Quality Report for Dataset WKERMO

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The quality metrics that follow represent quantitative measures of the quality of the dataset.

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Warnings Summary

Data Source Health:
Data sourced from components with a health status of 'ill', 'bad', or 'unknown'.

Frame Counts:
33.3% of frames were not used in the processing of task type DARK

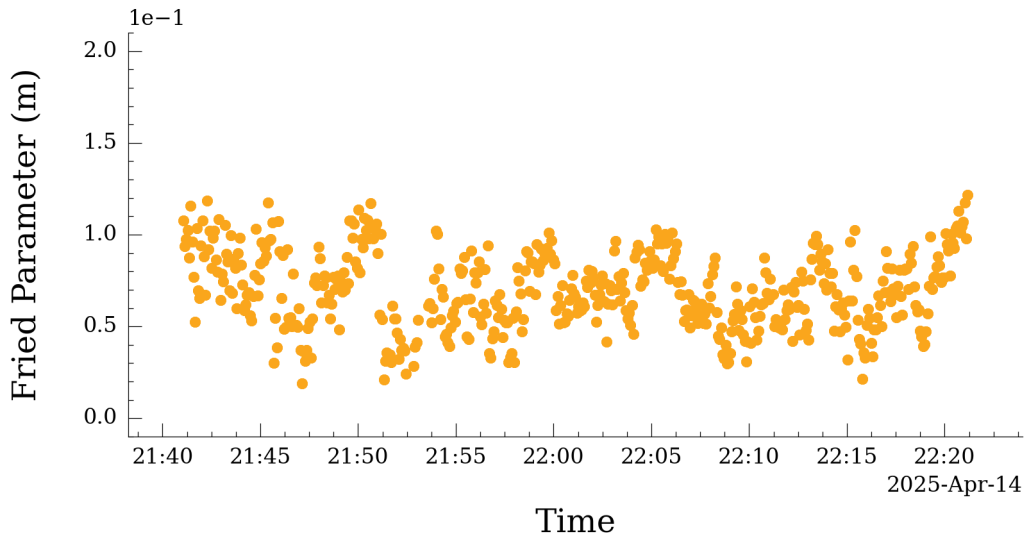
Average Across Frame - LAMP_GAIN:
File with datetime 2025-04-14T23:40:06.787794 has a value considered to be an outlier for this metric

Root Mean Square (RMS) Across Frame - LAMP_GAIN:
File with datetime 2025-04-14T23:40:08.829305 has a value considered to be an outlier for this metric

Fried Parameter

This metric quantifies the stability of the atmosphere during an observation and directly impacts the data quality through a phenomenon known as atmospheric seeing. One measurement is taken per L1 frame. Only measurements taken while the AO system is locked are valid.

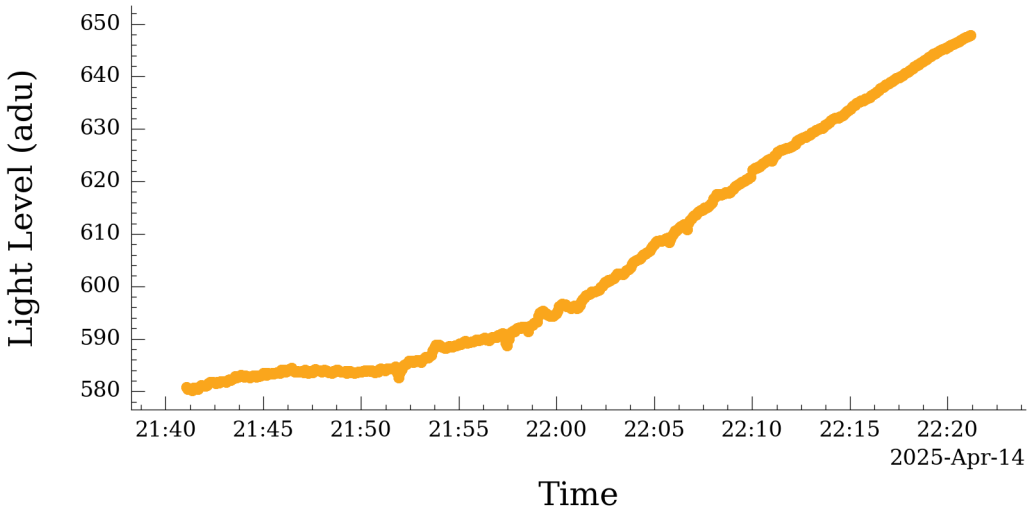
Average valid Fried Parameter measurements for L1 dataset: 0.07 ± 0.02 m



Light Level

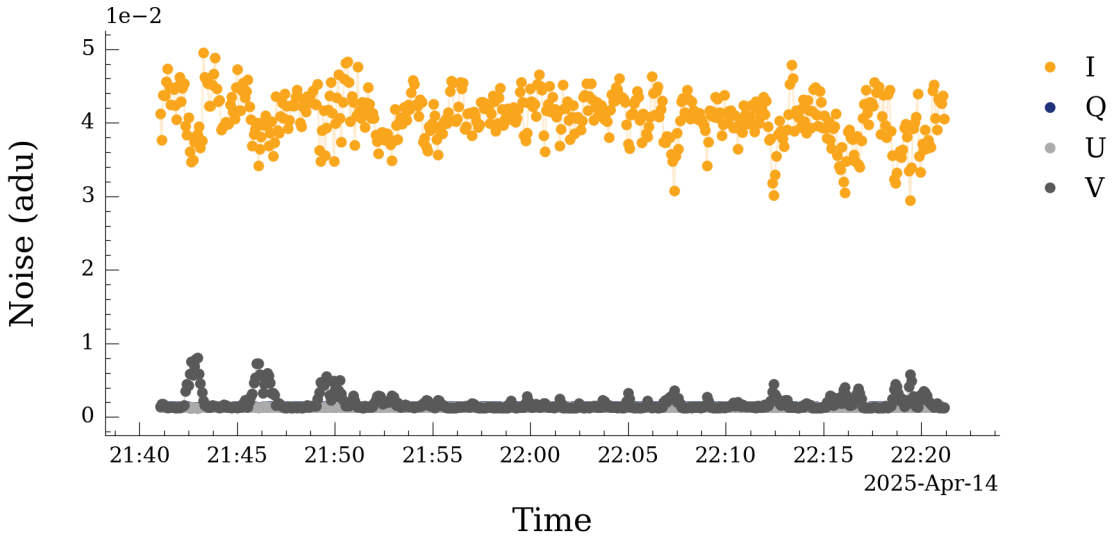
The telescope light level, as measured by the Telescope Acquisition Camera, at the start of data acquisition of each frame.

Average Light Level for L1 dataset: 605.11 ± 21.65 adu



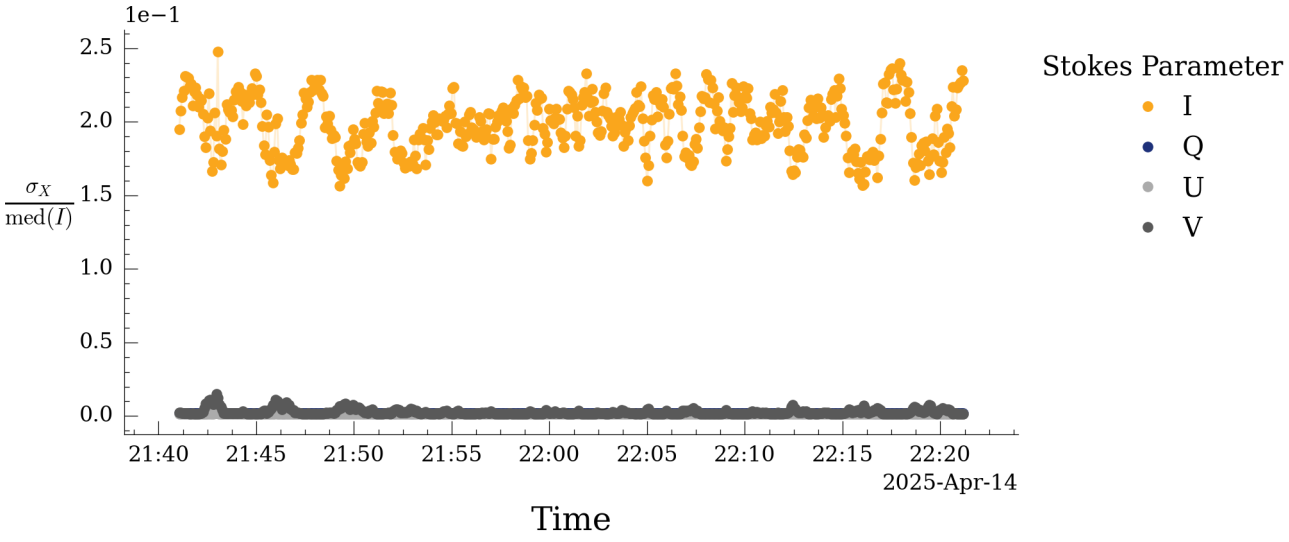
Noise Estimation

Estimate of the noise in L1 frames. Noise is computed as the average of the stddev of boxes/cubes that extend 1/5 from the edge of the images on all sides. One measurement taken per L1 frame.



