Updates on XY calibration

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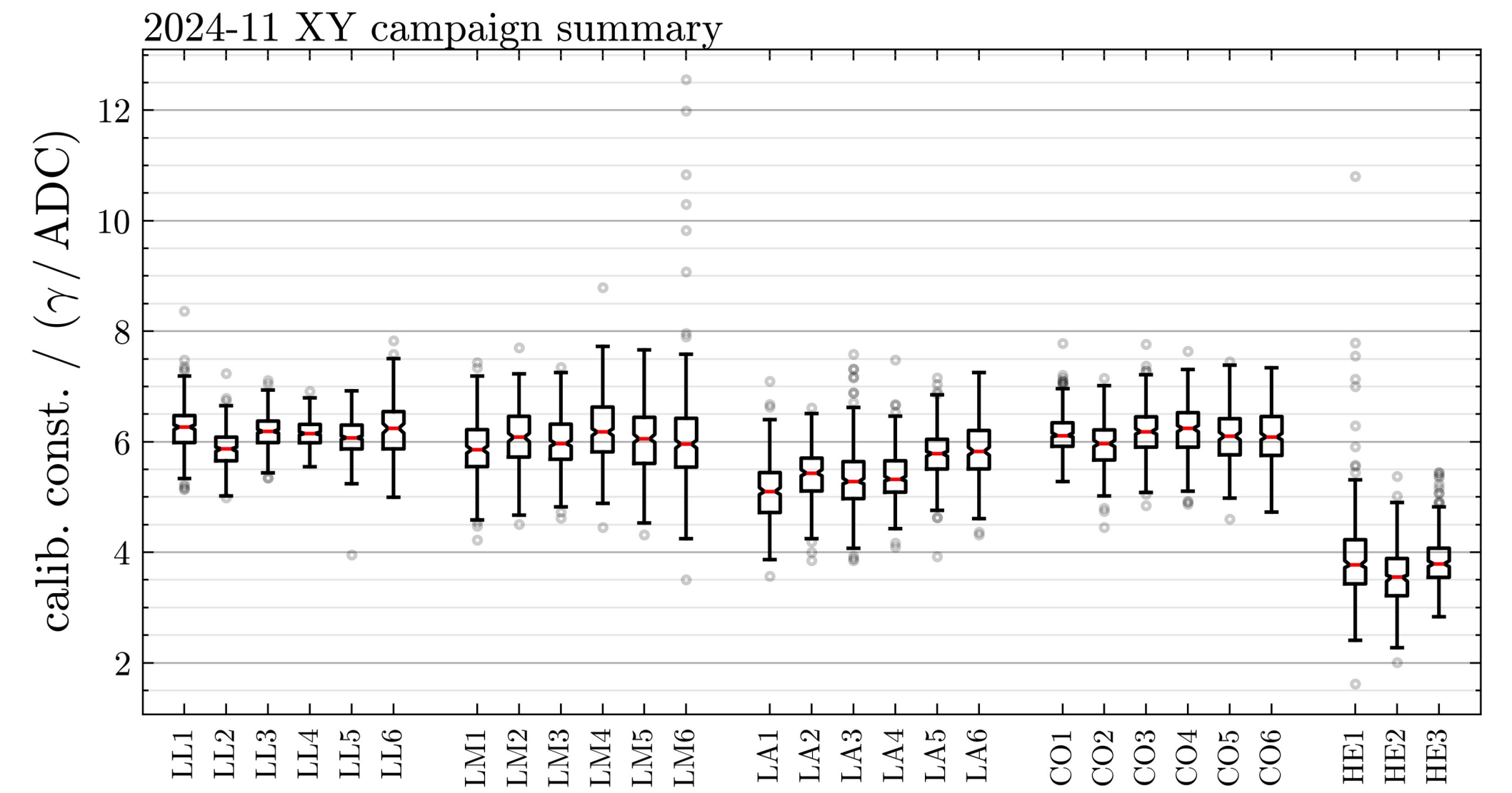
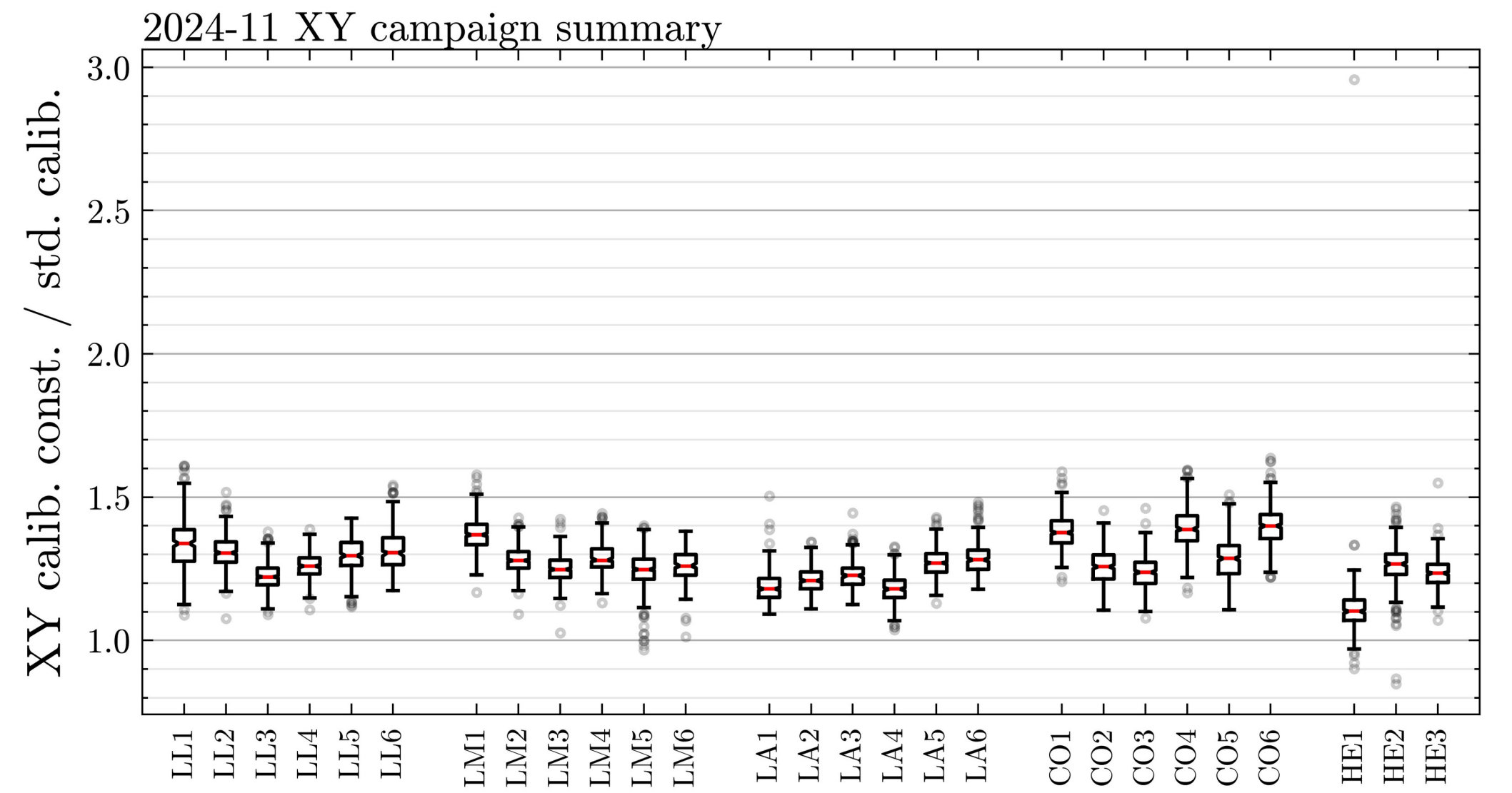
Outline

