XY quality assurance, potential energy shift

Paul Filip

XY quality assurance

- Python script for automatic testing
  - Unit tests for XY run information
  - Replaces plot_scripts code
  - One application (= easy to use)
  - Hard (TBD) selection criteria

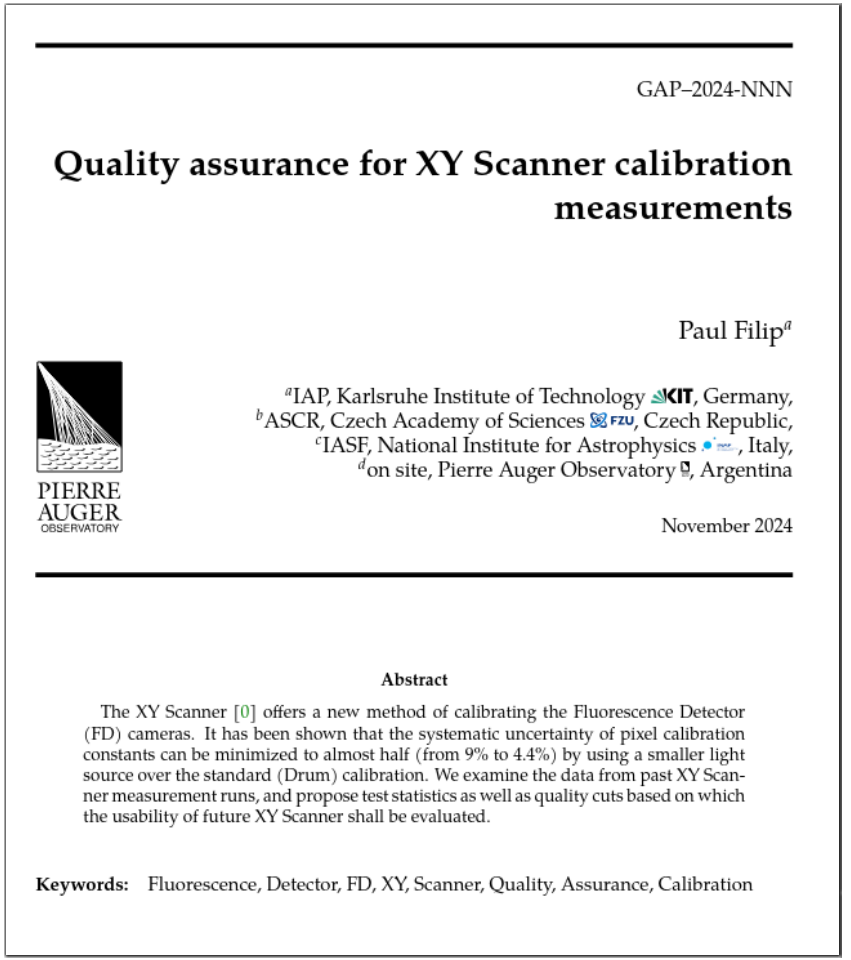
```
 ~/xy-calibration                                                    filip debian:pts/1
(22:17:19 on main ● ★)──> ./run_Check.py 12825                        ──(Di,Nov12)

test1_board_temperature (__main__.XYTest)
Check temperature stability of the Diode and LED ... ok
test2_diode_stability (__main__.XYTest)
Check diode noise level and drift ... ok
test3_positions_and_isotropy (__main__.XYTest)
Check positions, and isotropy of FD camera ... ok
test4_cal_a_stability (__main__.XYTest)
Check stability of FD camera before/after XY run ... ok
test6_compare_xy_to_std (__main__.XYTest)
Compare XY constants to std. Calib. ... ok

Plot saved to check_12825.pdf

----------------------------------------------------------------------
Ran 5 tests in 5.434s

OK
 ~/xy-calibration                                                    filip debian:pts/1
(22:18:18 on main ● ★)──>                                             ──(Di,Nov12)
```



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Quality assurance for XY Scanner calibration measurements