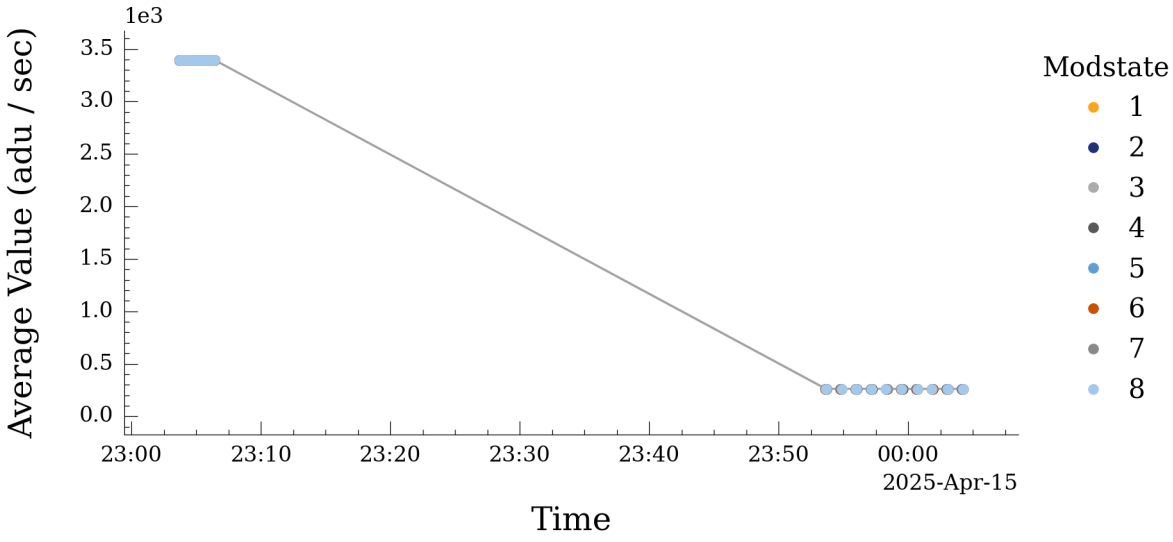
Sensitivity

Sensitivity is defined as the stddev of a particular Stokes parameter divided by the signal in Stokes I (computed as a median over the whole frame). One measurement is shown per map scan.



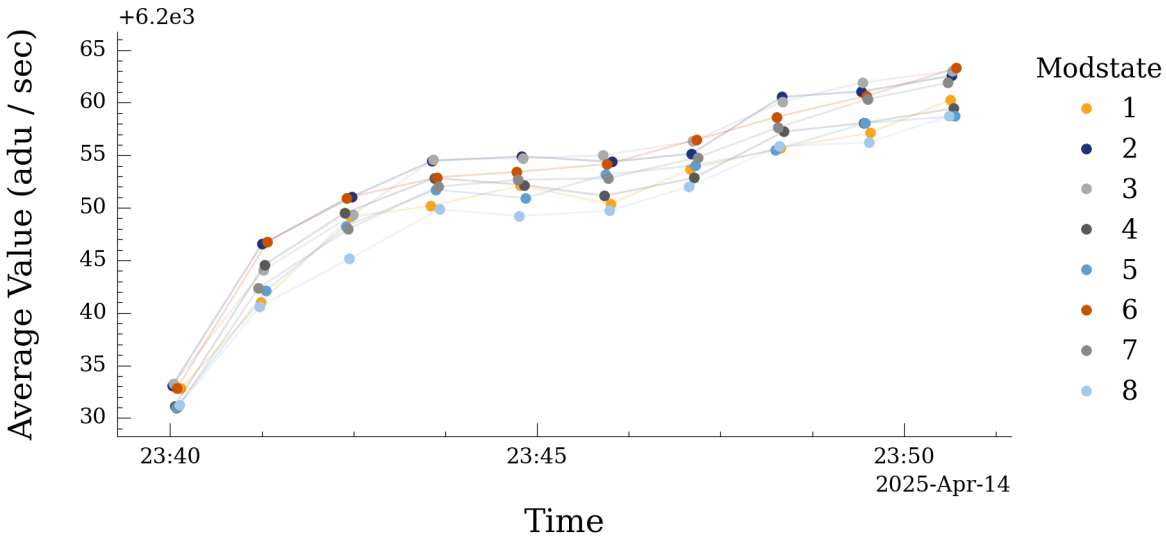
Average Across Frame - DARK

Average intensity value across frames of task type DARK. One measurement is taken per frame in each task type.



Average Across Frame - LAMP_GAIN

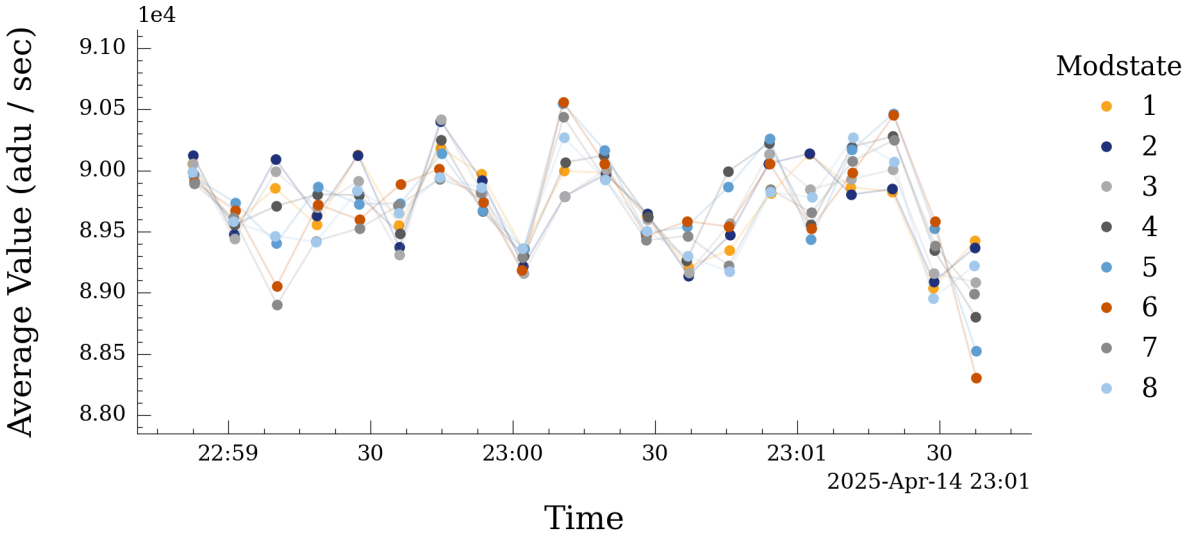
Average intensity value across frames of task type LAMP_GAIN. One measurement is taken per frame in each task type.



File with datetime 2025-04-14T23:40:06.787794 has a value considered to be an outlier for this metric

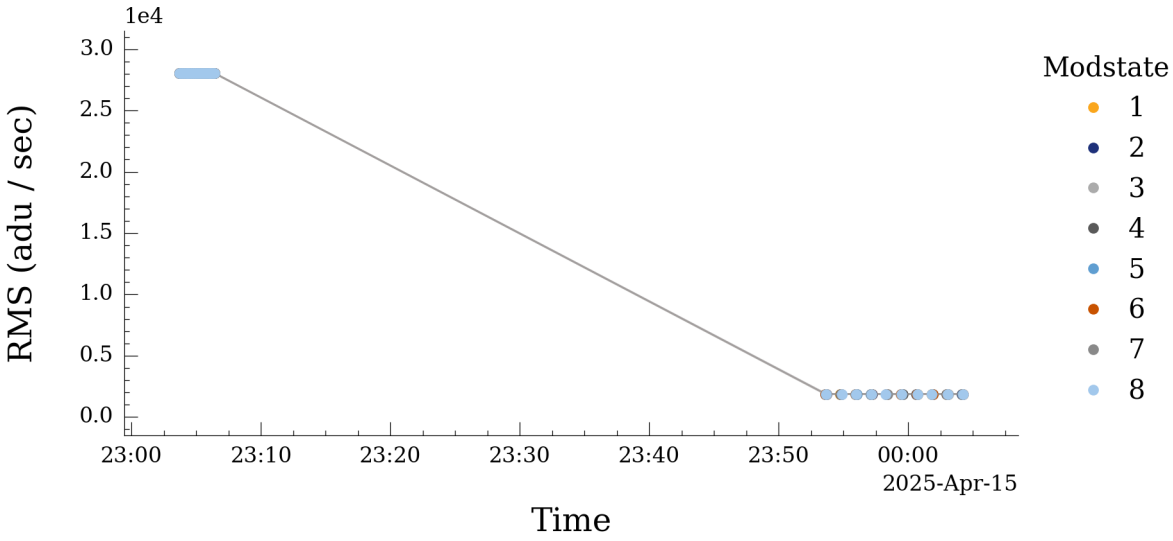
Average Across Frame - SOLAR_GAIN

Average intensity value across frames of task type SOLAR_GAIN. One measurement is taken per frame in each task type.