- 2024-11 XY campaign
- GAP 2024-084
- Calibration of light source

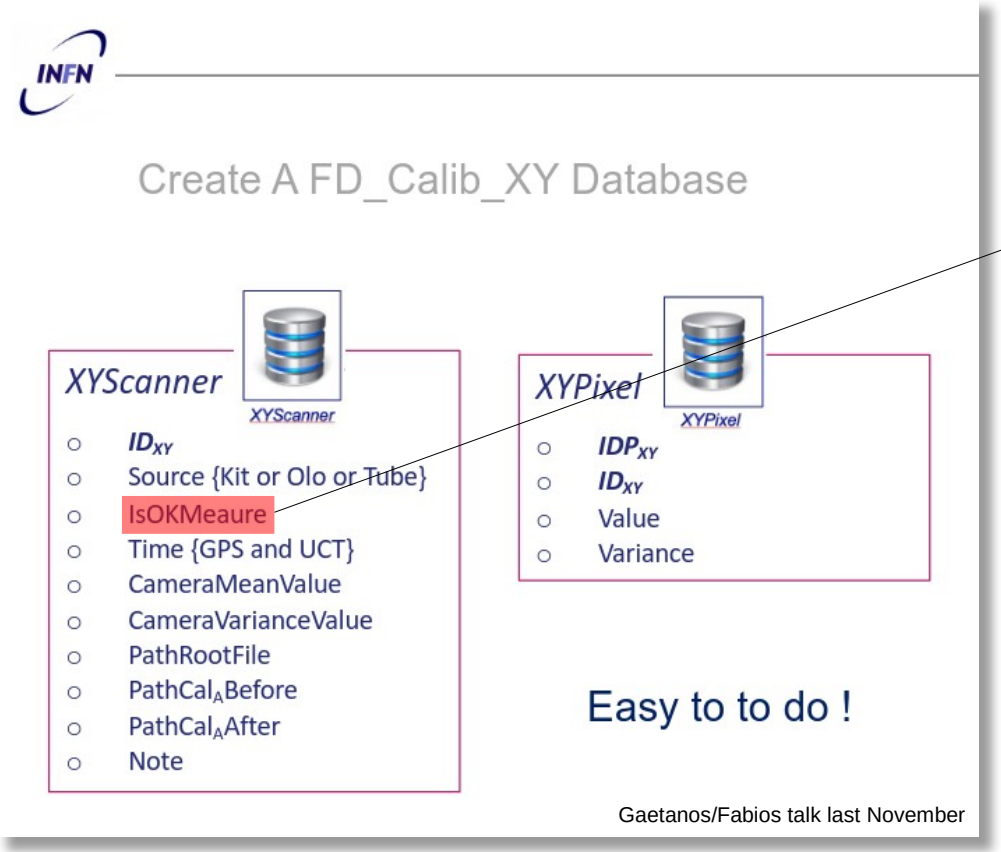
Review of November 2024 campaign

- FD shift **2024/11/20 – 2024/12/07** (17 nights)
  - 4 people
  - 9 DAQ nights
  - 27 telescopes → first time for **LL1** / **LL2** / **LL5** / **LL6** !!
  - 31 measurement runs
- Thanks to Hermann-Josef, Kai, Pavel and Martin!
- Some hardware/software/operator errors → all recoverable


2024-11 XY campaign summary
calib. const. / (γ / ADC)
12
10
8
6
4
2
LL1
LL2
LL3
LL4
LL5
LL6
LM1
LM2
LM3
LM4
LM5
LM6
LA1
LA2
LA3
LA4
LA5
LA6
CO1
CO2
CO3
CO4
CO5
CO6
HE1
HE2
HE3


2024-11 XY campaign summary
XY calib. const. / std. calib.
3.0
2.5
2.0
1.5
1.0
LL1
LL2
LL3
LL4
LL5
LL6
LM1
LM2
LM3
LM4
LM5
LM6
LA1
LA2
LA3
LA4
LA5
LA6
CO1
CO2
CO3
CO4
CO5
CO6
HE1
HE2
HE3

Quality assurance (GAP2024-084)