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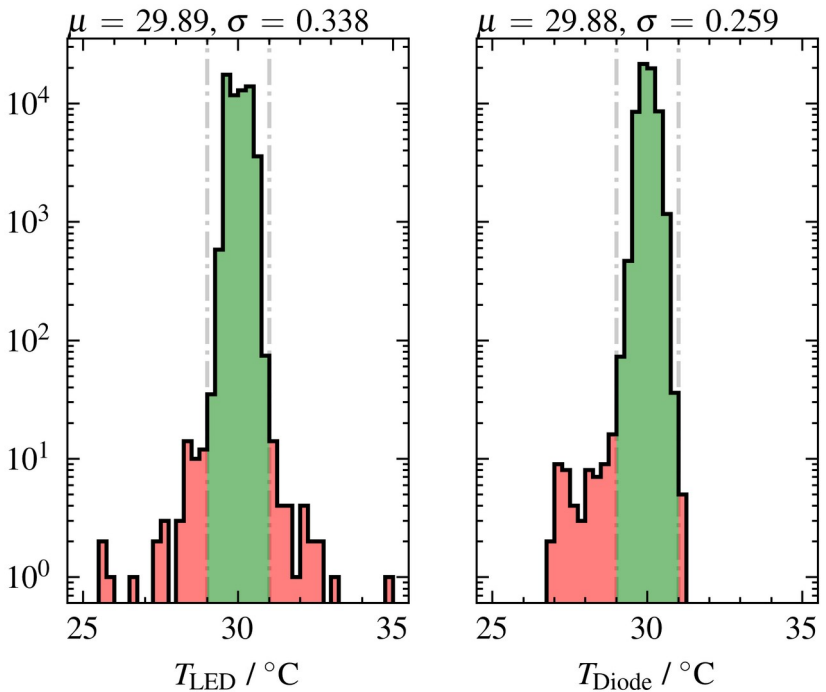
Abstract

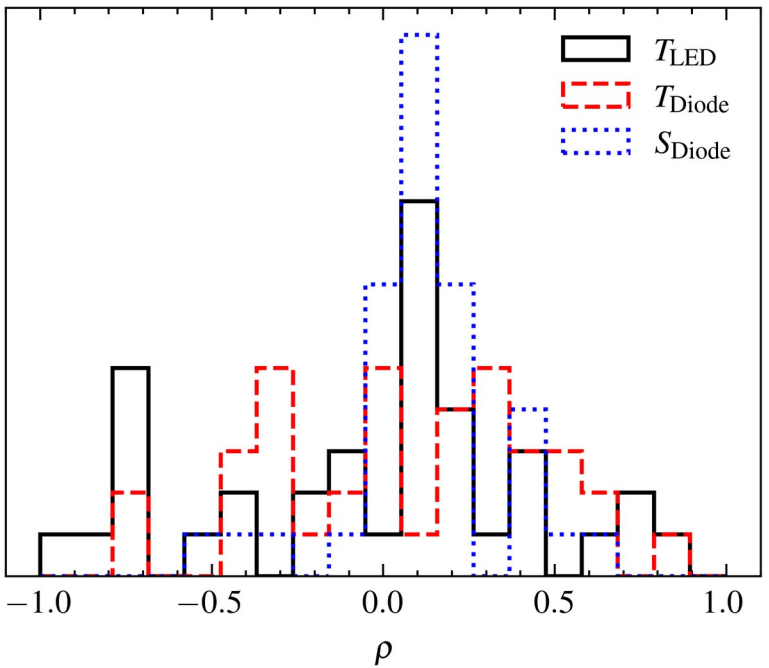
The XY Scanner [0] offers a new method of calibrating the Fluorescence Detector (FD) cameras. It has been shown that the systematic uncertainty of pixel calibration constants can be minimized to almost half (from 9% to 4.4%) by using a smaller light source over the standard (Drum) calibration. We examine the data from past XY Scanner measurement runs, and propose test statistics as well as quality cuts based on which the usability of future XY Scanner shall be evaluated.

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

Unit tests – defining limits

- Log distribution of all test statistics over all XY runs with:
  - OLO sphere, LED up, 6 cm stepsize, d=10 cm, full aperture