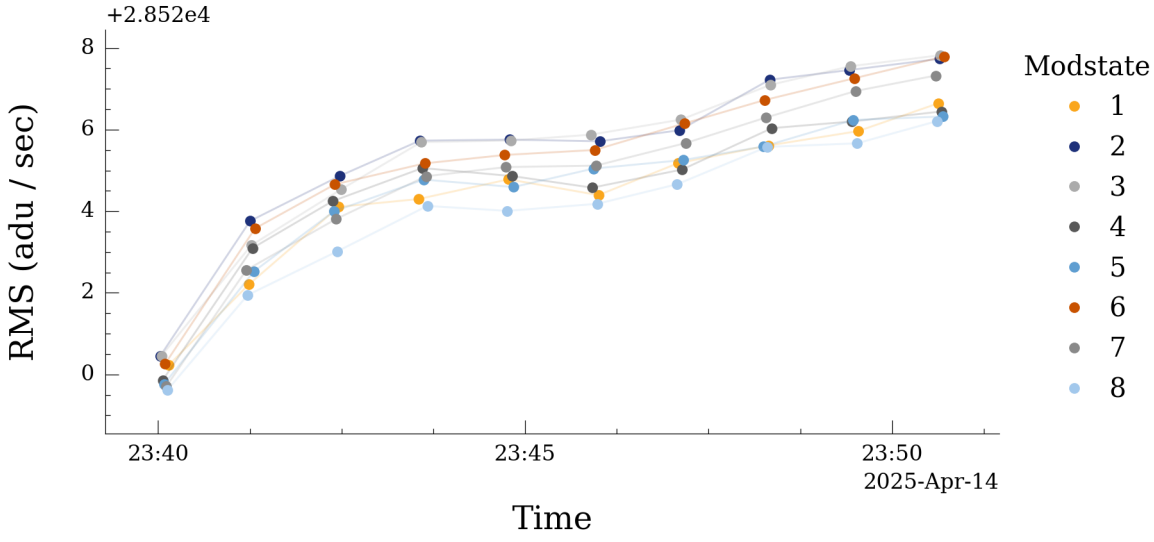
Root Mean Square (RMS) Across Frame - DARK

RMS value across frames of task type DARK. One measurement is taken per frame in each task type.



Root Mean Square (RMS) Across Frame - LAMP_GAIN

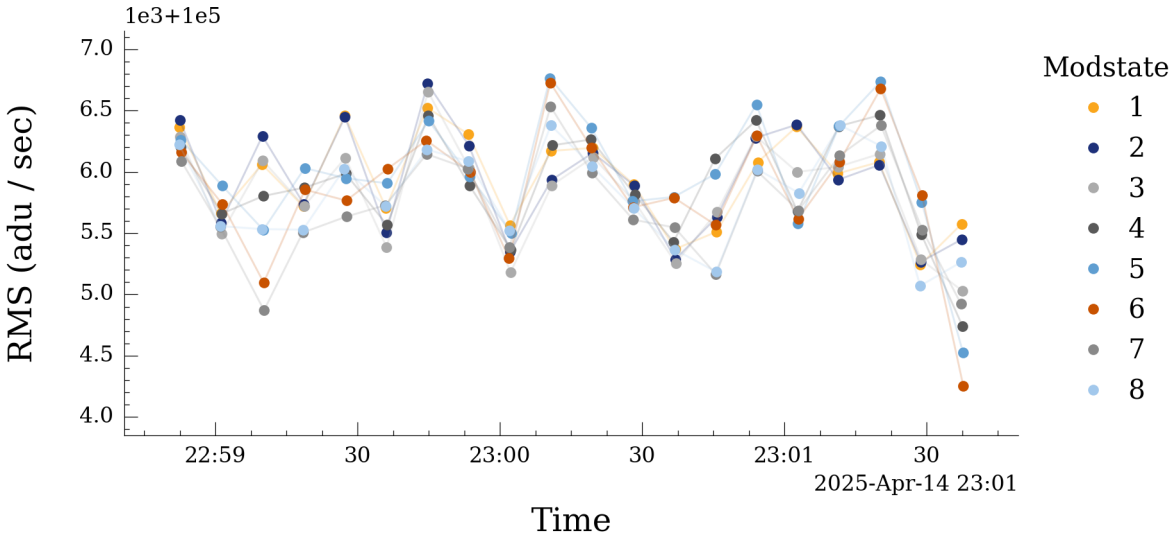
RMS value across frames of task type LAMP_GAIN. One measurement is taken per frame in each task type.



File with datetime 2025-04-14T23:40:08.829305 has a value considered to be an outlier for this metric

Root Mean Square (RMS) Across Frame - SOLAR_GAIN

RMS value across frames of task type SOLAR_GAIN. One measurement is taken per frame in each task type.



Data Source Health

This metric contains the worst health status of the data source during data acquisition. One reading is taken per L1 frame.

Status	Count
unknown	2116

Data sourced from components with a health status of 'ill', 'bad', or 'unknown'.

Frame Counts

This metric is a count of the number of frames used to produce a calibrated L1 dataset

Task Type	Total Frames	Unused Frames
SOLAR_GAIN	160	0
OBSERVE	4232	0
GEOMETRIC	160	0
DARK	240	80
POLCAL	1152	0
LAMP_GAIN	80	0

33.3% of frames were not used in the processing of task type DARK

Average Across Dataset

This metric is the calculated mean intensity value across data from an instrument program task type used in the creation of an entire L1 dataset.

Task Type	Dataset Average (adu / sec)
SOLAR_GAIN	89712.23
DARK	2350.16
LAMP_GAIN	6251.42

Dataset RMS

This metric is the calculated root mean square intensity value across data from an instrument program task type used in the creation of an entire L1 dataset.

Task Type	Dataset RMS (adu / sec)
SOLAR_GAIN	105864.62
LAMP_GAIN	28524.76
DARK	19312.18

Adaptive Optics Status

This metric shows the percentage of frames in which the adaptive optics system was running and locked

The adaptive optics system was running and locked for 98.1% of the observed frames

PolCal Constant Values in Calibration Unit Fit

These values are important aspects of the polcal model, but are held constant during Calibration Unit fits. p_y is the "transmission leakage" of the polarizer (see Appendix D of Harrington et al. 2021 for more information). The (x, t) pairs parameterize mirror Mueller matrices for three mirror groups; M12, M34, and M56.

Parameter	Value used during fit
polarizer p_y	0.010566
x12	1.006634
t12	-0.004514
x34	0.997536
t34	-0.073770
x56	1.001032
t56	-0.006143

PolCal Global Calibration Unit Fit - Beam 1

The deviation from database metrology values for Calibration Unit parameters used to compute demodulation matrices. These parameters are fit the same across all polcal bins.

