : upward tendency, offset+LED: downward tendency
stop : tail, even at begin, via (vis)0.474 to 0.427, via (vis)0.480 to
0.432, (vis)0.480 to 0.431 within 60 s
temperature: 37 C
LEDs : around (vis)0.107, (0.113 to 0.102, assuming an offset of -0.007
from previous test runs
power : $(1.683-0.430)/0.00940 = 133.3$ nW estimated, assuming an additive
effect



Channel 1-4 (Zr (300nm) + AXUV20D), GI, 10 nm

(1) .../CH1-4/LYRA_1-4_Zr_stability-short.txt

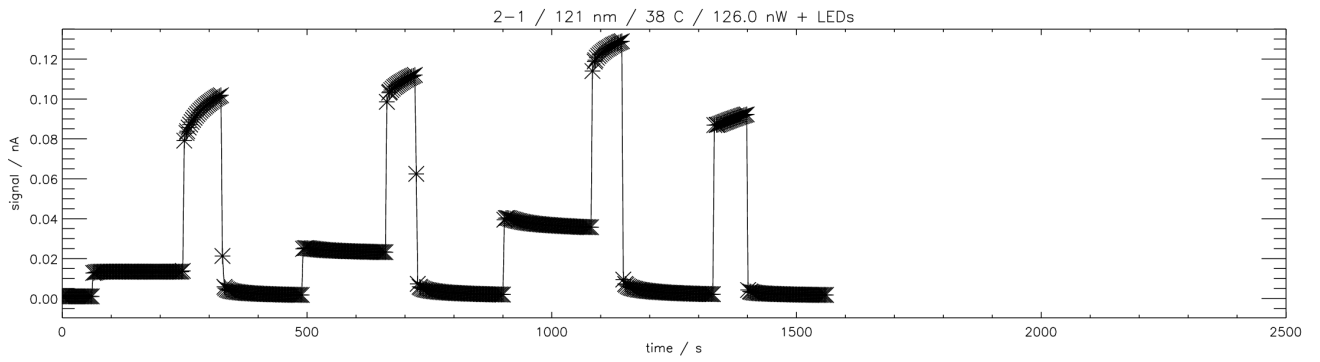
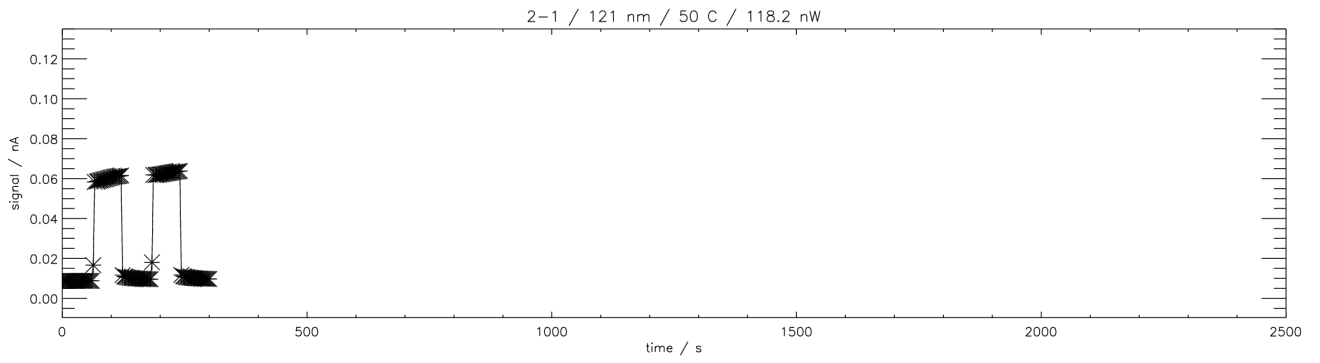
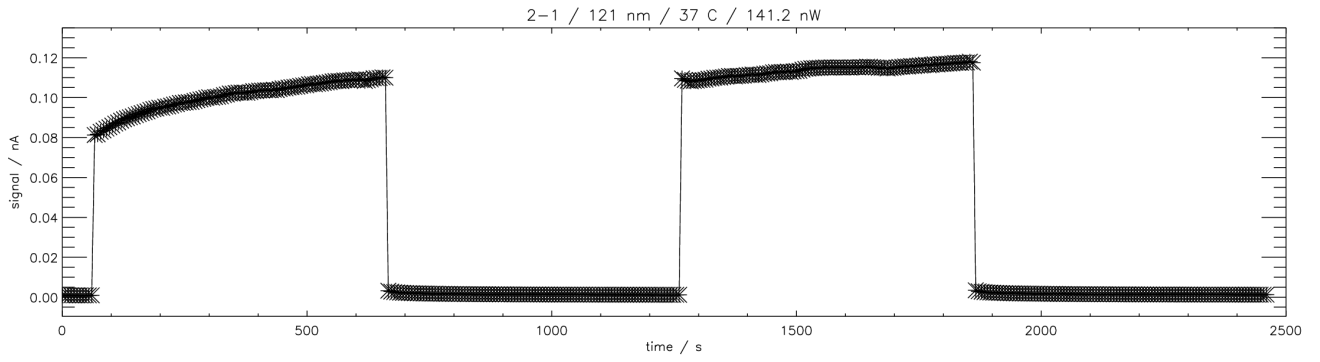
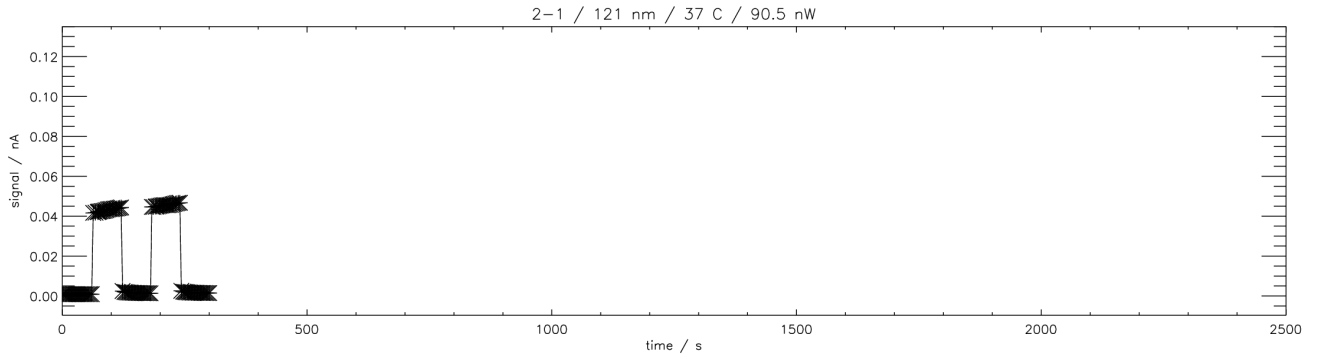
(60s off, 60 s on, 60 s off, 60 s on, 60 s off)

offset : around -0.004
start : immediate, to 31.96
drift : no, offset: minimal downward tendency
stop : immediate
temperature: 37 C
LEDs : no
power : $(31.96+0.030)/0.05603 = 570.9$ nW estimated

(2) .../CH1-4/LYRA_1-4_Zr_stability-long.txt

(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)

offset : around -0.004
start : immediate, to 31.18
drift : no, offset: minimal downward tendency
stop : immediate
temperature: 37 C
LEDs : no
power : $(31.18+0.025)/0.05603 = 556.9$ nW estimated



Channel 2-1 (Ly XN + MSM21), NI, 121.6 nm

(1) .../CH2-1/Stability/LYRA_2-1_stab_short_121nm.asc

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.0009
start : slow, via 0.0416 to 0.0444, via 0.0446 to 0.0467 within 60 s
drift : upward tendency
stop : tail, via 0.0025 to 0.0014 within 60 s
temperature: 37 C
LEDs : no
power : $(0.0466-0.0009)/0.00054 = 84.6$ nW estimated vs. 90.5 nW recorded

(2) .../CH2-1/Stability/LYRA_2-1_stab_long_121nm.asc

(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : 0.0009
start : slow, via 0.0812 to 0.1100, via 0.1096 to 0.1175 within 600s
drift : upward tendency
stop : tail, via 0.0033 to 0.0012 within 600 s
temperature: 37 C
LEDs : no
power : $(0.1175-0.0009)/0.00054 = 215.9$ nW estimated vs. 141.2 nW recorded

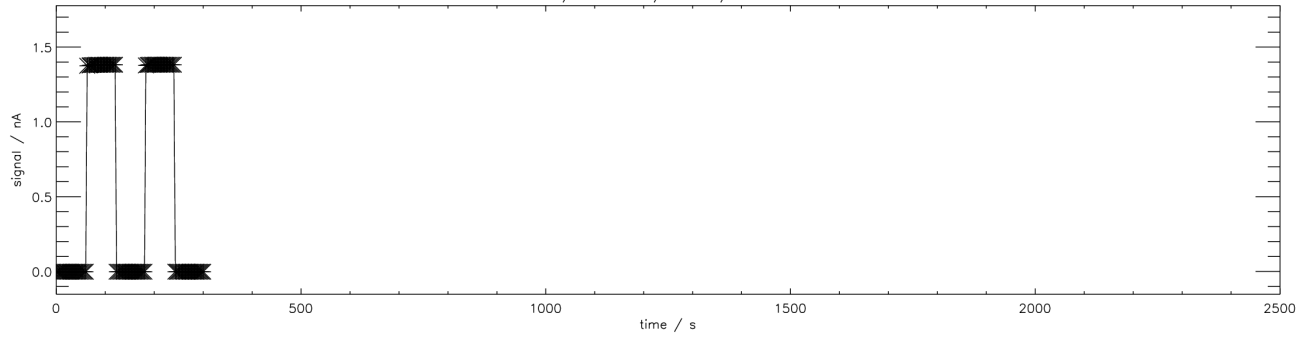
(3) .../CH2-1/Temperature/LYRA_2-1_stab_50C_121nm.as