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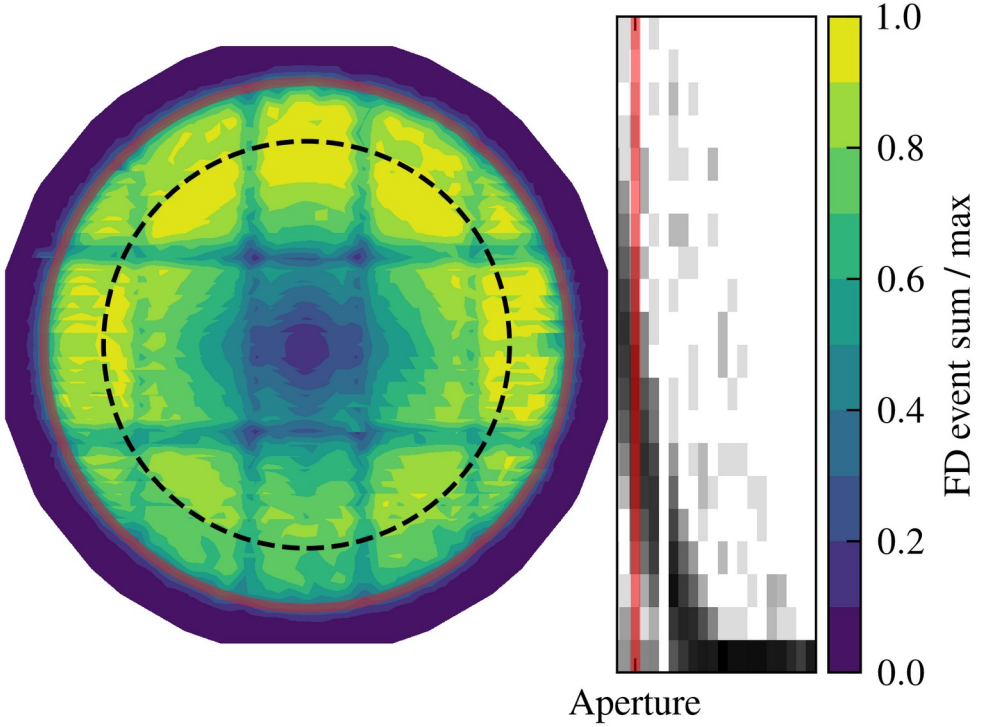