Parameter	Free in Fit?	Init Value	Best Fit Value	Difference	Relative Diff.
Q_in	False	0.00	0.00	0.00e+00	-
U_in	False	0.00	0.00	0.00e+00	-
V_in	False	0.00	0.00	0.00e+00	-
ret045 [deg]	True	12.01	11.01	1.00e+00	8.36e-02
ret0h [deg]	True	-46.88	-47.22	3.40e-01	-7.26e-03
ret0r [deg]	True	0.08	0.04	3.39e-02	4.51e-01
t_pol [%]	False	90.95	90.95	0.00e+00	0.00e+00
t_ret [%]	False	97.17	97.17	0.00e+00	0.00e+00

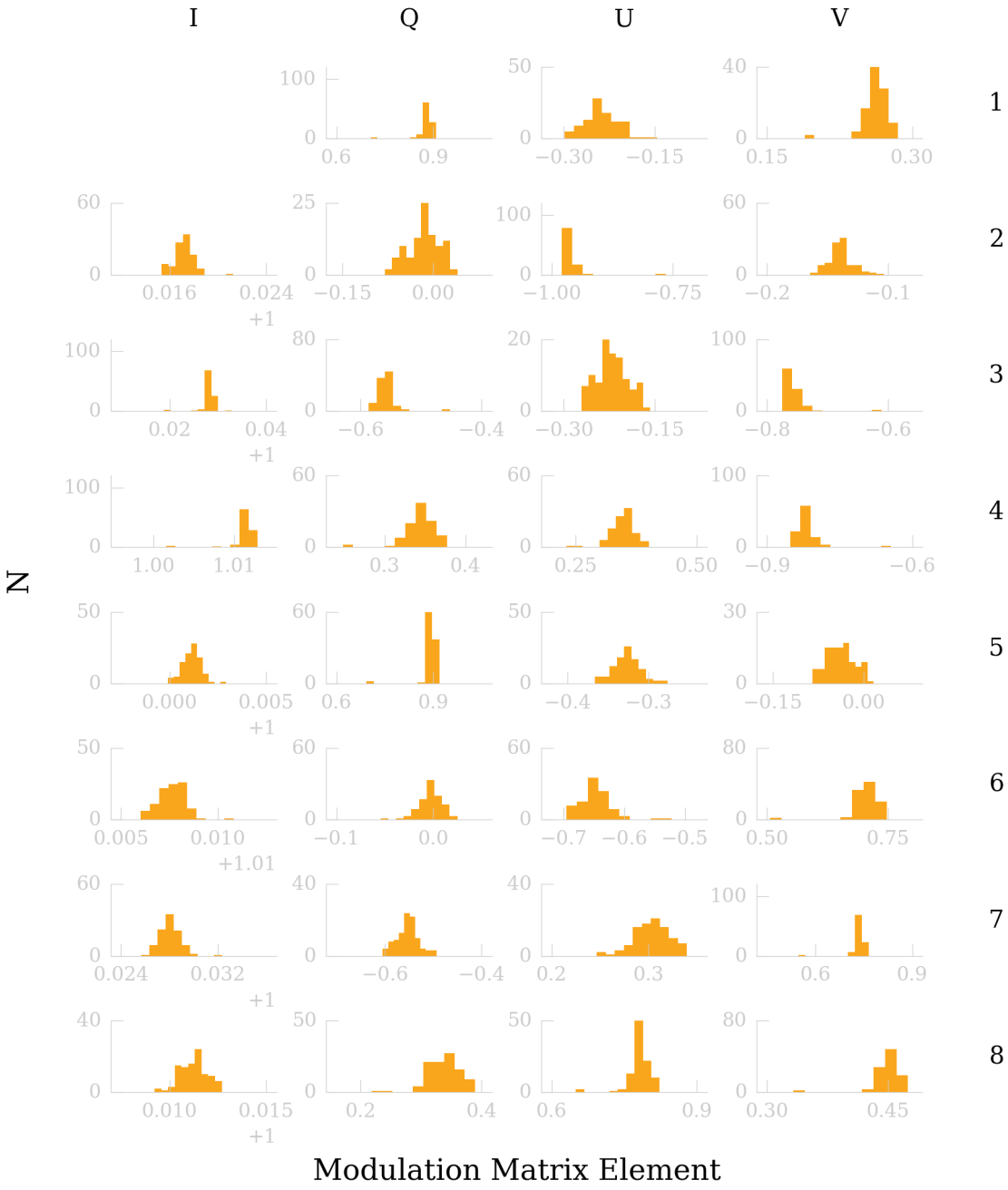
PolCal Global Calibration Unit Fit - Beam 2

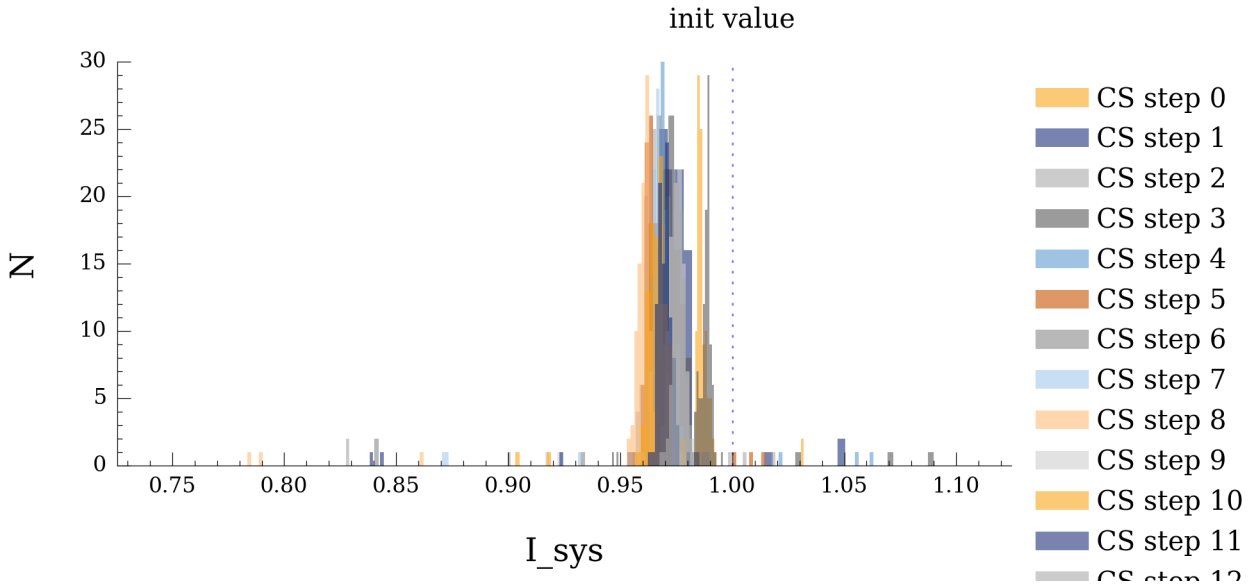
The deviation from database metrology values for Calibration Unit parameters used to compute demodulation matrices. These parameters are fit the same across all polcal bins.

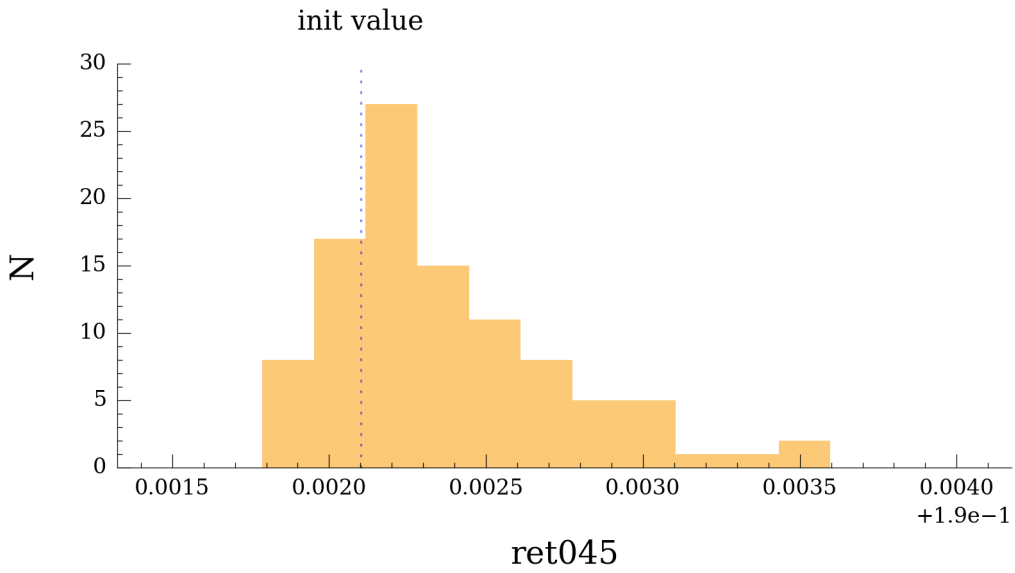
Parameter	Free in Fit?	Init Value	Best Fit Value	Difference	Relative Diff.
Q_in	False	0.00	0.00	0.00e+00	-
U_in	False	0.00	0.00	0.00e+00	-
V_in	False	0.00	0.00	0.00e+00	-
ret045 [deg]	True	12.01	11.06	9.49e-01	7.90e-02
ret0h [deg]	True	-46.88	-47.25	3.78e-01	-8.06e-03
ret0r [deg]	True	0.08	0.09	-1.15e-02	1.52e-01
t_pol [%]	False	90.95	90.95	0.00e+00	0.00e+00
t_ret [%]	False	97.17	97.17	0.00e+00	0.00e+00