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.0087
start : slow, via 0.0583 to 0.0616, via 0.0619 to 0.0638 within 60 s
drift : upward tendency
stop : tail, via 0.0116 to 0.0096 within 60 s
temperature: 50 C, effect on offset
LEDs : no
power : $(0.0638-0.0087)/0.00054 = 102.0$ nW estimated vs. 118.2 nW recorded

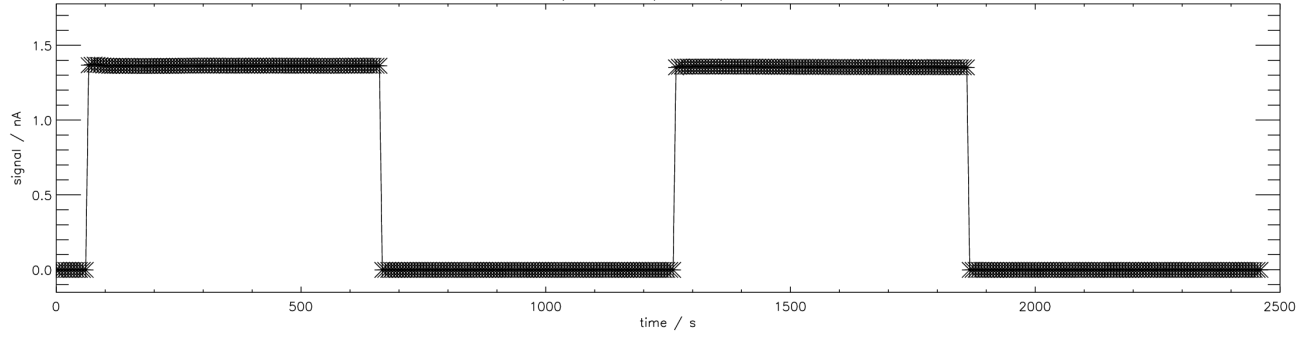
(4) .../CH2-1/Leds/LEDs_2-1_121nm_IIU.asc

(60 s off, 180 s off+visLED, 60 s on+visLED, 180 s off, 180 s off+uvLED,
60 s on+uvLED, 180 s off, 180 s off+visLED+uvLED, 60 s on+visLED+uvLED, 180 s off,
60 s on, 160 s off)
offset : 0.0011
start : slow, (vis)0.0830 to 0.0996, (uv)0.0986 to 0.1120,
(vis+uv)0.1140 to 0.1290, 0.0869 to 0.0923 within 60 s
drift : upward tendency, uvLED: downward tendency
stop : tail, via 0.0058, 0.0074, 0.0095, or 0.0043 to 0.0018 within 180 s
temperature: 38 C
LEDs : (vis)0.0110 to 0.0123, (uv)0.0231 to 0.0221, (vis+uv)0.0377 to 0.0346
within 180 s, assuming an offset+tail from 0.0018 to 0.0011
effect approx. additiv
power : $(0.0923-0.0011)/0.00054 = 168.9$ nW estimated vs. 126.0 nW recorded

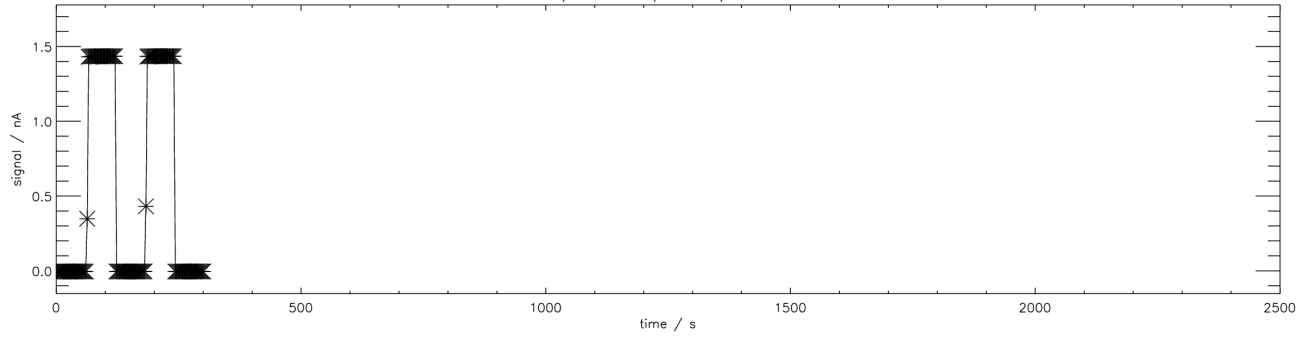
2-2 / 210 nm / 37 C / 312.9 nW



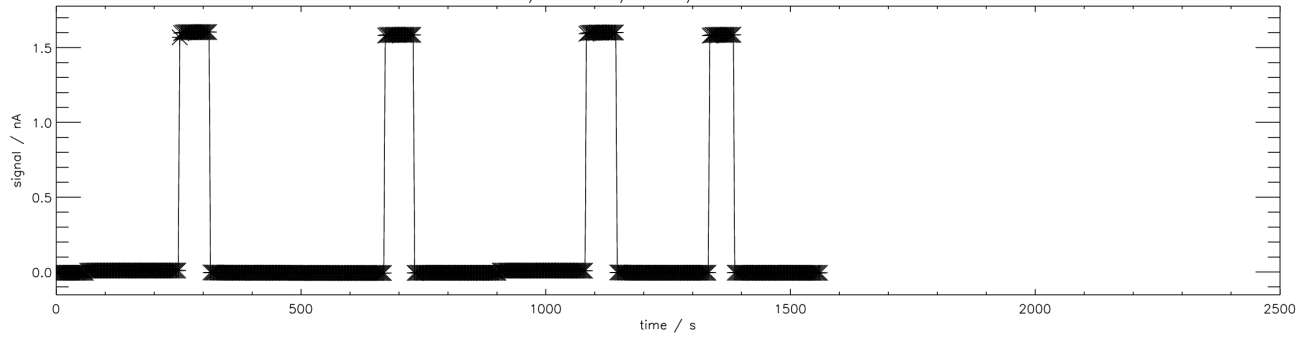
2-2 / 210 nm / 37 C / 310.5 nW



2-2 / 210 nm / 50 C / 328.5 nW



2-2 / 210 nm / 38 C / 344.3 nW + LEDs



Channel 2-2 (Herzberg + PIN11), NI, 210 nm

(1) .../CH2-2/Stability/LYRA_2-2_stab_short_210nm.asc

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : -0.002
start : almost immediate, via 1.376 to 1.382
drift : no
stop : immediate
temperature: 37 C
LEDs : no
power : $(1.382+0.002)/0.00444 = 311.7$ nW estimated vs. 312.9 nW recorded