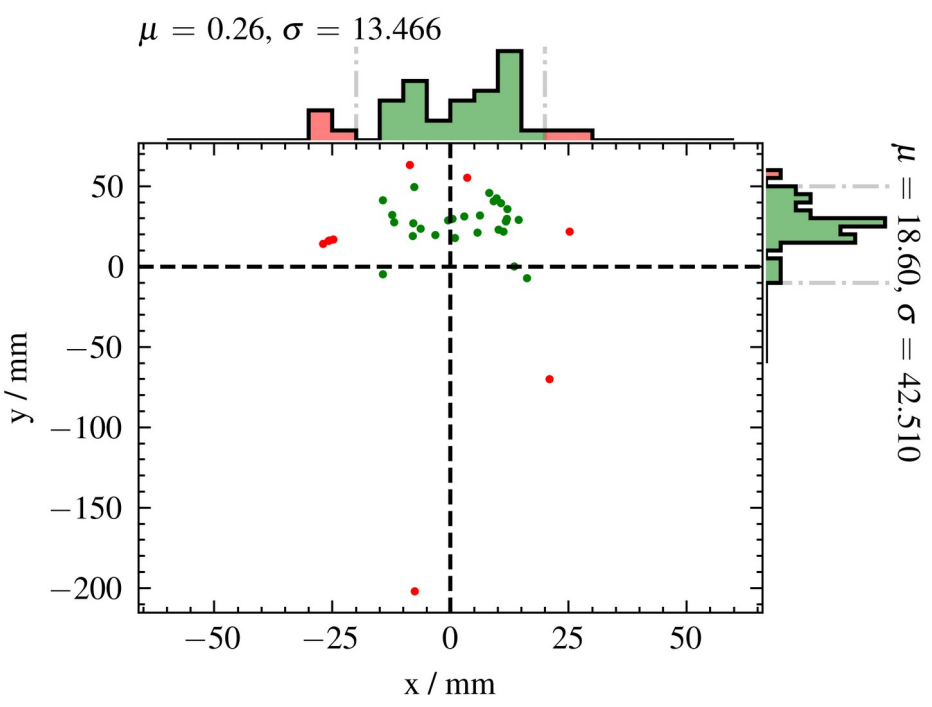

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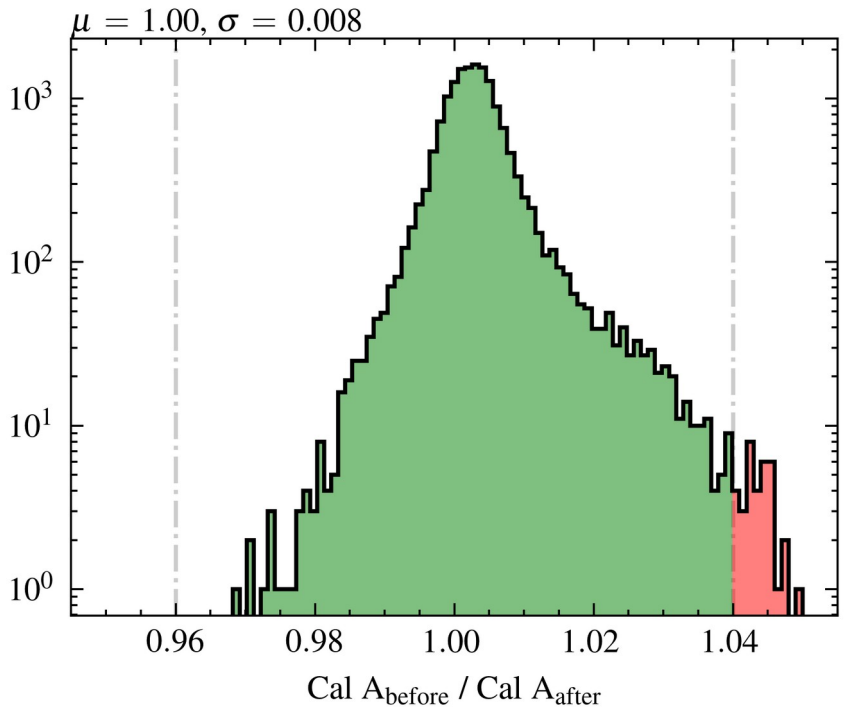
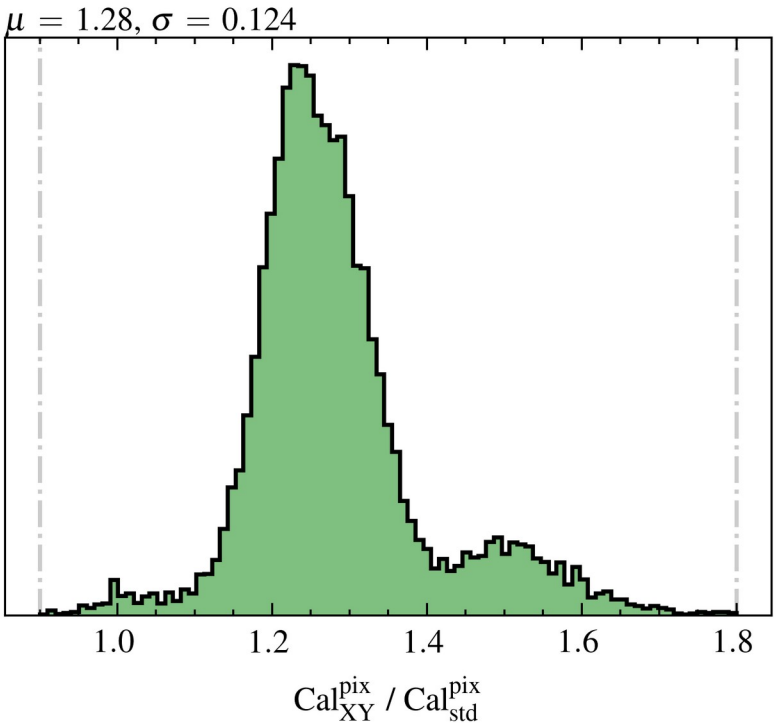
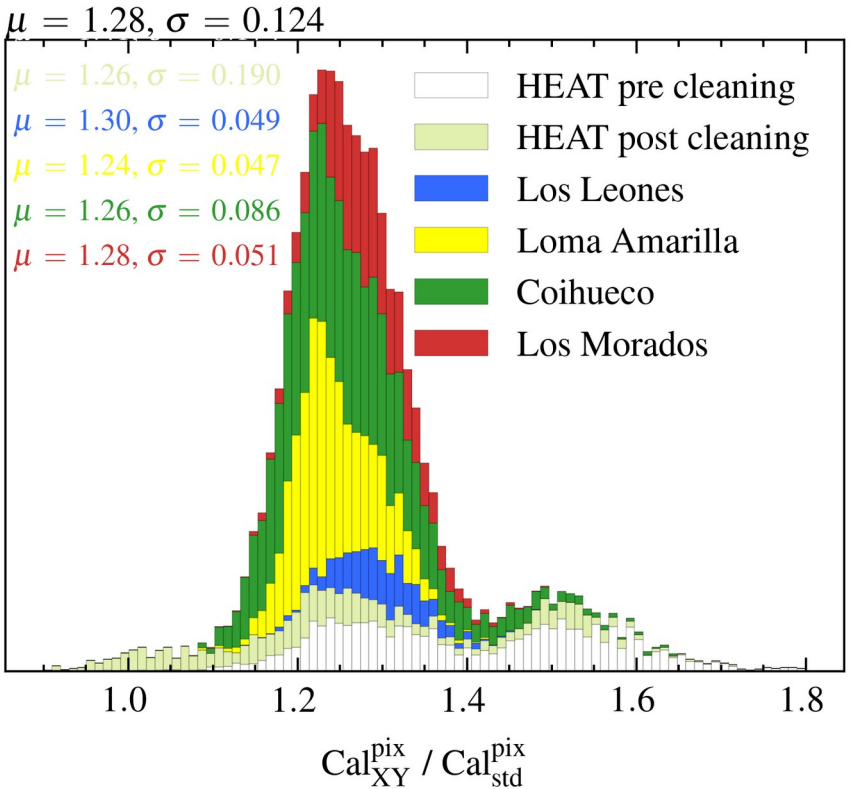