GAP–2024-084

Quality assurance for XY Scanner calibration measurements

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December 2024

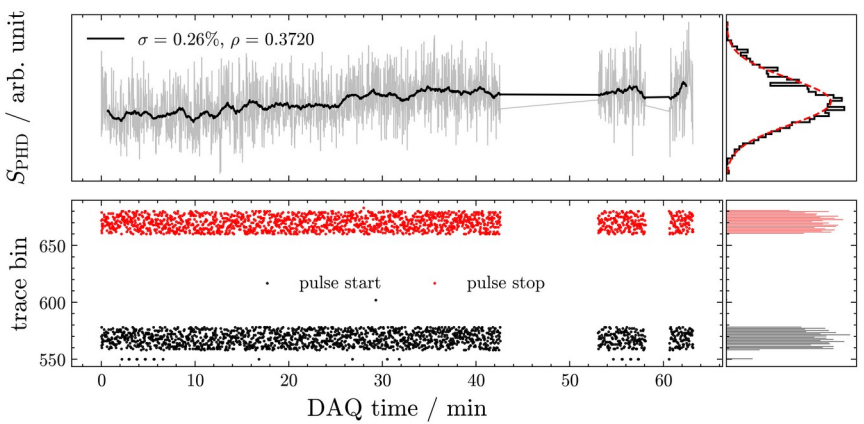
Abstract

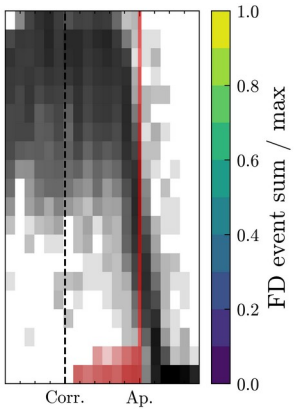
The XY scanner [1] offers a new method of calibrating the Fluorescence Detector (FD) cameras. It has been shown that the systematic uncertainty of pixel calibration constants can be minimized to almost half (from 9% to 4.4%) by using a smaller light source over the standard (Drum) calibration. We examine the data from past XY scanner measurement runs, and propose test statistics as well as first quality cuts based on which the usability of future XY scanner can be evaluated.

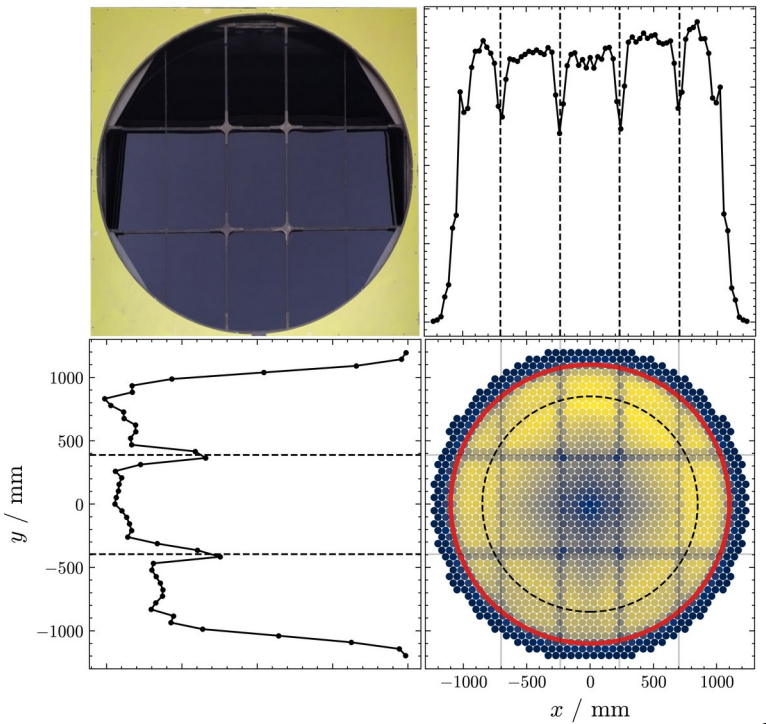
Keywords: Fluorescence, Detector, FD, XY, Scanner, Quality, Assurance, Pixel, Calibration

Quality assurance (GAP2024-084)

- Analyze all past XY runs, identify outliers, define test statistics
  - Cal A open shutter before/after, Olomouc light source, stepsize 6 cm
- Reject runs with abnormal test statistics
  - Light source stability
  - Camera stability
  - Measurement setup
  - (Calib. stability)