(2) .../CH2-2/Stability/LYRA_2-2_stab_long_210nm.asc

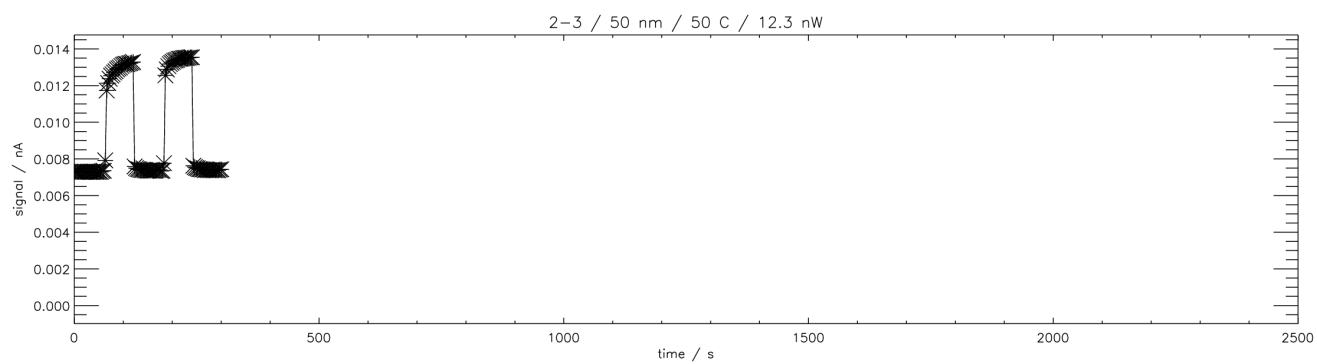
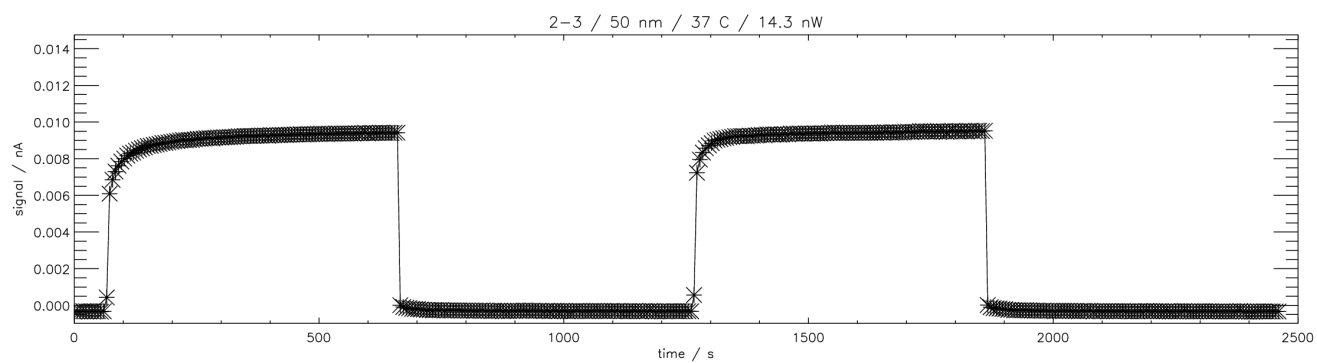
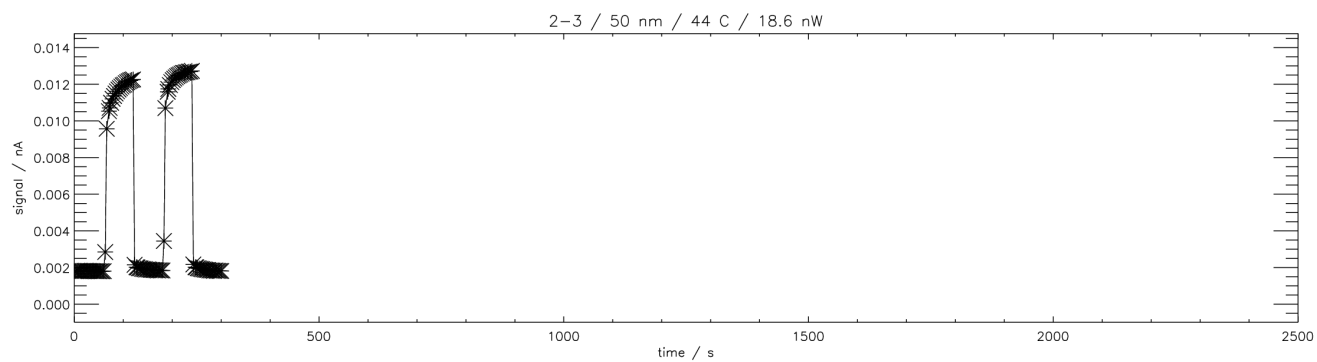
(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : -0.002
start : almost immediate, to 1.363, to 1.357
drift : almost no (less than -0.4% within 600 s)
stop : immediate
temperature: 37 C
LEDs : no
power : $(1.357+0.002)/0.00444 = 306.1$ nW estimated vs. 310.5 nW recorded

(3) .../CH2-2/Temperature/LYRA_2-2_stab_50C_210nm.asc

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : -0.005
start : almost immediate, via 0.348 to 1.434, via 0.431 to 1.435
drift : no
stop : immediate
temperature: 50 C, effect on offset(?) and on start(?)
LEDs : no
power : $(1.435+0.005)/0.00444 = 324.3$ nW estimated vs. 328.5 nW recorded

(4) .../CH2-2/Leds/LEDs_2-2_210nm_IIU.asc

(60 s off, 180 s off+visLED, 60 s on+visLED, 180 s off, 180 s off+uvLED,
60 s on+uvLED, 180 s off, 180 s off+visLED+uvLED, 60 s on+visLED+uvLED,
180 s off, 60 s on, 180 s off)
offset : -0.005
start : almost immediate, to (vis)1.604, to (uv)1.586, to (vis+uv)1.601,
to 1.586
drift : no, LEDs: no
stop : almost immediate, via (vis)-0.003, (uv)-0.006, (vis+uv)-0.003,
to -0.005
temperature: 38 C
LEDs : (vis)0.015, (uv)-0.001, (vis+uv)0.014, assuming an offset of -0.005
effect: additiv
power : $(1.586+0.005)/0.00444 = 358.3$ nW estimated vs. 344.3 nW recorded



Channel 2-3 (Aluminium + MSM15), NI, 50 nm

(1) .../CH2-3/Stability/LYRA_2-3_stab_short_50nm_44C.asc

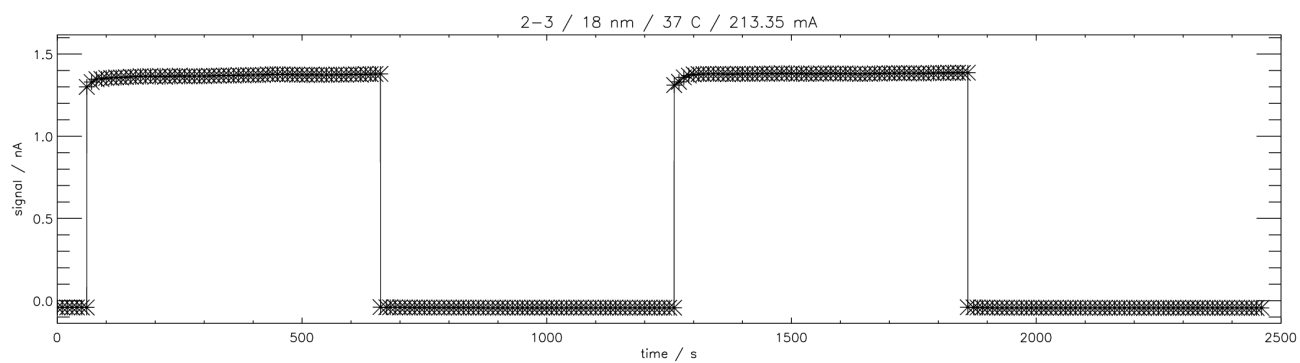
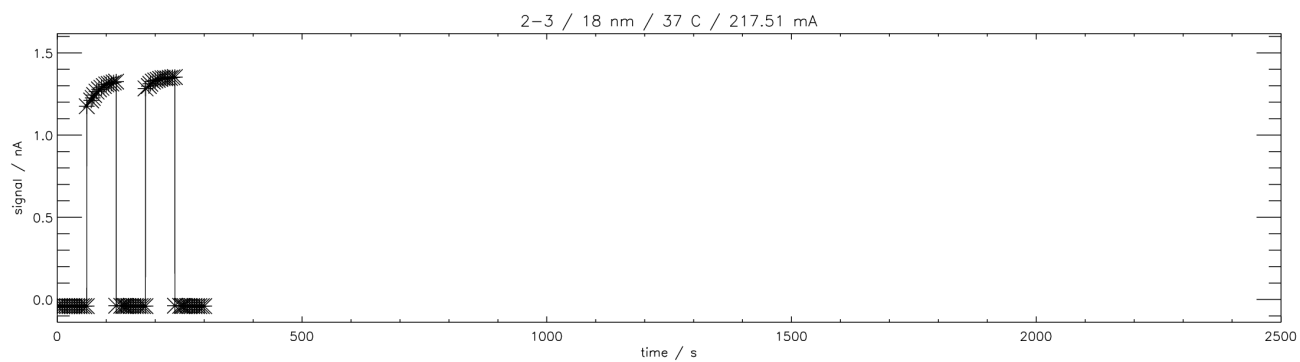
(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.0018
start : slow, via 0.0095 to 0.0123, via 0.0107 to 0.0127 within 60 s
drift : upward tendency
stop : small tail, via 0.0021 to 0.0018 within approx. 40 s
temperature: 44 C, effect on offset
LEDs : no
power : $(0.0127-0.0018)/0.000476 = 22.9$ nW estimated vs. 18.6 nW recorded

(2) .../CH2-3/Stability/LYRA_2-3_stab_long_50nm.asc

(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : -0.0003
start : slow, via 0.0061 to 0.0094, via 0.0072 to 0.0095 within 600 s
drift : upward tendency
stop : small tail, via 0.0000 to -0.0003 within 60-100 s
temperature: 37 C
LEDs : no
power : $(0.0095+0.0003)/0.000476 = 20.6$ nW estimated vs. 14.3 nW recorded

(3) .../CH2-3/Temperature/LYRA_2-3_stab_50C_50nm.asc

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.0073
start : slow, via 0.0117 to 0.0133, via 0.0126 to 0.0135
drift : upward tendency
stop : almost immediate, via 0.0076 to 0.0074
temperature: 50 C, effect on offset
LEDs : no
power : $(0.0135-0.0073)/0.000476 = 13.0$ nW estimated vs. 12.3 nW recorded