Potential energy shift

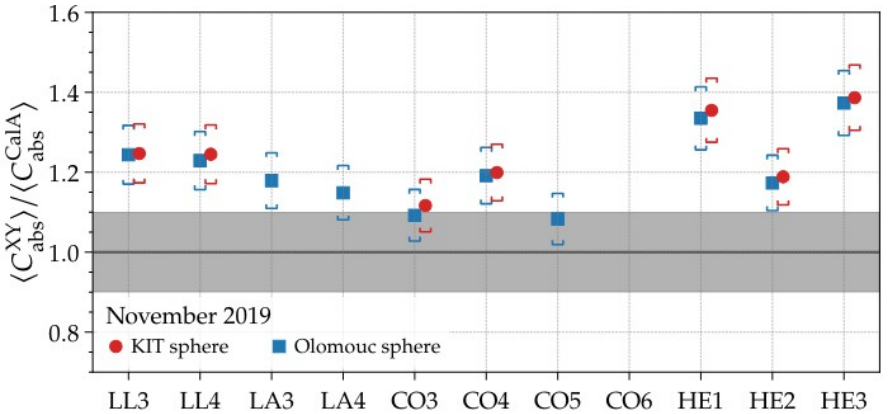
- Given roughly by Cal XY ratio (corr.) vs. Cal A ratio