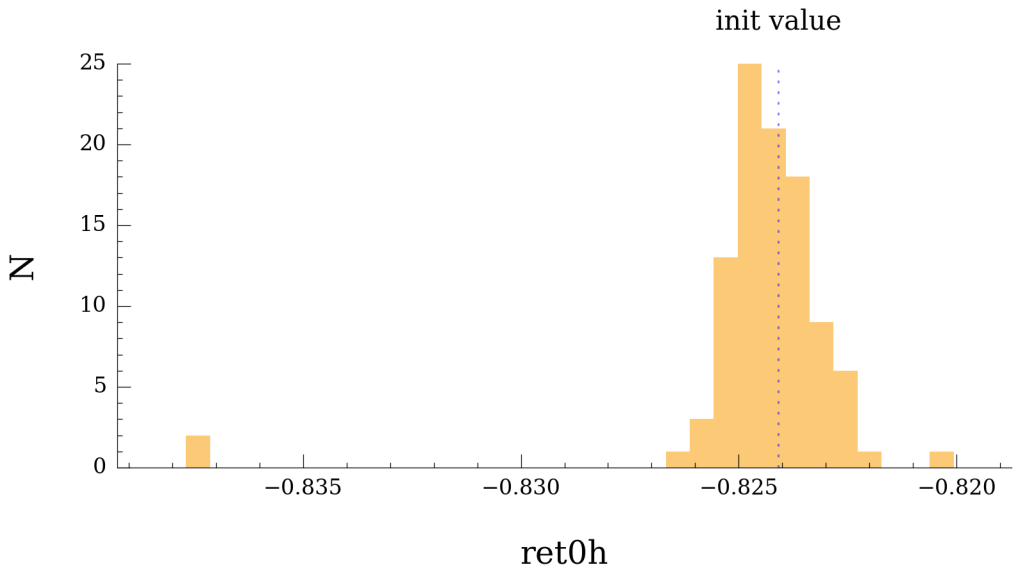
PolCal Local Bin Fits - Beam 1

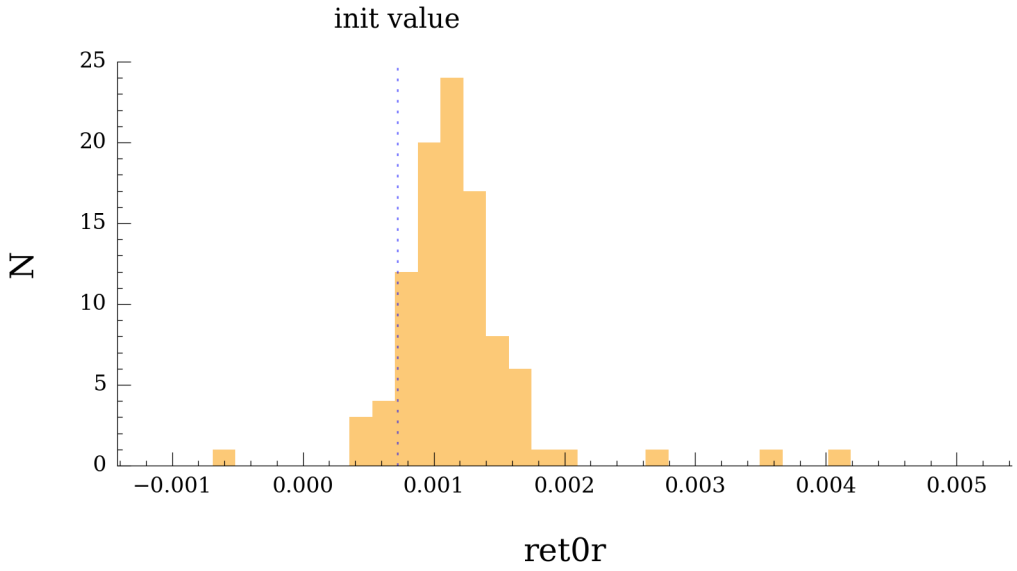
The first plot shows histograms of the individual modulation matrix elements. Data show 100 uniformly sampled points from 10866 total points spanning 10866 spatial bins.




init value
N
I_sys
CS step 0
CS step 1
CS step 2
CS step 3
CS step 4
CS step 5
CS step 6
CS step 7
CS step 8
CS step 9
CS step 10
CS step 11