Channel 2-3 (Aluminium + MSM15), GI, 18 nm

(4) .../CH2-3/LYRA_2-3_Al_stability-short.txt

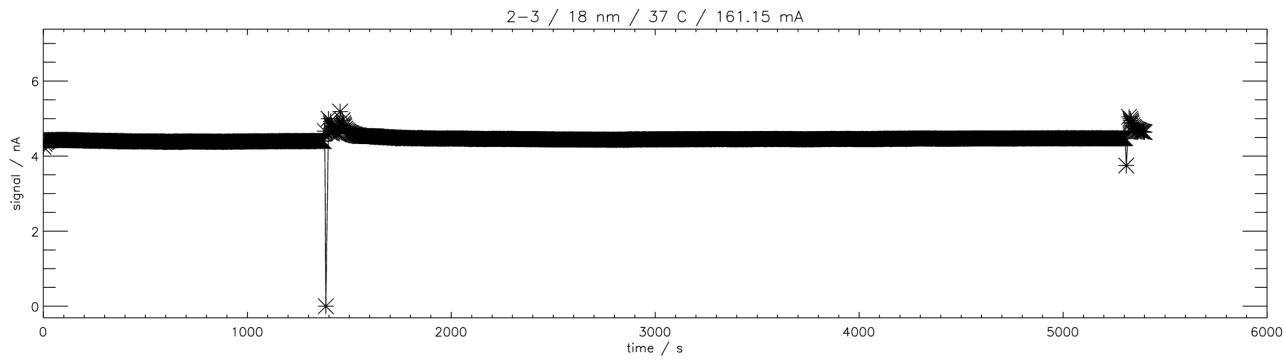
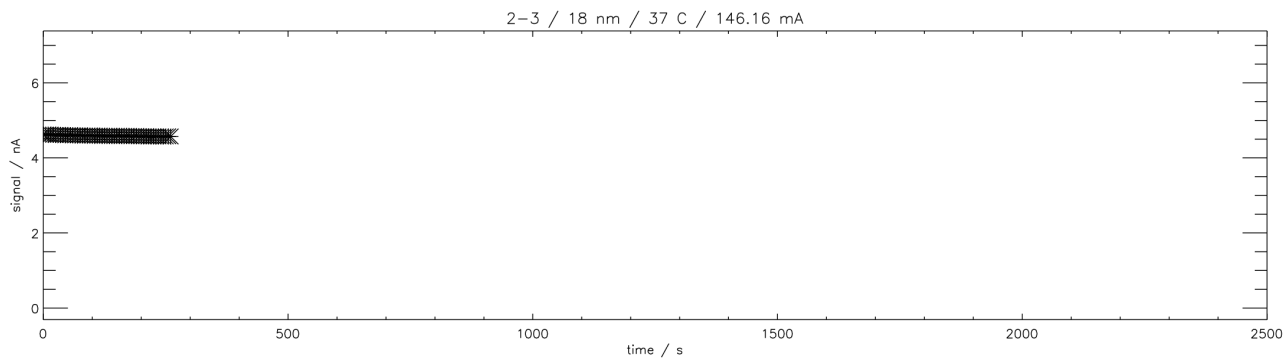
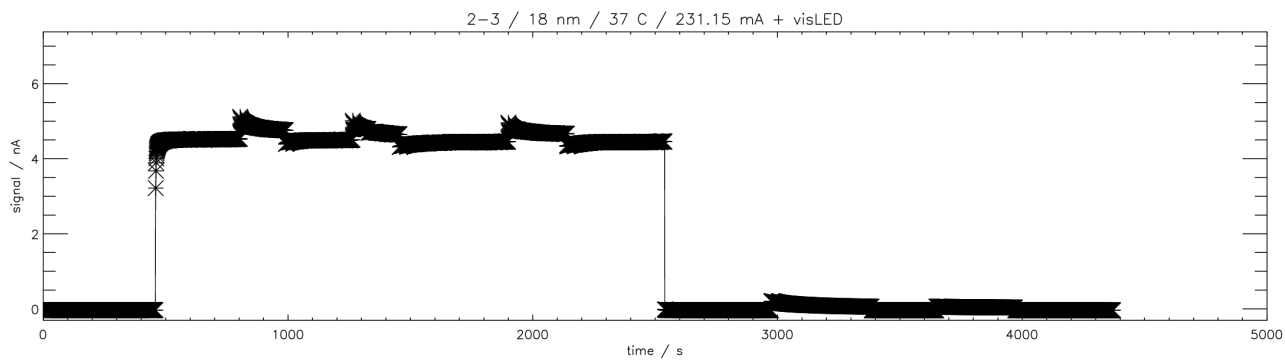
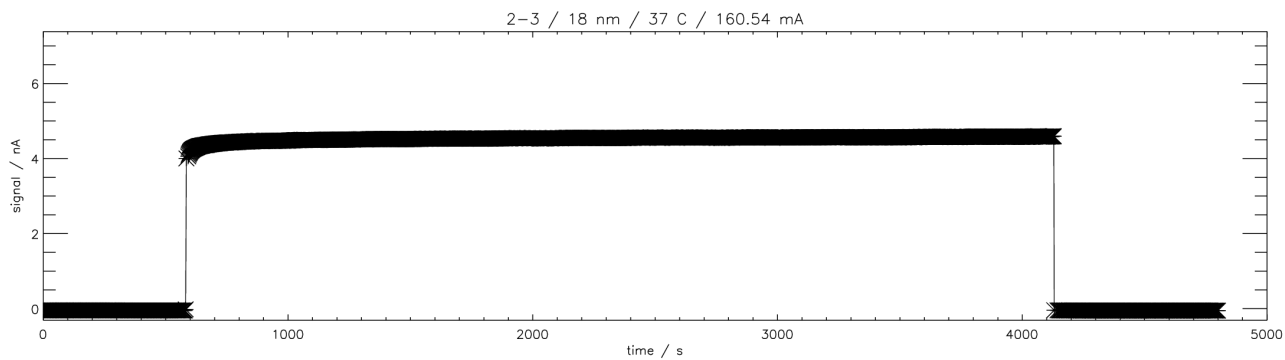
(60s off, 60 s on, 60 s off, 60 s on, 60 s off)

offset : -0.009
start : slow, via 1.175 to 1.325, via 1.284 to 1.353 within 60 s
drift : upward tendency
stop : almost immediate, via -0.038 to -0.041
temperature: 37 C
LEDs : no
power : $(1.353+0.041)/0.00875 = 159.3$ nW estimated

(5) .../CH2-3/LYRA_2-3_Al_stability-long.txt

(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)

offset : -0.009
start : slow, via 1,300 to 1.380, via 1.311 to 1.387 within 600 s
drift : upward tendency, offset: downward tendency
stop : almost immediate, via -0.040, then drifting down
temperature: 37 C
LEDs : no
power : $(1.387+0.041)/0.00875 = 163.2$ nW estimated



Channel 2-3 (Aluminium + MSM15), GI, 18 nm

(6) .../CH2-3/LYRA_2-3_Al_stability-friday-special-1h-of-light.txt

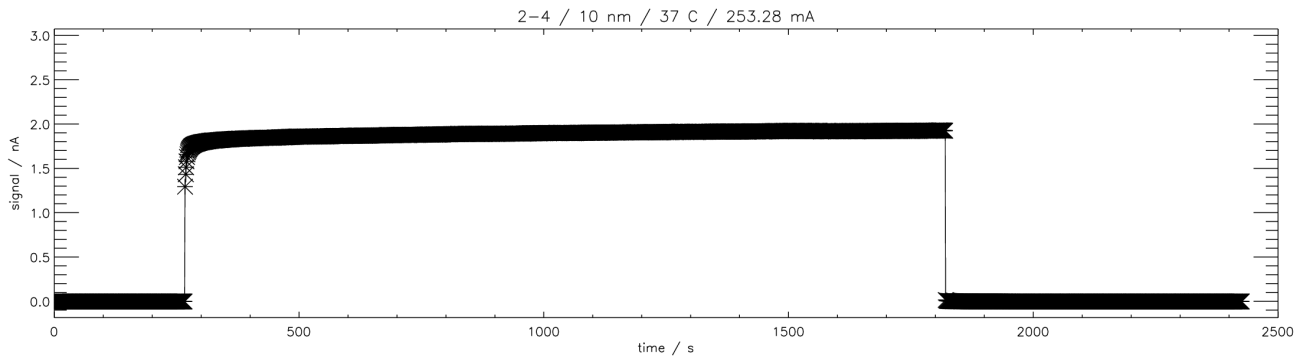
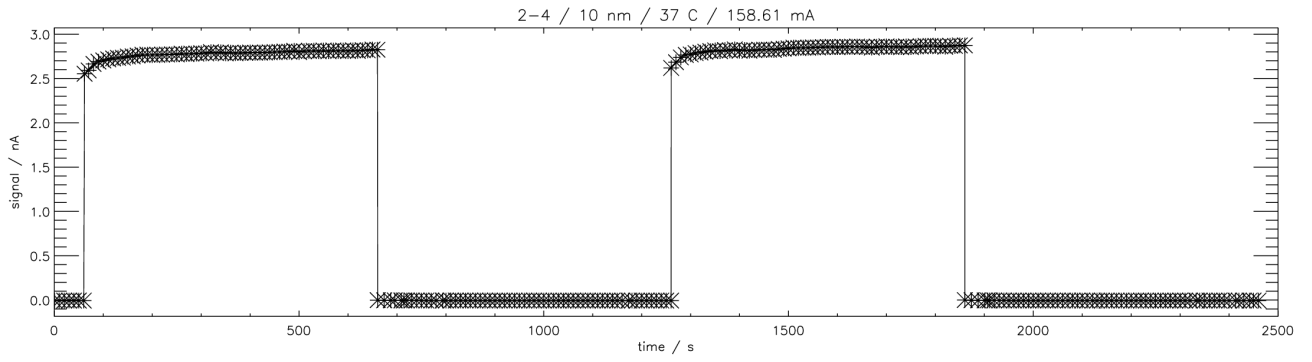
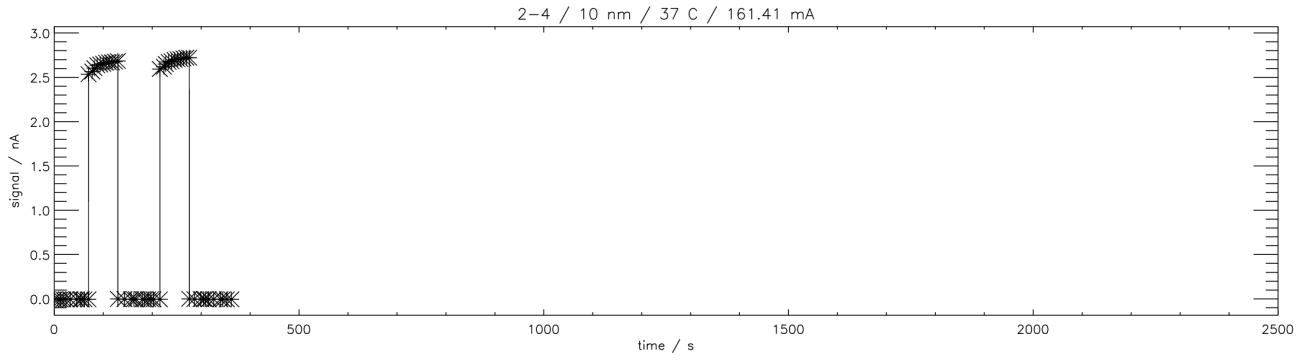
(580 s off, 3550 s on, 670 s off)
offset : -0.008
start : slow, via 4.003 to 4.593, within 3550 s
drift : upward tendency, offset: downward tendency
stop : almost immediate, via -0.043 to -0.047, then drifting down
temperature: 37 C
LEDs : no
power : $(4.593+0.047)/0.00875 = 530.3$ nW estimated