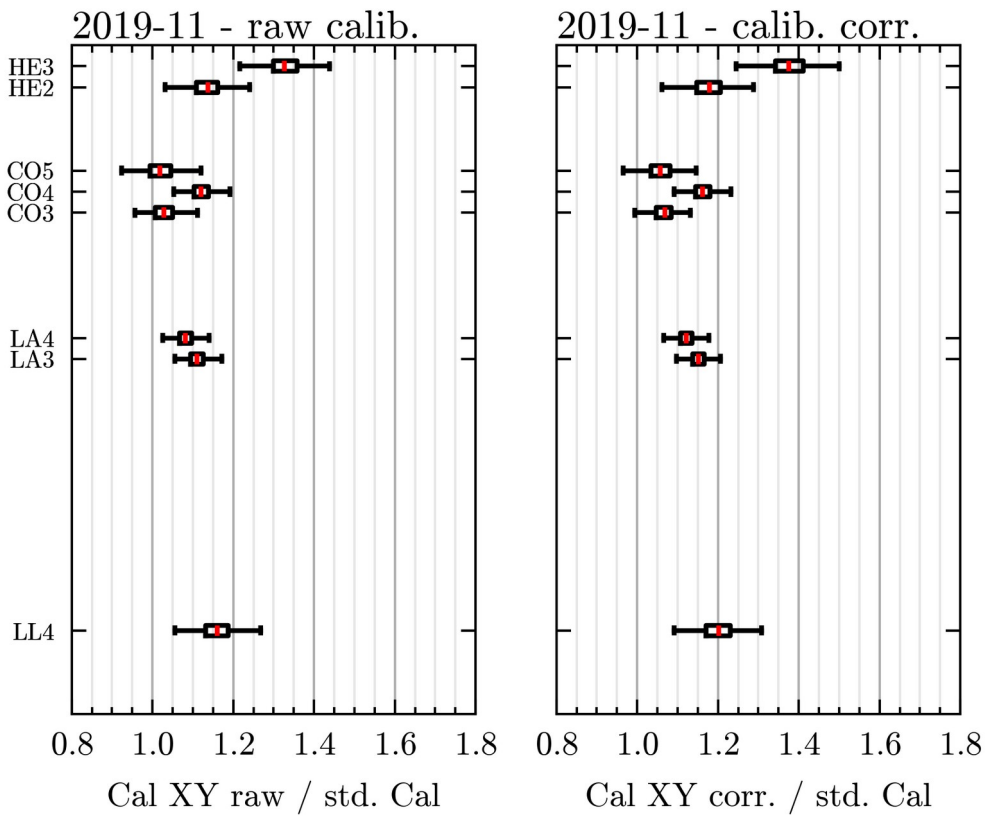


- Average +25% change!
- HE/CO have large spread
- Mean driven by outliers

- Differs from Christophs results by few percent

Potential energy shift





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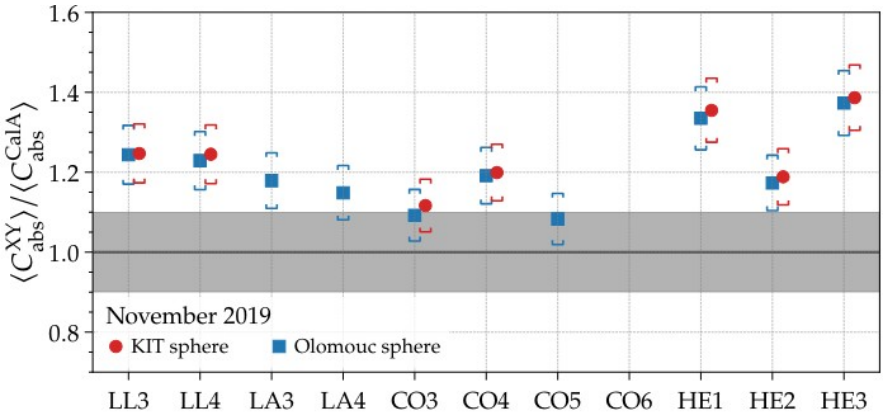