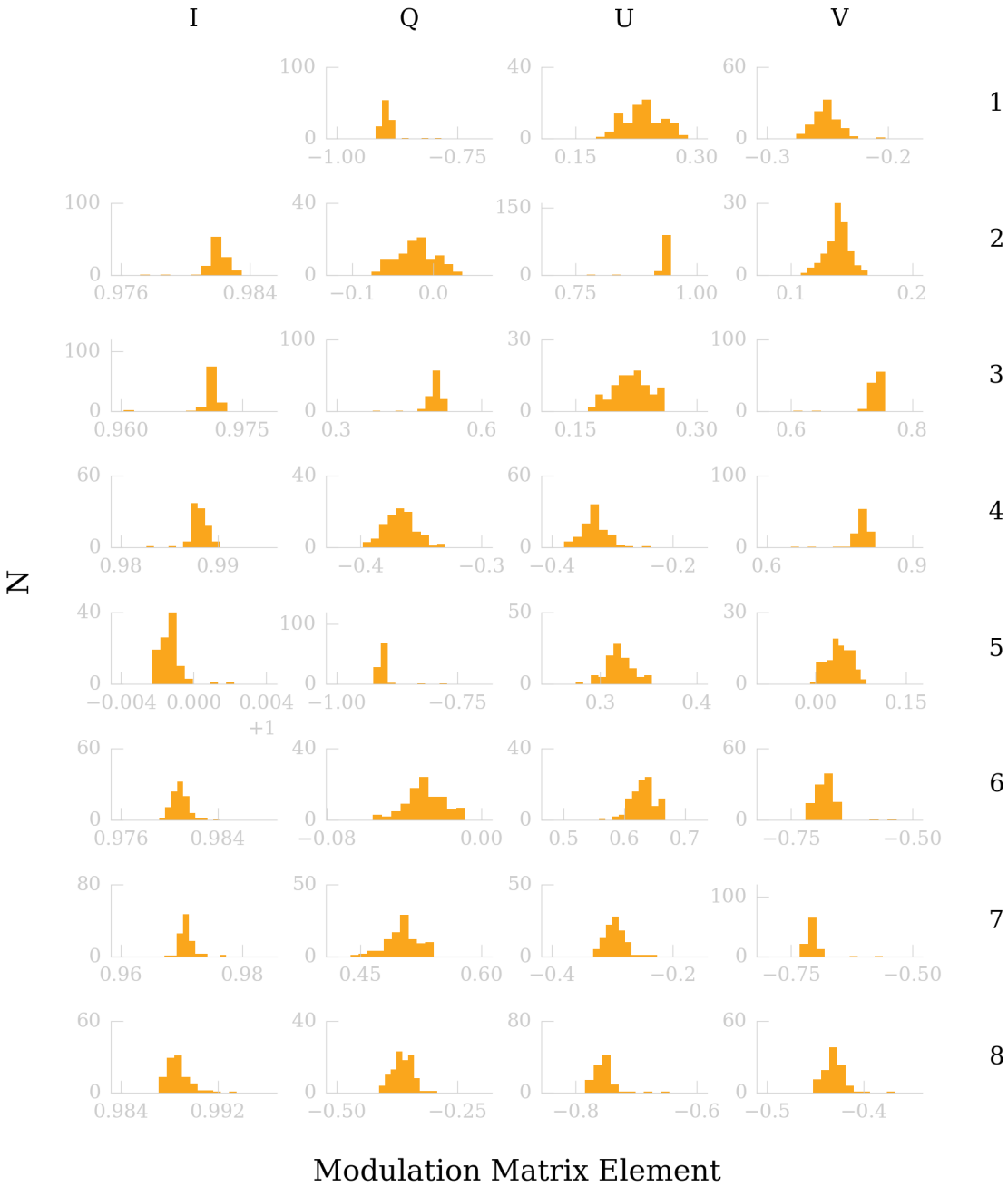

init value
N
ret045
+1.9e−1

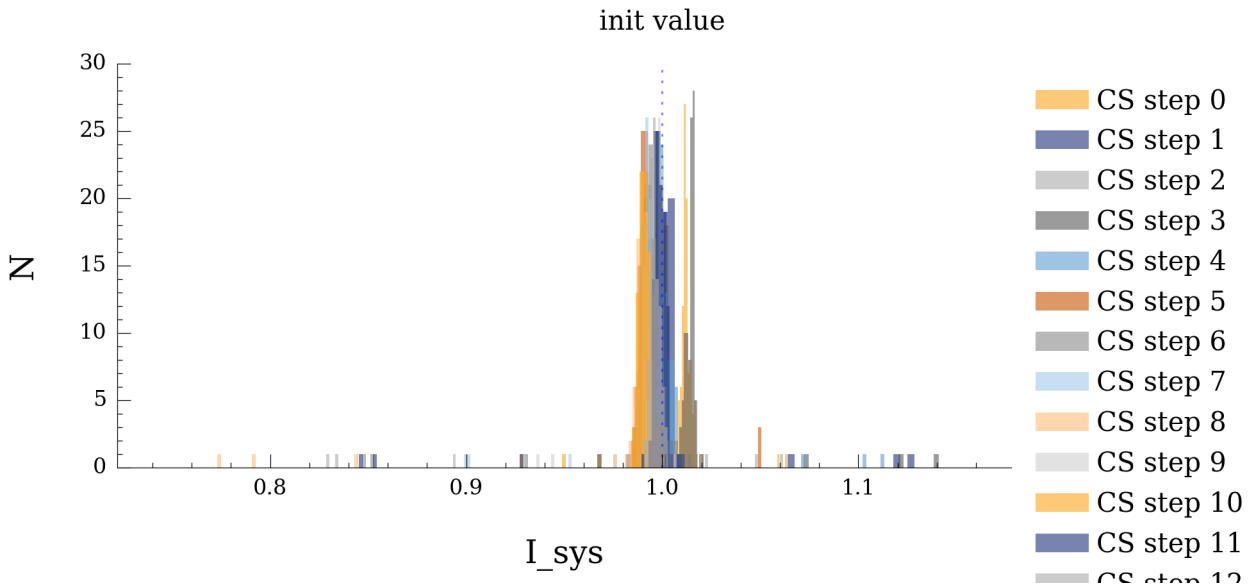

init value
25
20
15
10
5
0
N
−0.835
−0.830
−0.825
−0.820
ret0h

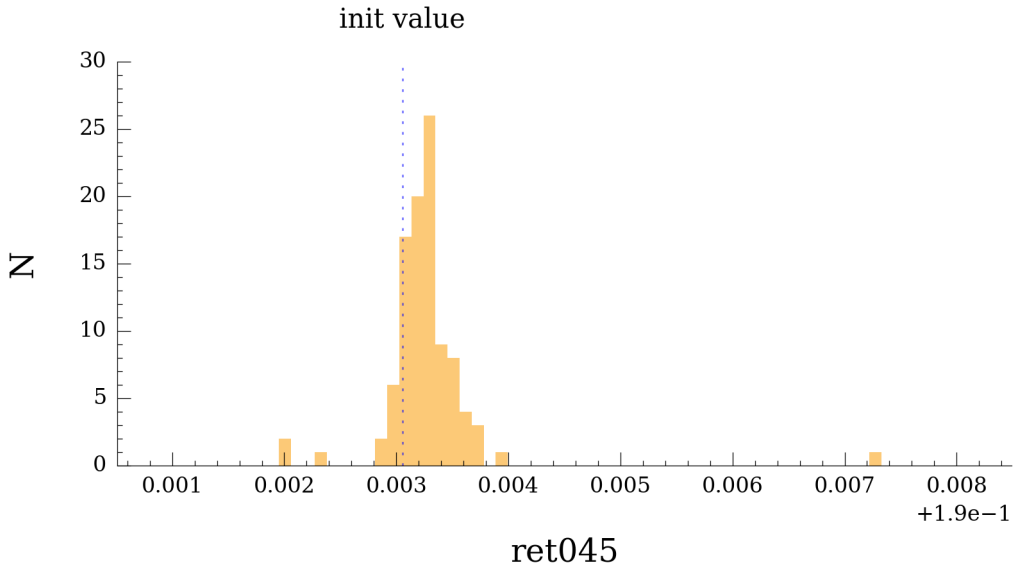

init value
25
20
15
10
5
0
N
−0.001
0.000
0.001
0.002
0.003
0.004
0.005
ret0r

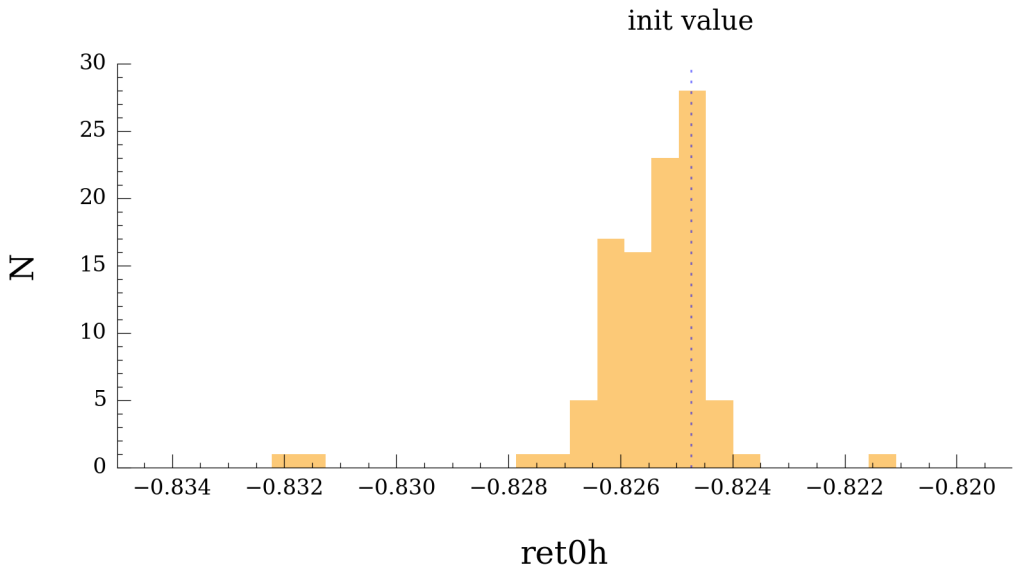
PolCal Local Bin Fits - Beam 2

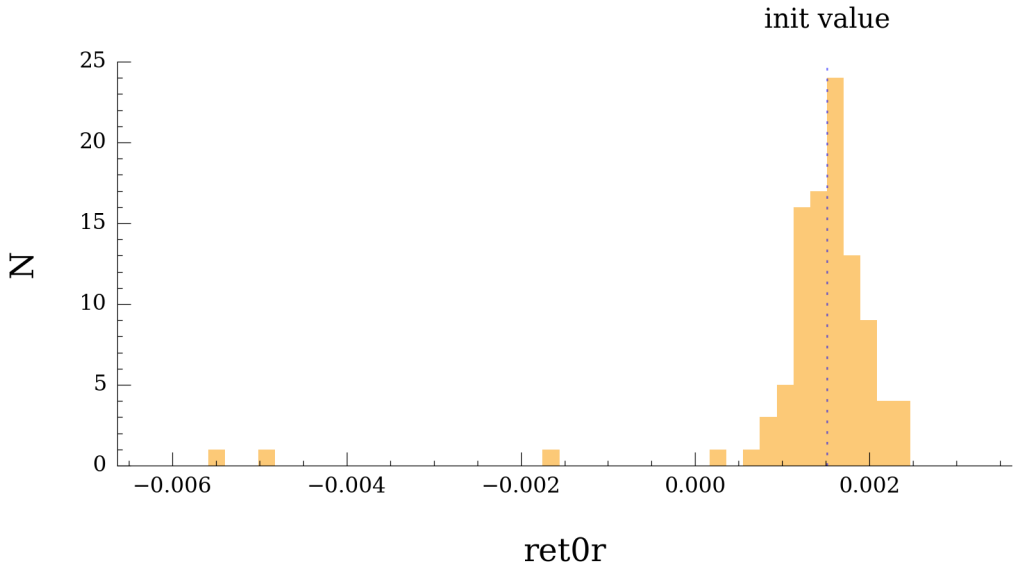
The first plot shows histograms of the individual modulation matrix elements. Data show 100 uniformly sampled points from 10866 total points spanning 10866 spatial bins.




init value
N
30
25
20
15
10
5
0
0.8
0.9
1.0
1.1
I_sys
CS step 0
CS step 1
CS step 2
CS step 3
CS step 4
CS step 5
CS step 6
CS step 7
CS step 8
CS step 9
CS step 10
CS step 11