(7) .../CH2-3/LYRA_2-3_Al_stability-friday-special-with-visLEDs.txt

(460 s off, 2080 s on, 1330 s off; meanwhile 5x LED on, for 200-300 s)
offset : -0.008
start : slow, via 3.216 to 4.533, after LED off: via 4.388 to 4.506,
via 4.310 to 4.453, via 4.352 to 4.453
drift : no
stop : almost immediate, via 0.013 to -0.035
temperature: 37 C
LEDs : (vis)unstable between 0.136 and 0.016, assuming an additive effect
power : $(4.453+0.033)/0.00875 = 512.7$ nW estimated

(8) ?

(9) ?



Channel 2-4 (Zr (150nm) + MSM19), GI, 10 nm

(1) .../CH2-4/LYRA_2-4_Zr_stability-short.txt

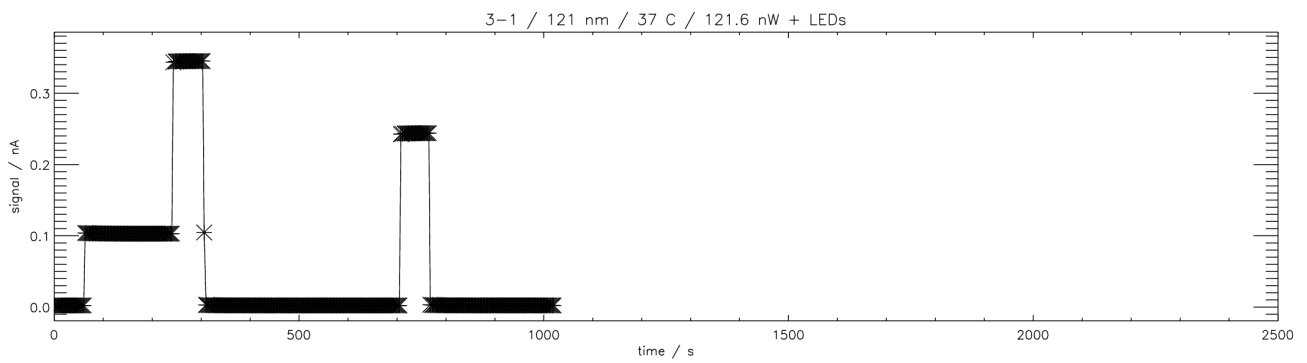
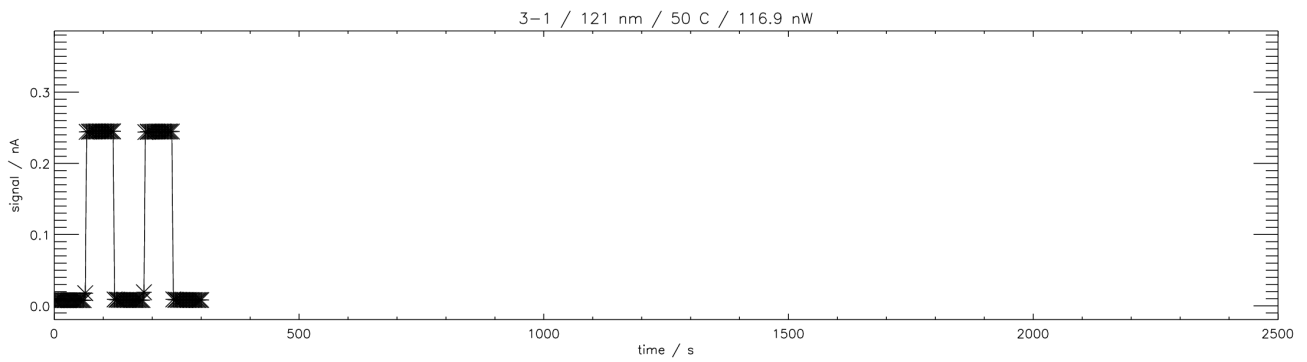
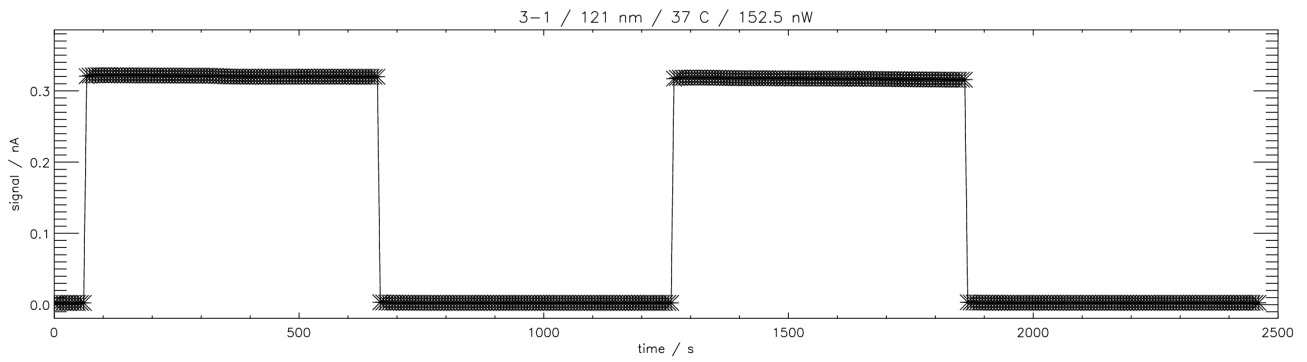
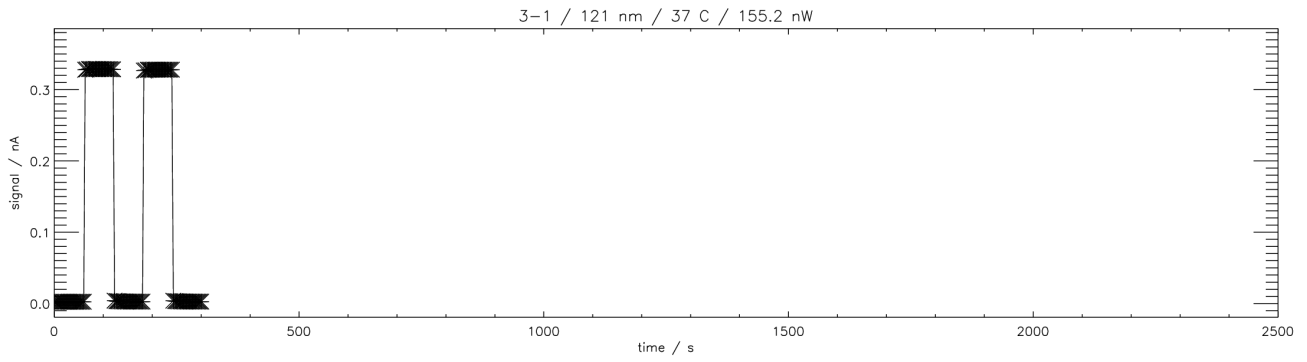
(70 s off, 60 s on, 80 s off, 60 s on, 90 s off)
offset : around -0.001
start : slow, via 2.535 to 2.683, via 2.594 to 2.721 within 60 s
drift : upward tendency, offset: downward tendency
stop : almost immediate, via 0.001 or 0.000 to -0.005
temperature: 37 C
LEDs : no
power : $(2.721+0.005)/0.00741 = 367.9$ nW estimated