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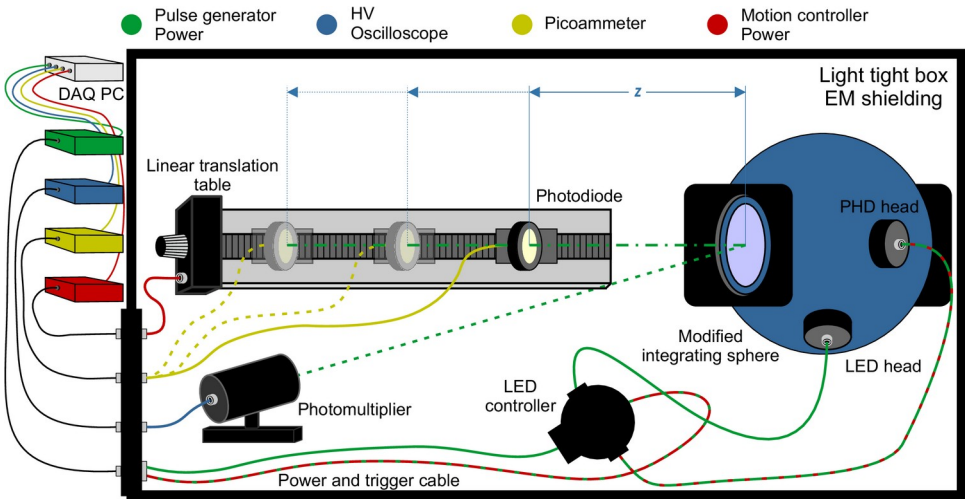
Absolute calibration of the XY light source

- BWU, Wuppertal
  - Work in progress
  - Results comparable to KIT, FZU
- KIT, Karlsruhe
  - Setup running since 2> years
  - Software improvements
  - 2.8% uncertainty in Luminance
  - Used for the results on page 3/4
- FZU, Olomouc
  - Fully ready for data acquisition
  - 2.18% uncertainty in Luminance
  - Down to 1.85% after recent work