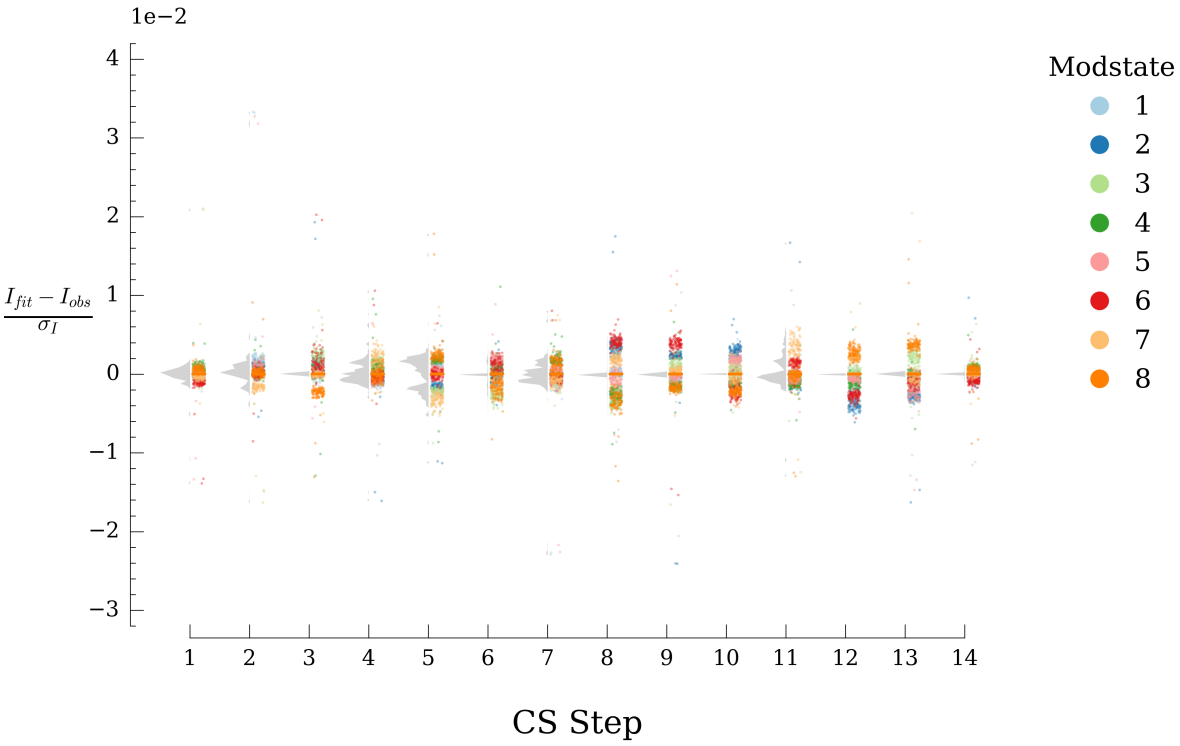

init value
N
30
25
20
15
10
5
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
+1.9e−1
ret045

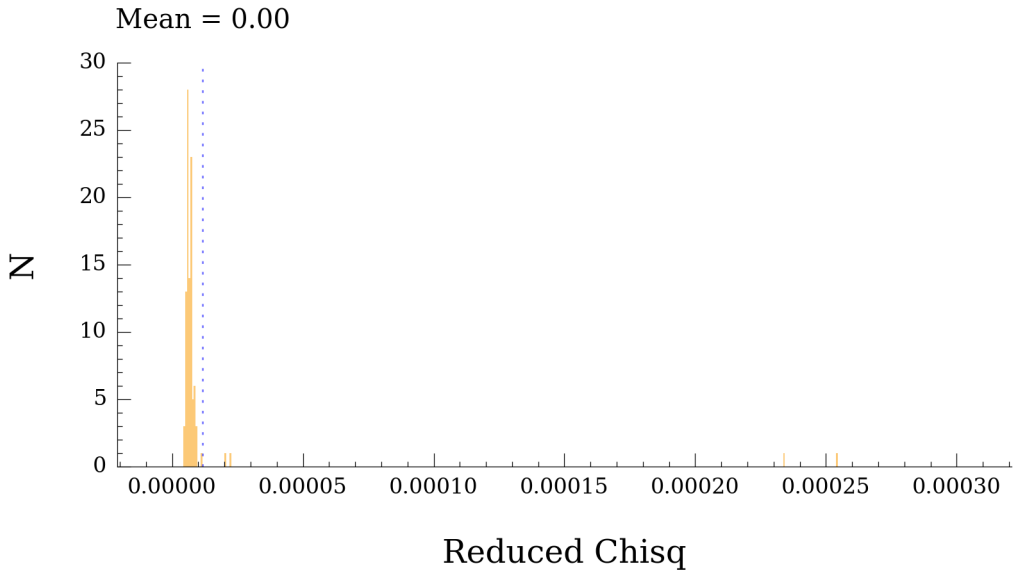

init value
30
25
20
15
10
5
0
N
−0.834
−0.832
−0.830
−0.828
−0.826
−0.824
−0.822
−0.820
ret0h


init value
25
20
15
10
5
0
N
−0.006
−0.004
−0.002
0.000
0.002
ret0r

PolCal Fit Residuals - Beam 1

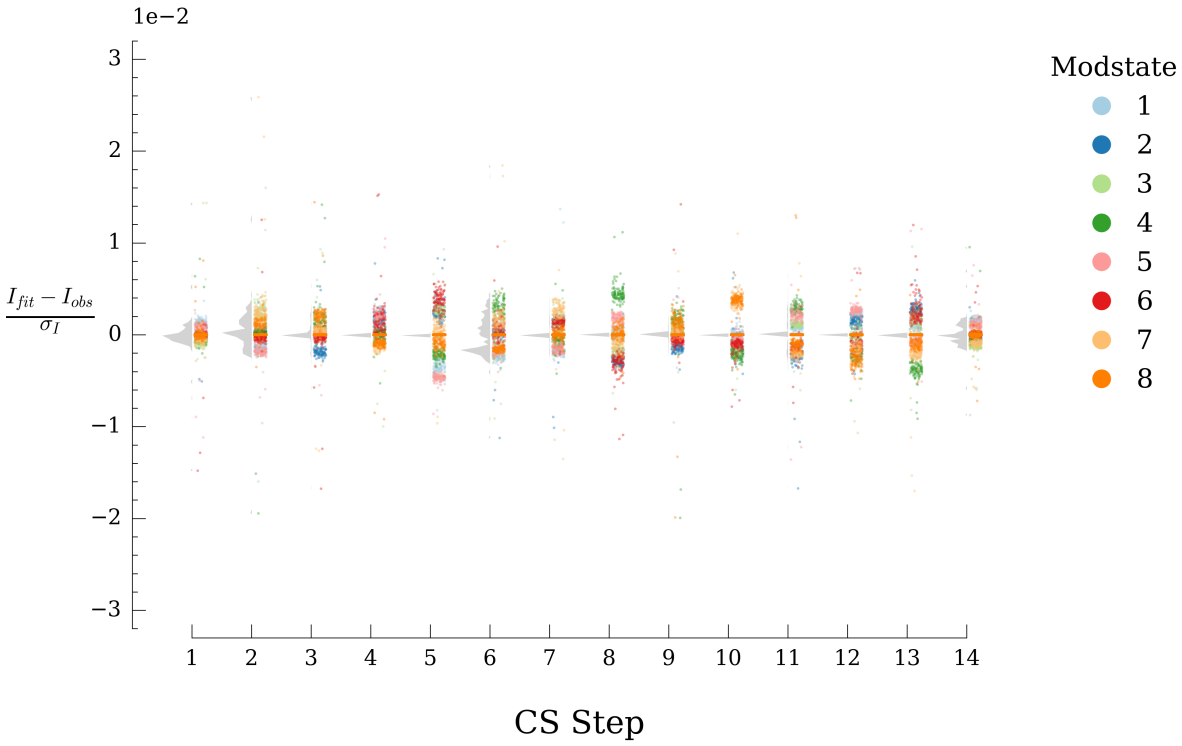
The top plot shows relative flux residual distributions for all polcal Calibration Sequence steps. The bottom plot shows the reduced chi-squared distribution of all fits. Data show 100 uniformly sampled points from 10866 total points spanning 10866 spatial bins.