(2) .../CH2-4/LYRA_2-4_Zr_stability-long.txt

(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : around -0.001
start : slow, via 2.553 to 2.825, via 2.618 to 2.873 within 600 s
drift : upward tendency, offset: downward tendency
stop : almost immediate, via 0.000 to -0.006
temperature: 37 C
LEDs : no
power : $(2.873+0.006)/0.00741 = 388.5$ nW estimated

(3) .../CH2-4/LYRA_2-4_Zr_stability-friday-special-45min-of-light.txt

(260 s off, 1560 s on, 600 s off)
offset : around -0.001
start : slow, via 1.292 to 1.924 within 1560 s
drift : upward tendency, offset: downward tendency
stop : almost immediate, via 0.014 to -0.003
temperature: 37 C
LEDs : no
power : $(1.924+0.003)/0.00741 = 260.1$ nW estimated



Channel 3-1 (Ly N+XN + AXUV20A), NI, 121.6 nm

(1) .../CH3-1/Stability/LYRA_3-1_stab_short_121nm.asc

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.002
start : immediate, to 0.328
drift : no
stop : small tail, via 0.004 to 0.003 within 60 s
temperature: 37 C
LEDs : no
power : $(0.328-0.002)/0.00225 = 144.9$ nW estimated vs. 155.2 nW recorded

(2) .../CH3-1/Stability/LYRA_3-1_stab_long_121nm.asc

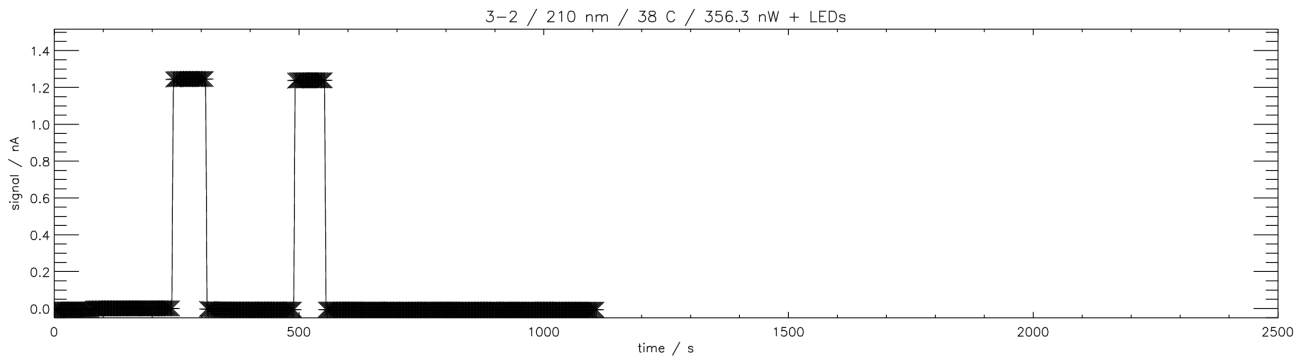
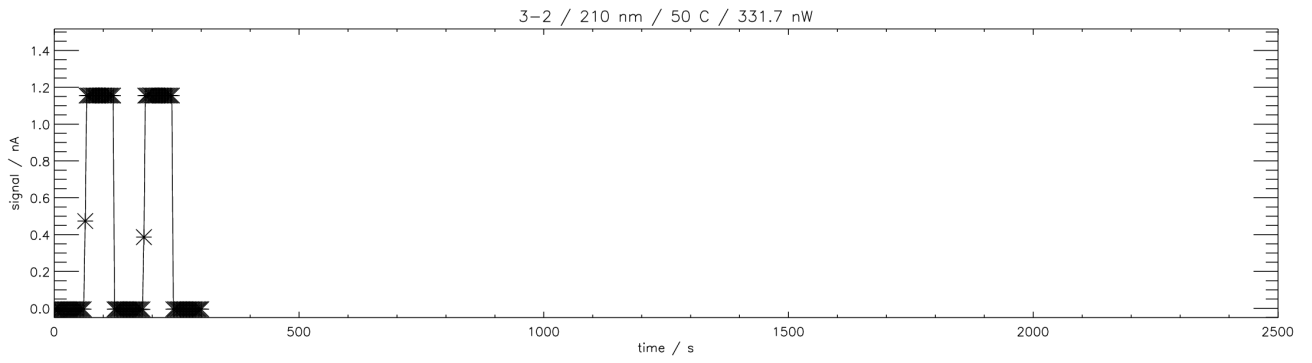
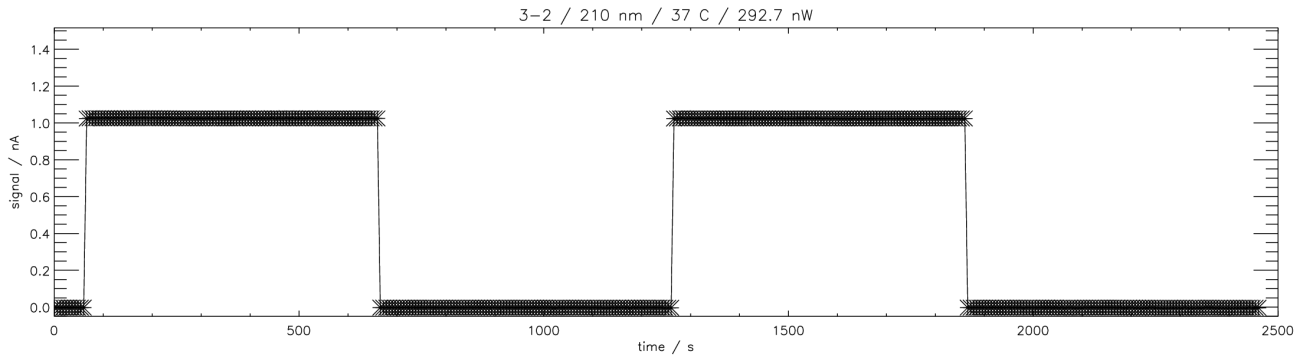
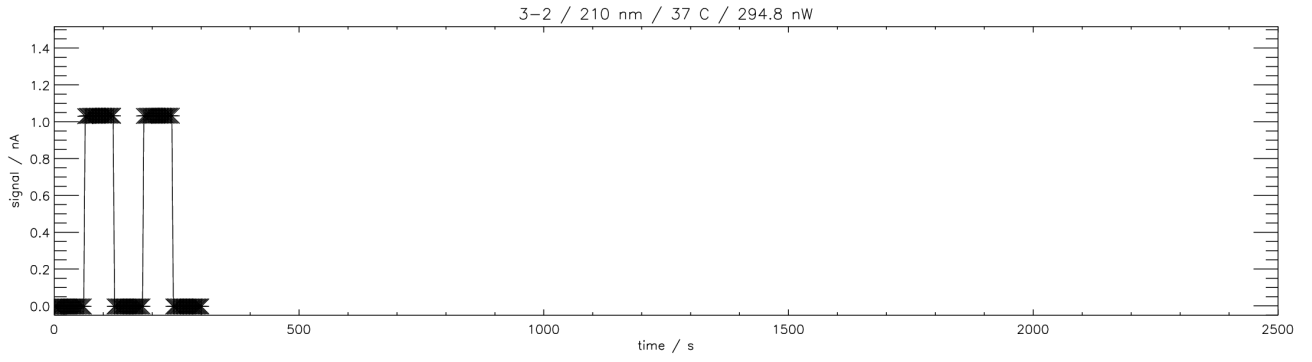
(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : 0.002
start : immediate, to 0.320, to 0.317
drift : small downward tendency
stop : almost immediate, via 0.003 to 0.002
temperature: 37 C
LEDs : no
power : $(0.317-0.002)/0.00225 = 140.0$ nW estimated vs. 152.5 nW recorded

(3) .../CH3-1/Leds/LYRA_3-1_stab_50C_121nm.asc

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : 0.008
start : almost immediate, via 0.018 to 0.244
drift : no
stop : almost immediate, via 0.009 to 0.008
temperature: 50 C, effect on offset, start(?)
LEDs : no
power : $(0.244-0.008)/0.00225 = 104.9$ nW estimated vs. 116.9 nW recorded

(4) /home/dammasch/lyracal/LEDs_3-1_121nm_IIU.asc

(60 s off, 180 s off+visLED, 60 s on+visLED, 400 s off (uvLED not working),
60 s on, 260 s off)
offset : 0.002
start : immediate, to (vis)0.345, to 0.244
drift : no
stop : almost immediate, to 0.002
temperature: 37 C
LEDs : (vis)0.101, assuming an offset of 0.002, effect additiv
power : $(0.244-0.002)/0.00225 = 107.6$ nW estimated vs. 121.6 nW recorded



Channel 3-2 (Herzberg + PIN12), NI, 210 nm

(1) .../CH3-2/Stability/LYRA_3-2_stab_short_210nm.asc

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : -0.003
start : almost immediate, via 1.030 to 1.032
drift : no
stop : immediate
temperature: 37 C
LEDs : no
power : $(1.032+0.003)/0.00329 = 314.6$ nW estimated vs. 294.8 nW recorded