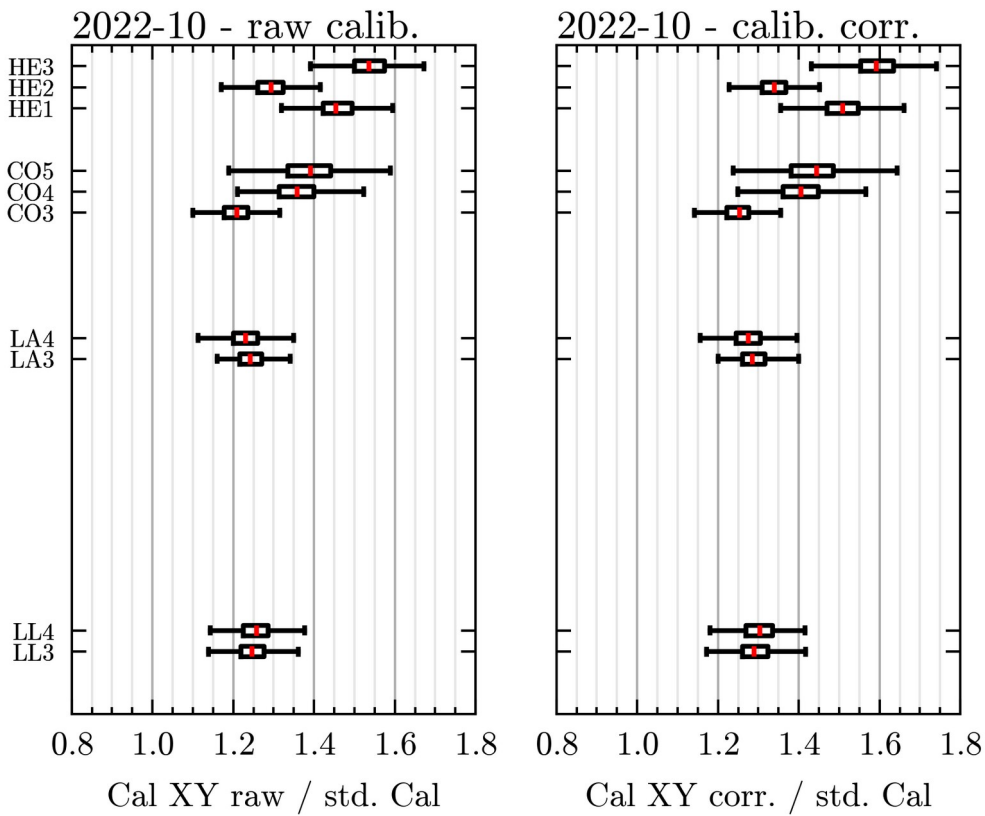

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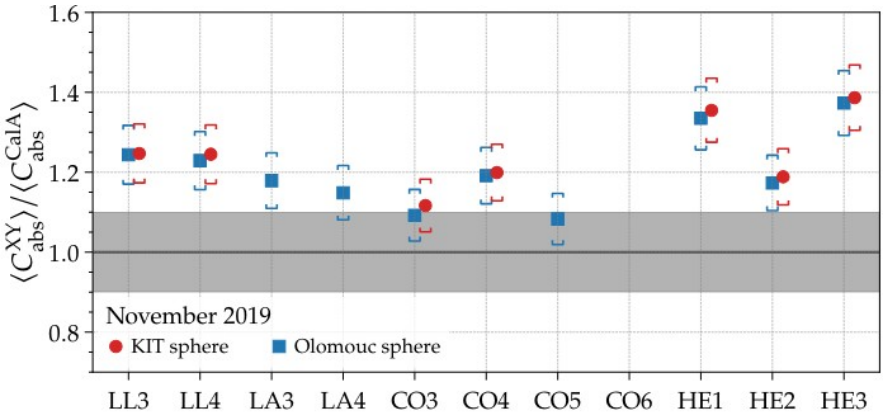