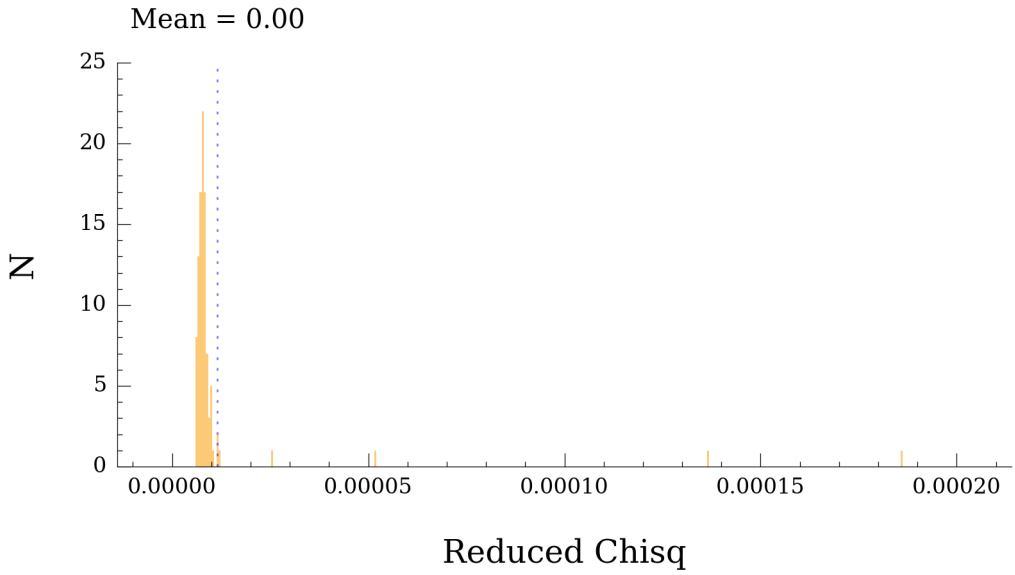




PolCal Fit Residuals - Beam 2

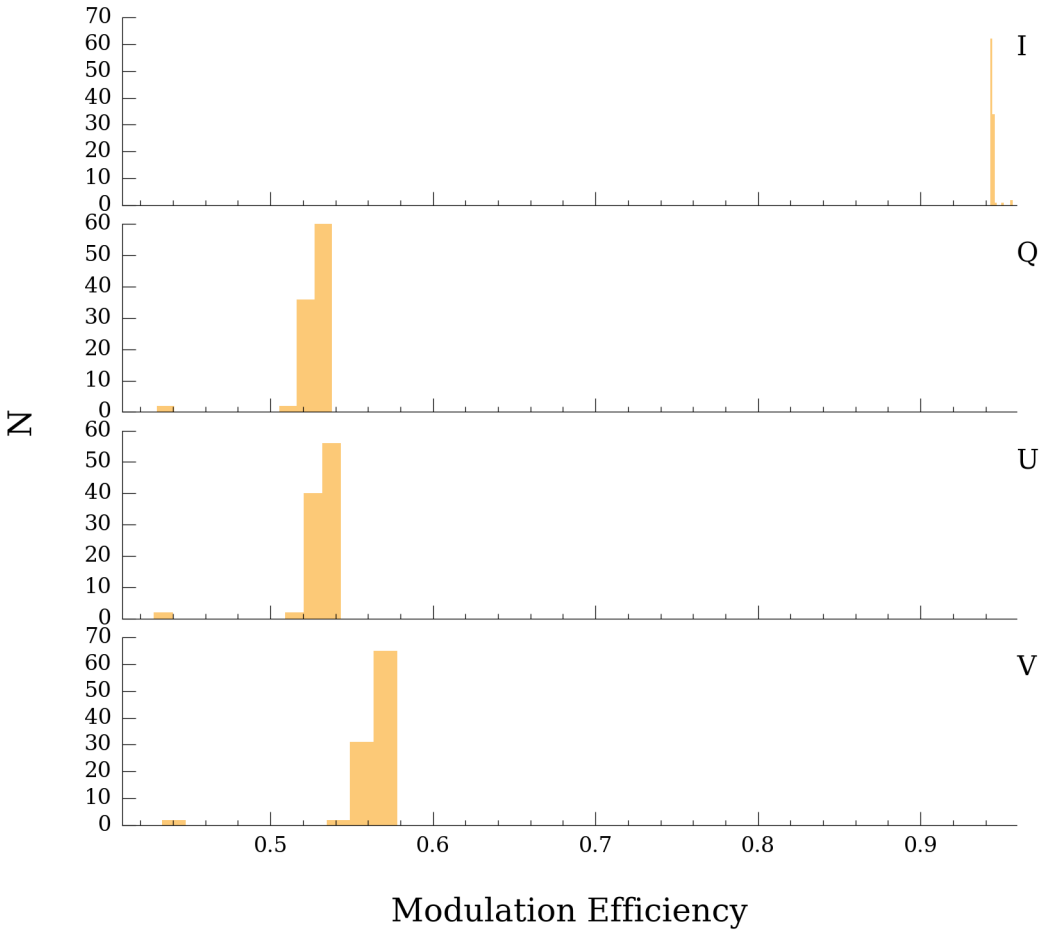
The top plot shows relative flux residual distributions for all polcal Calibration Sequence steps. The bottom plot shows the reduced chi-squared distribution of all fits. Data show 100 uniformly sampled points from 10866 total points spanning 10866 spatial bins.

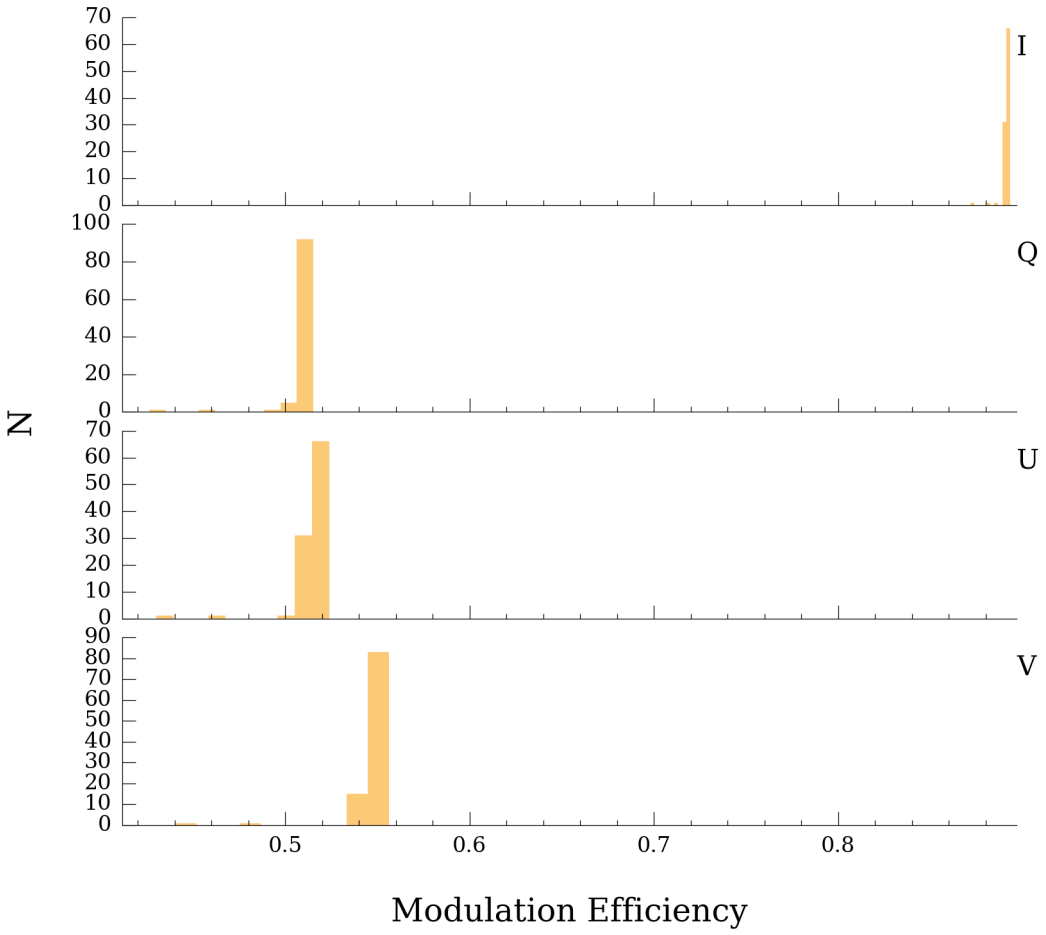




PolCal Modulation Efficiency - Beam 1

The modulation efficiencies for all fit modulation matrices. Data show 100 uniformly sampled points from 10866 total points spanning 10866 spatial bins.



PolCal Modulation Efficiency - Beam 2

The modulation efficiencies for all fit modulation matrices. Data show 100 uniformly sampled points from 10866 total points spanning 10866 spatial bins.