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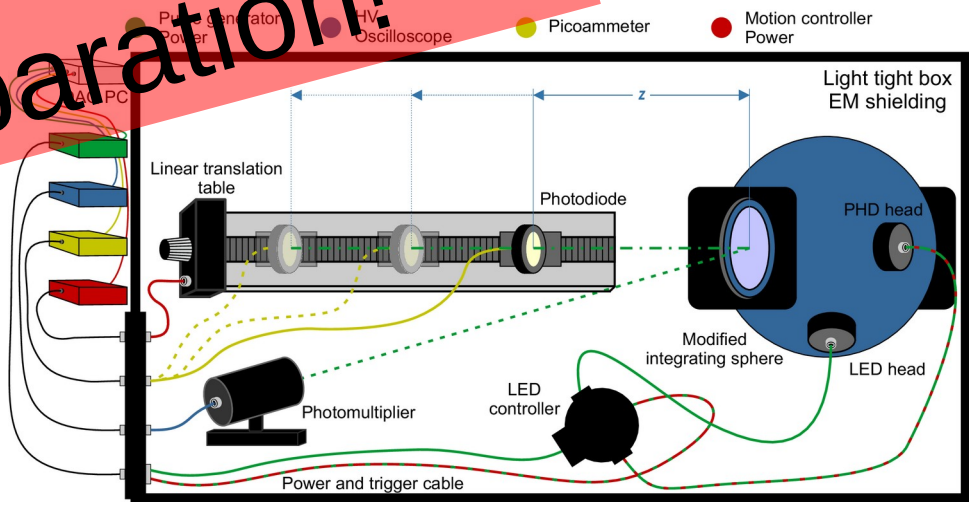
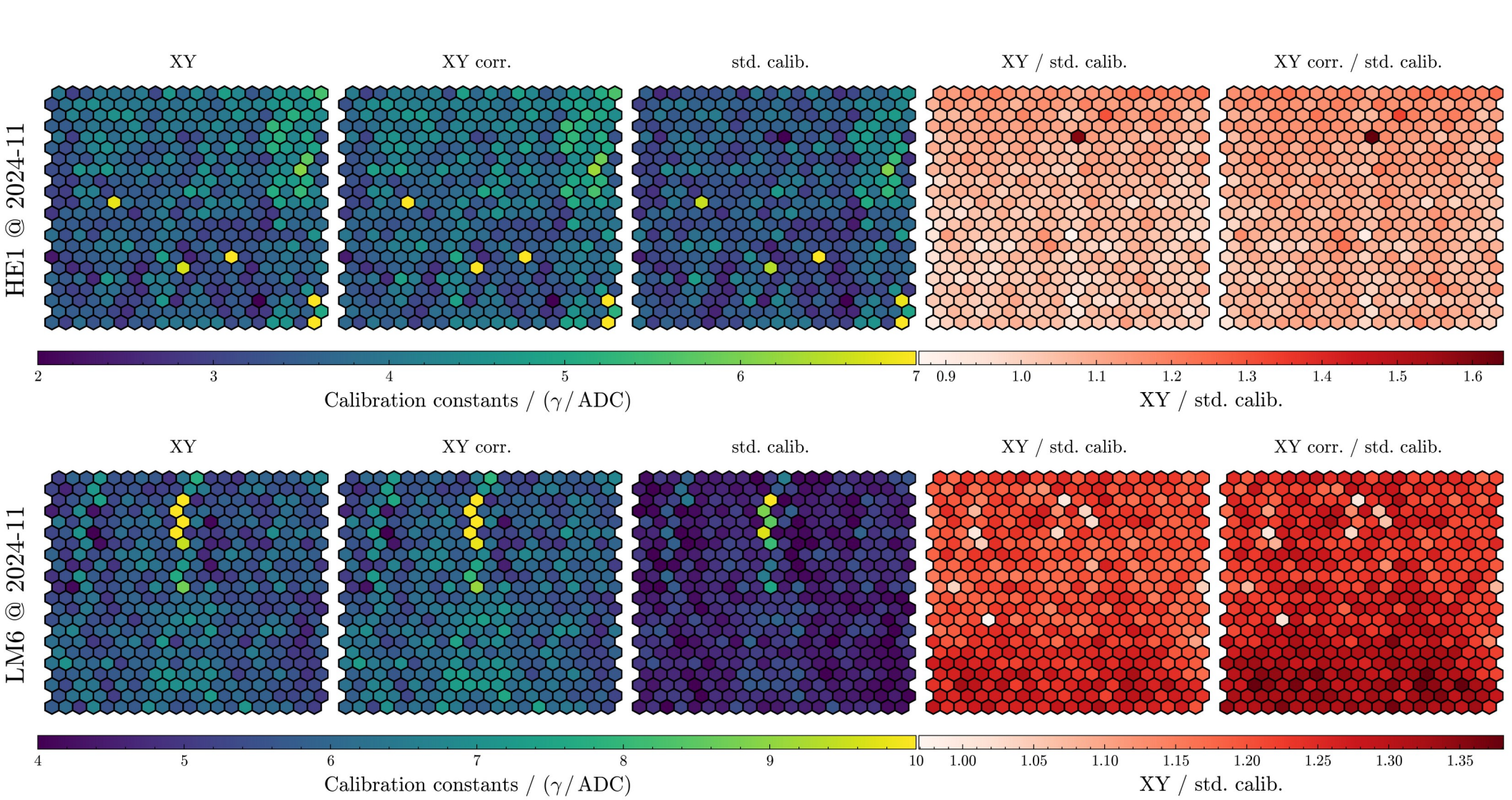
SAL Paper currently in preparation!



Backup


XY
XY corr.
std. calib.
XY / std. calib.
XY corr. / std. calib.
HE1 @ 2024-11
2
3
4
5
6
7
Calibration constants / (γ / ADC)
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
XY / std. calib.
XY
XY corr.
std. calib.
XY / std. calib.
XY corr. / std. calib.
LM6 @ 2024-11
4
5
6
7
8
9
10
Calibration constants / (γ / ADC)
1.00
1.05
1.10
1.15
1.20
1.25
1.30
1.35
XY / std. calib.