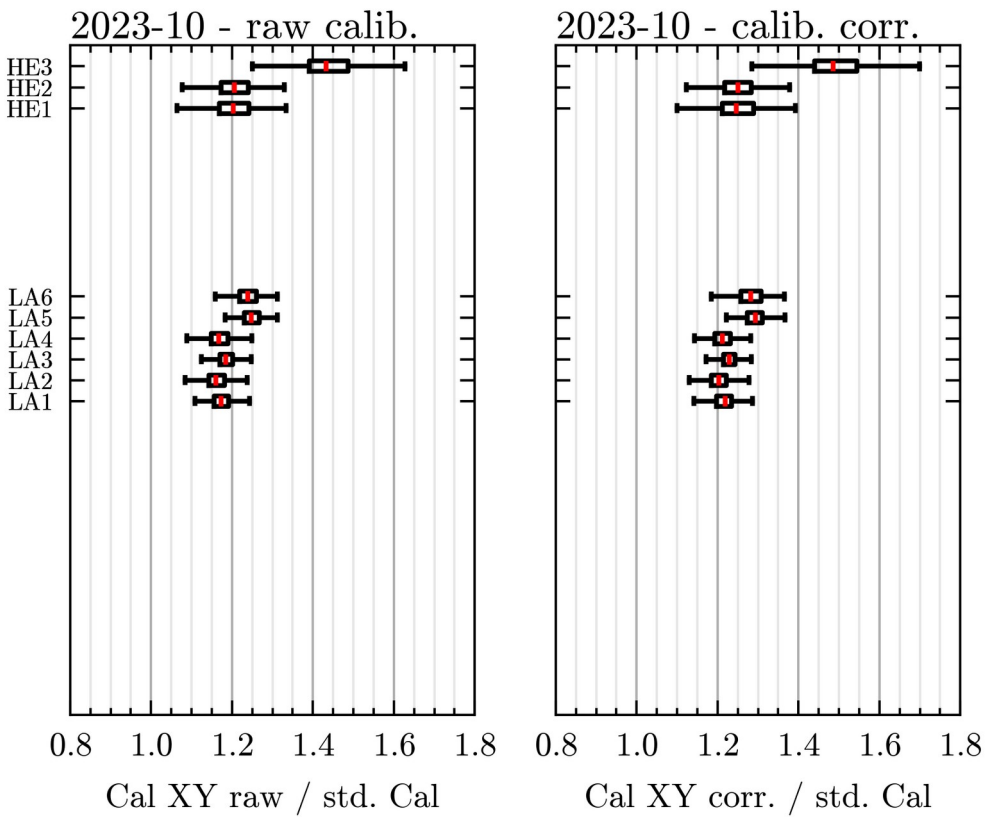

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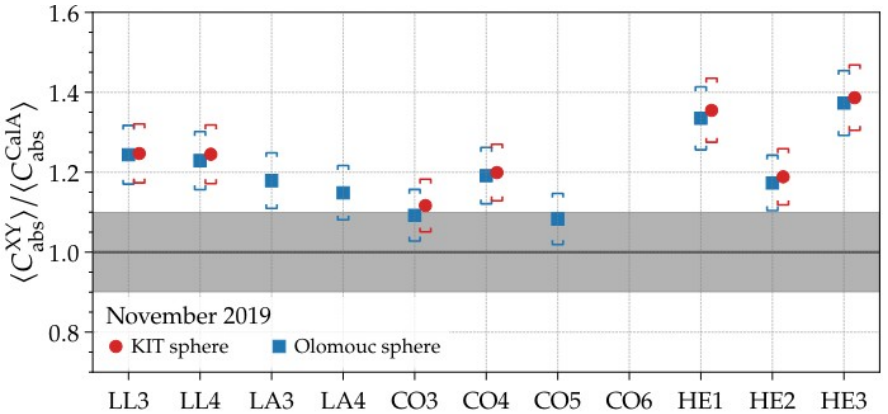

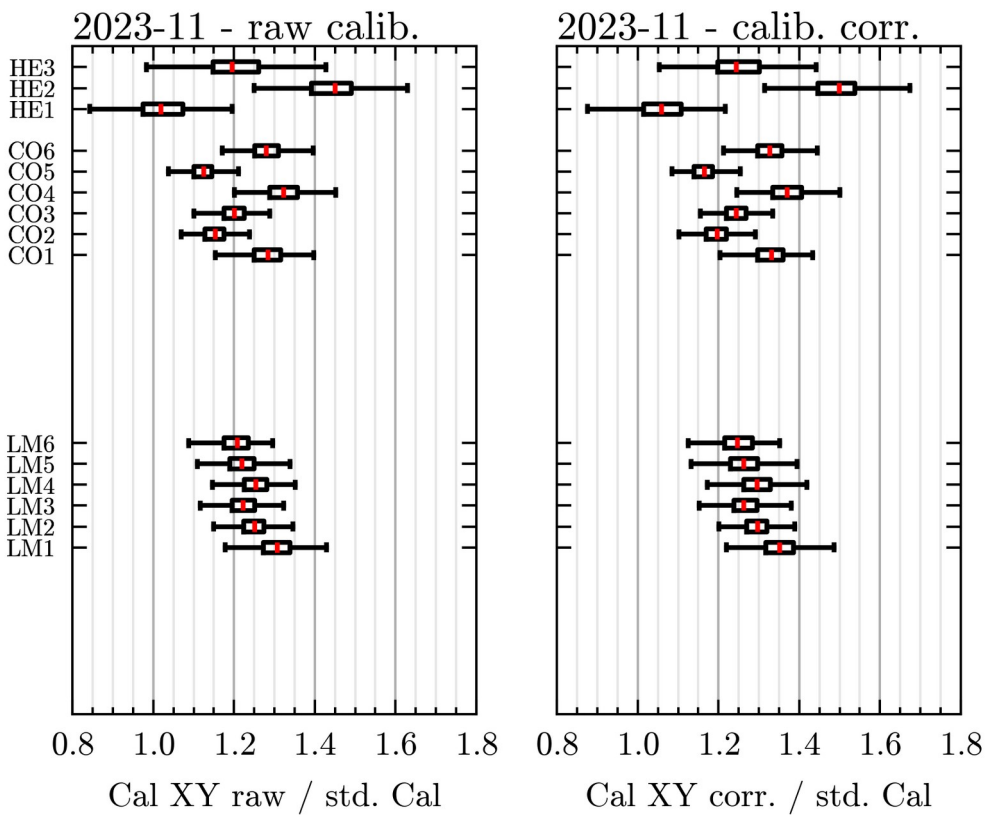

Backup