(2) .../CH3-2/Stability/LYRA_3-2_stab_long_210nm.asc

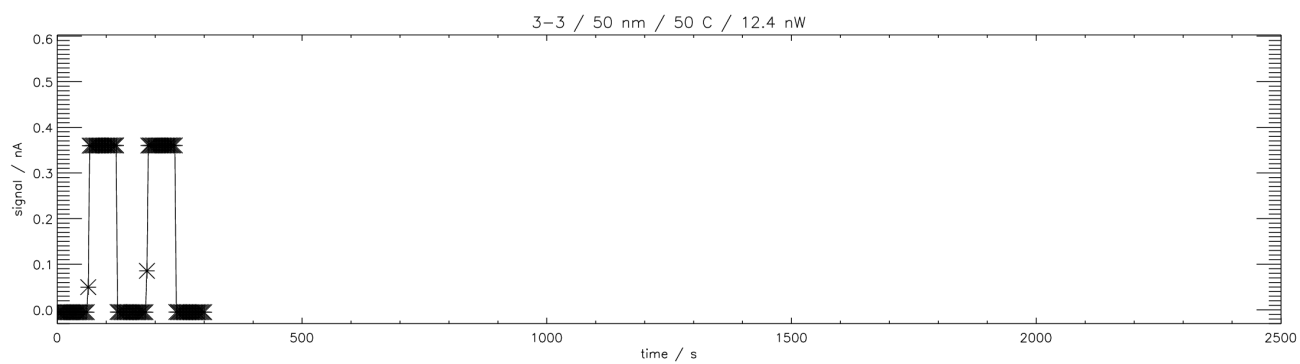
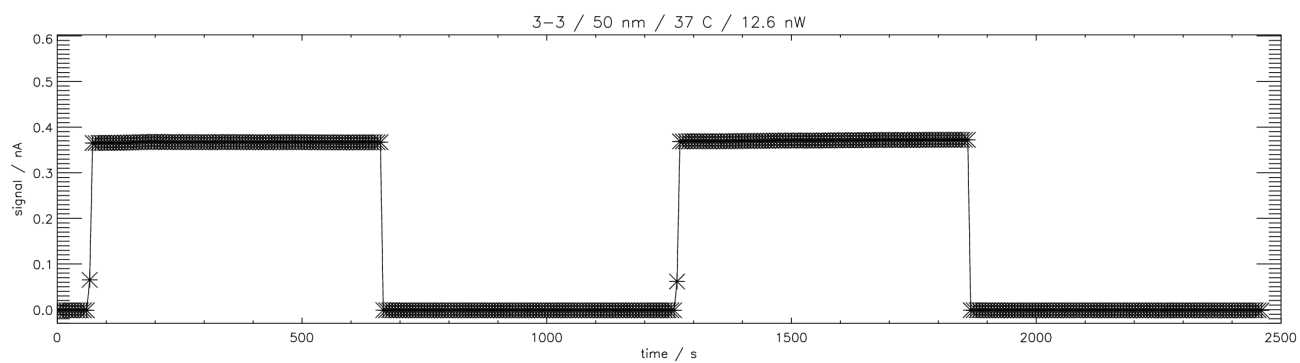
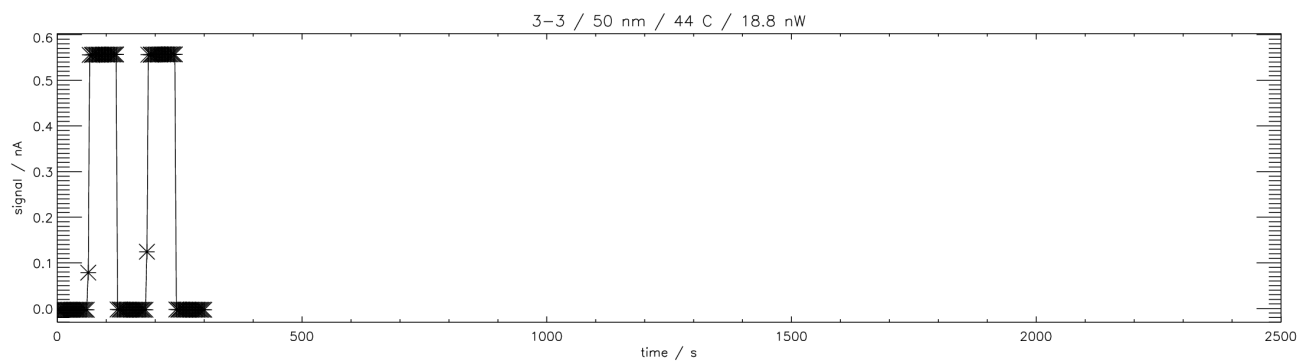
(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : -0.003
start : almost immediate, via 1.024 to 1.025
drift : no
stop : immediate
temperature: 37 C
LEDs : no
power : $(1.025+0.003)/0.00329 = 312.5$ nW estimated vs. 292.7 nW recorded

(3) .../CH3-2/Temperature/LYRA_3-2_stab_50C_210nm.asc

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : -0.005
start : almost immediate, via 0.473 to 1.155, via 0.386 to 1.155
drift : no
stop : immediate
temperature: 50 C, effect on offset(?) and on start(?)
LEDs : no
power : $(1.155+0.005)/0.00329 = 352.6$ nW estimated vs. 331.7 nW recorded

(4) .../CH3-2/Leds/LEDs_3-2_210nm_IIU.asc

(80 s off, 160 s off+visLED, 70 s on+visLED, 180 s off, 60 s on, 560 s off)
offset : -0.006
start : almost immediate, via 1.244 to (vis)1.246, via 1.237 to 1.239
drift : no, LEDs: no
stop : almost immediate, via (vis)-0.003 to -0.006
temperature: 38 C
LEDs : (vis)0.006, assuming an offset of -0.006, effect: additiv
power : $(1.239+0.006)/0.00329 = 378.4$ nW estimated vs. 356.3 nW recorded



Channel 3-3 (Aluminium + AXUV20B), NI, 50 nm

(1) .../CH3-3/Stability/LYRA_3-3_stab_short_50nm_44C.asc

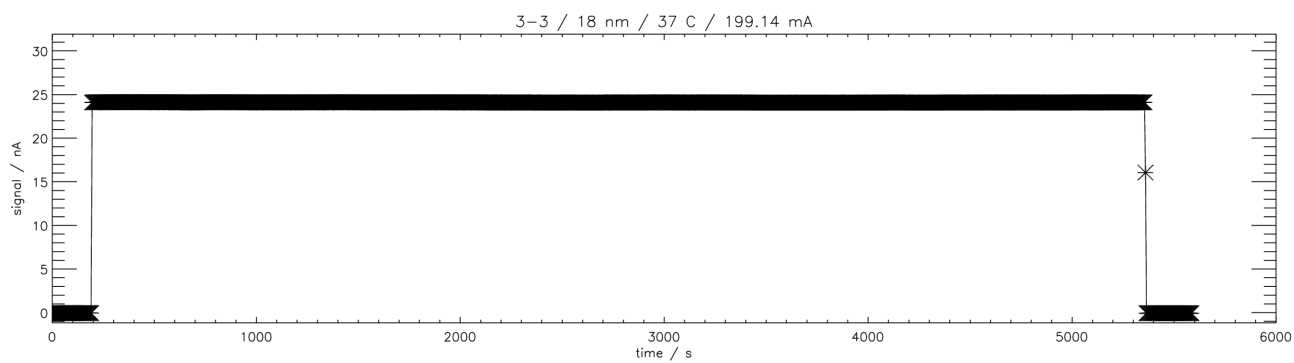
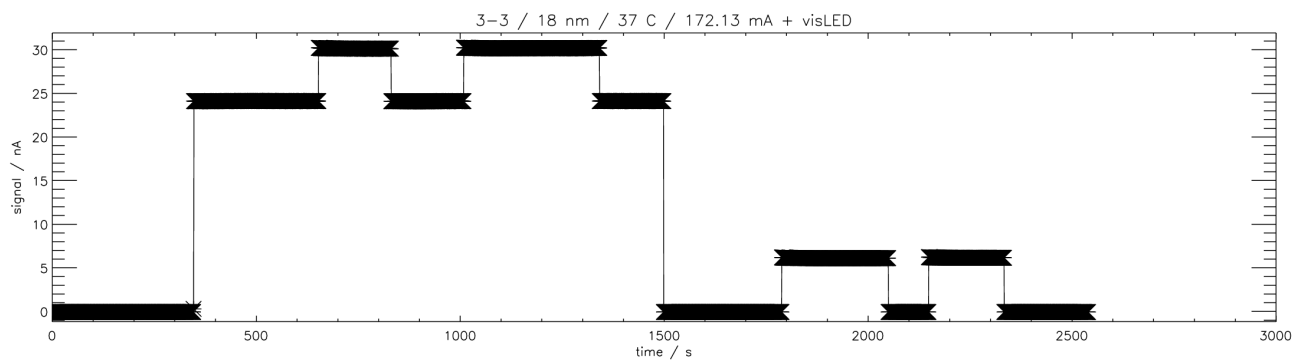
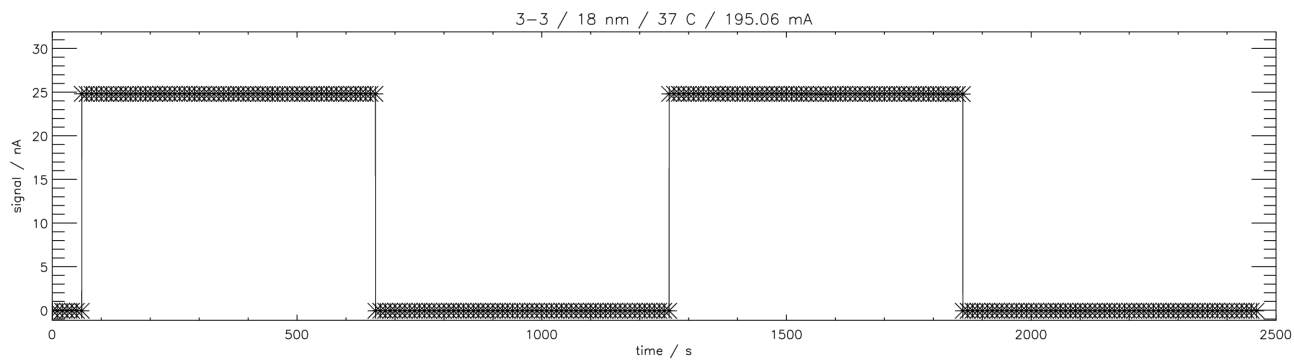
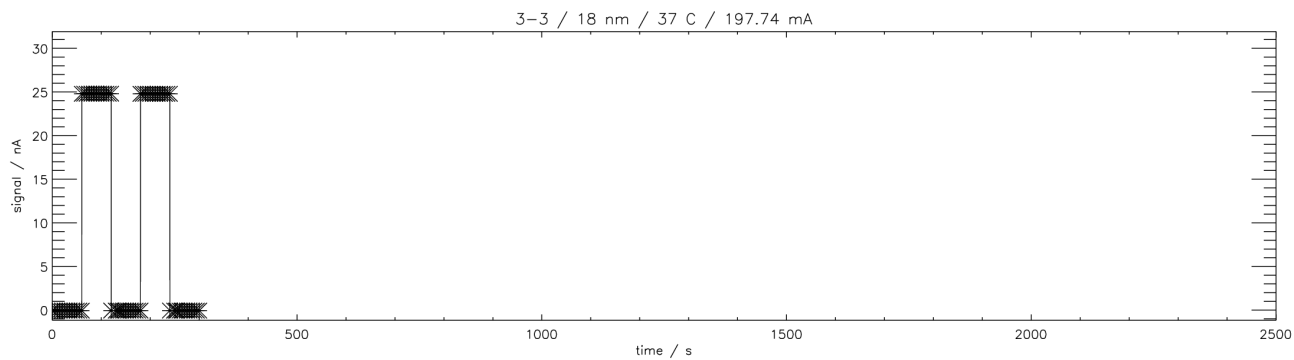
(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : -0.003
start : almost immediate, via 0.078 to 0.556, via 0.124 to 0.556
drift : no
stop : almost immediate, via -0.002 to -0.003
temperature: 44 C, effect on offset
LEDs : no
power : $(0.556+0.003)/0.02877 = 19.4$ nW estimated vs. 18.8 nW recorded

(2) .../CH3-3/Stability/LYRA_3-3_stab_long_50nm.asc

(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : -0.001
start : almost immediate, via 0.065 to 0.367, via 0.062 to 0.369
drift : small upward tendency, offset: small downward tendency (second part)
stop : immediate, to -0.001
temperature: 37 C
LEDs : no
power : $(0.369+0.001)/0.02877 = 12.9$ nW estimated vs. 12.6 nW recorded

(3) .../CH3-3/Temperature/LYRA_3-3_stab_50C_50nm.asc

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : -0.005
start : almost immediate, via 0.050 to 0.360, via 0.085 to 0.360
drift : no
stop : immediate, to -0.005
temperature: 50 C, effect on offset
LEDs : no
power : $(0.360+0.005)/0.02877 = 12.7$ nW estimated vs. 12.4 nW recorded



Channel 3-3 (Aluminium + AXUV20B), GI, 18 nm

(4) .../CH3-3/LYRA_3-3_Al_stability-short.txt

(60s off, 60 s on, 60 s off, 60 s on, 60 s off)
offset : -0.011
start : immediate, to 24.80, to 24.79
drift : no
stop : almost immediate, via -0.056 to -0.058
temperature: 37 C
LEDs : no
power : $(24.80+0.058)/0.13153 = 189.0$ nW estimated

(5) .../CH3-3/LYRA_3-3_Al_stability-long.txt

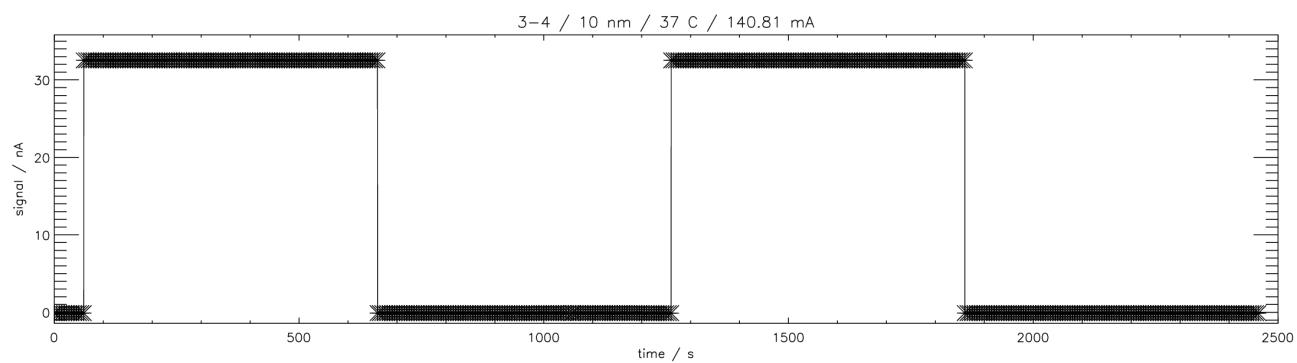
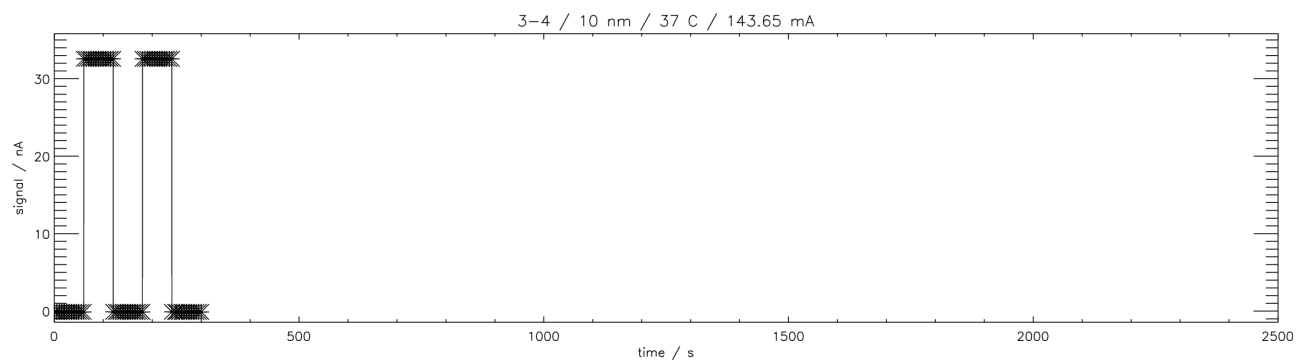
(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)
offset : -0.011
start : immediate, to 24.80
drift : no
stop : almost immediate, via -0.057 to -0.060, via -0.059 to -0.062
temperature: 37 C
LEDs : no
power : $(24.80+0.059)/0.13153 = 189.0$ nW estimated

(6) .../CH3-3/LYRA_3-3_Al_stability-friday-special-with-visLEDs.txt

(350 s off, 1150 s on, 1040 s off; meanwhile 4x LED on, for 200-300 s)
offset : -0.011
start : almost immediate, to 24.10
drift : no, LED: small downward tendency
stop : almost immediate, via -0.056 to -0.062
temperature: 37 C
LEDs : (vis)1.059, i.e. various values around this average,
assuming an offset of -0.011, effect additive
power : $(24.10+0.063)/0.13153 = 183.7$ nW estimated

(7) .../CH3-3/LYRA_3-3_Al_integration-time.txt

(200 s off, 5160 s on, 220 s off)
offset : -0.010
start : immediate, to 24.10
drift : no
stop : almost immediate, via -0.057 to -0.060
temperature: 37 C
LEDs : no
power : $(24.10+0.052)/0.13153 = 183.6$ nW estimated



Channel 3-4 (Zr (300nm) + AXUV20C), GI, 10 nm

(1) .../CH3-4/LYRA_3-4_Zr_stability-short.txt

(60 s off, 60 s on, 60 s off, 60 s on, 60 s off)

offset : around -0.014
start : immediate, to 32.56
drift : no
stop : almost immediate, via -0.098 to -0.100
temperature: 37 C
LEDs : no
power : $(32.56+0.100)/0.05676 = 575.4$ nW estimated

(2) .../CH3-4/LYRA_3-4_Zr_stability-long.txt

(60 s off, 600 s on, 600 s off, 600 s on, 600 s off)

offset : around -0.014
start : immediate, to 32.52
drift : no, offset: unstable between -0.093 and -0.112
stop : almost immediate, to -0.102, -0.104
temperature: 37 C
LEDs : no
power : $(32.52+0.102)/0.05676 = 574.7$ nW estimated