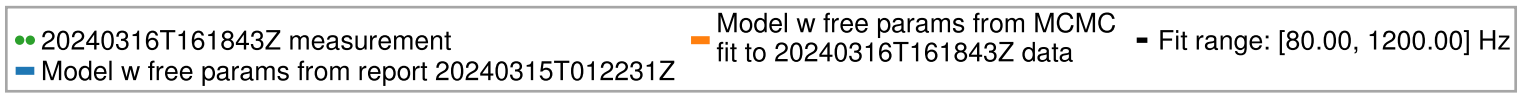
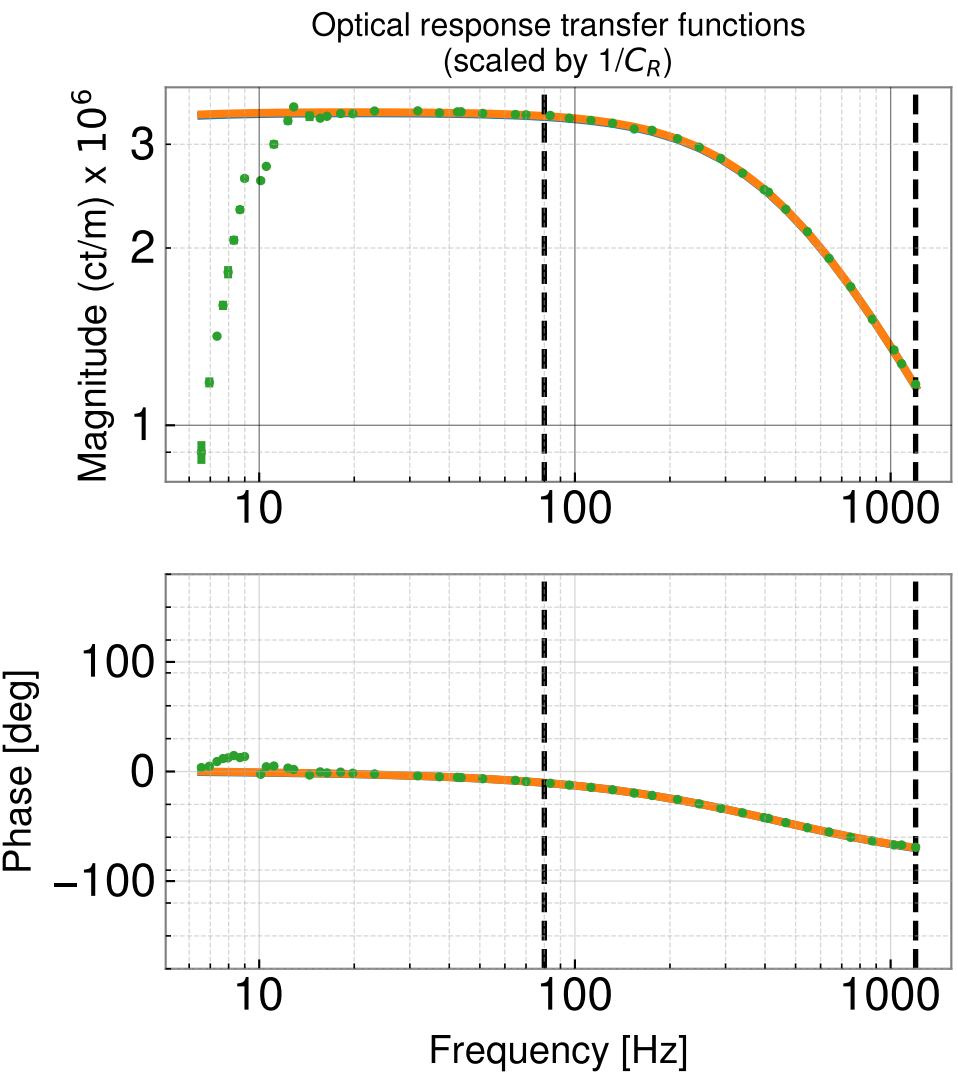
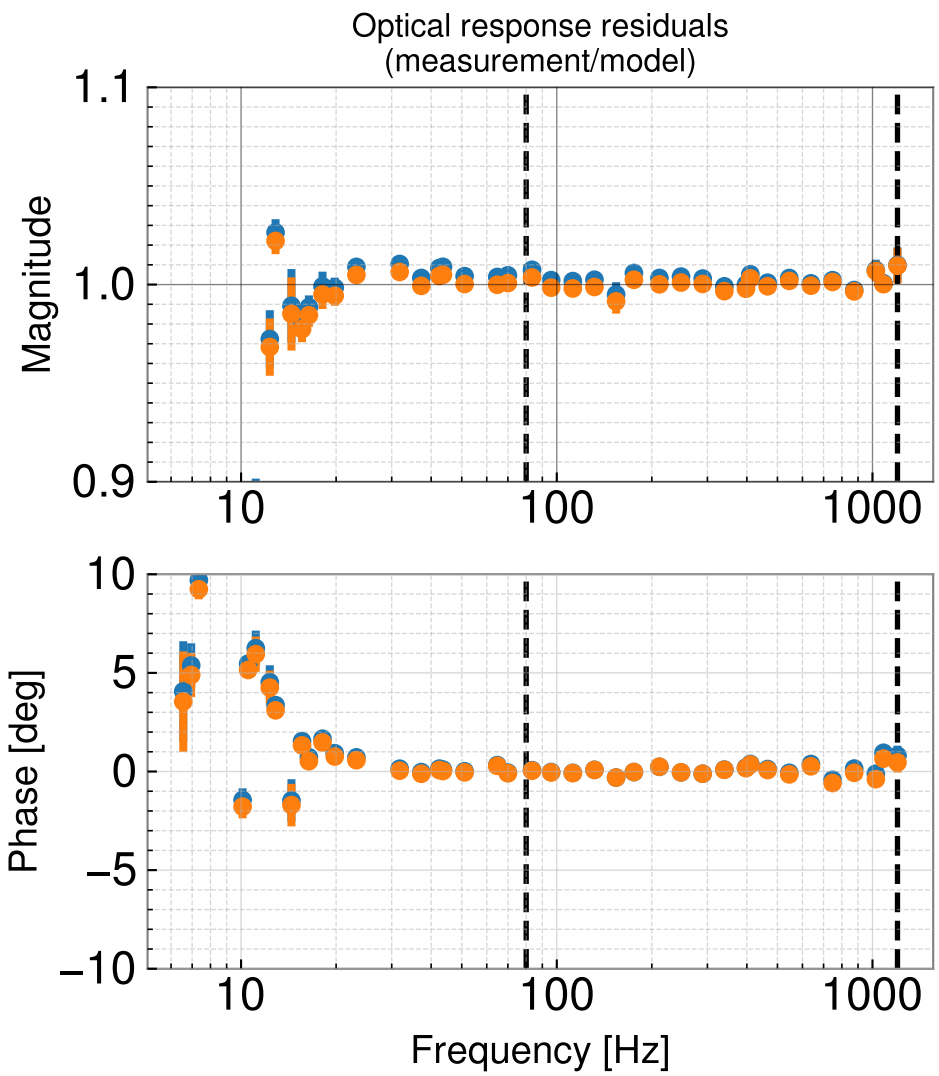
H1 sensing model MCMC summary

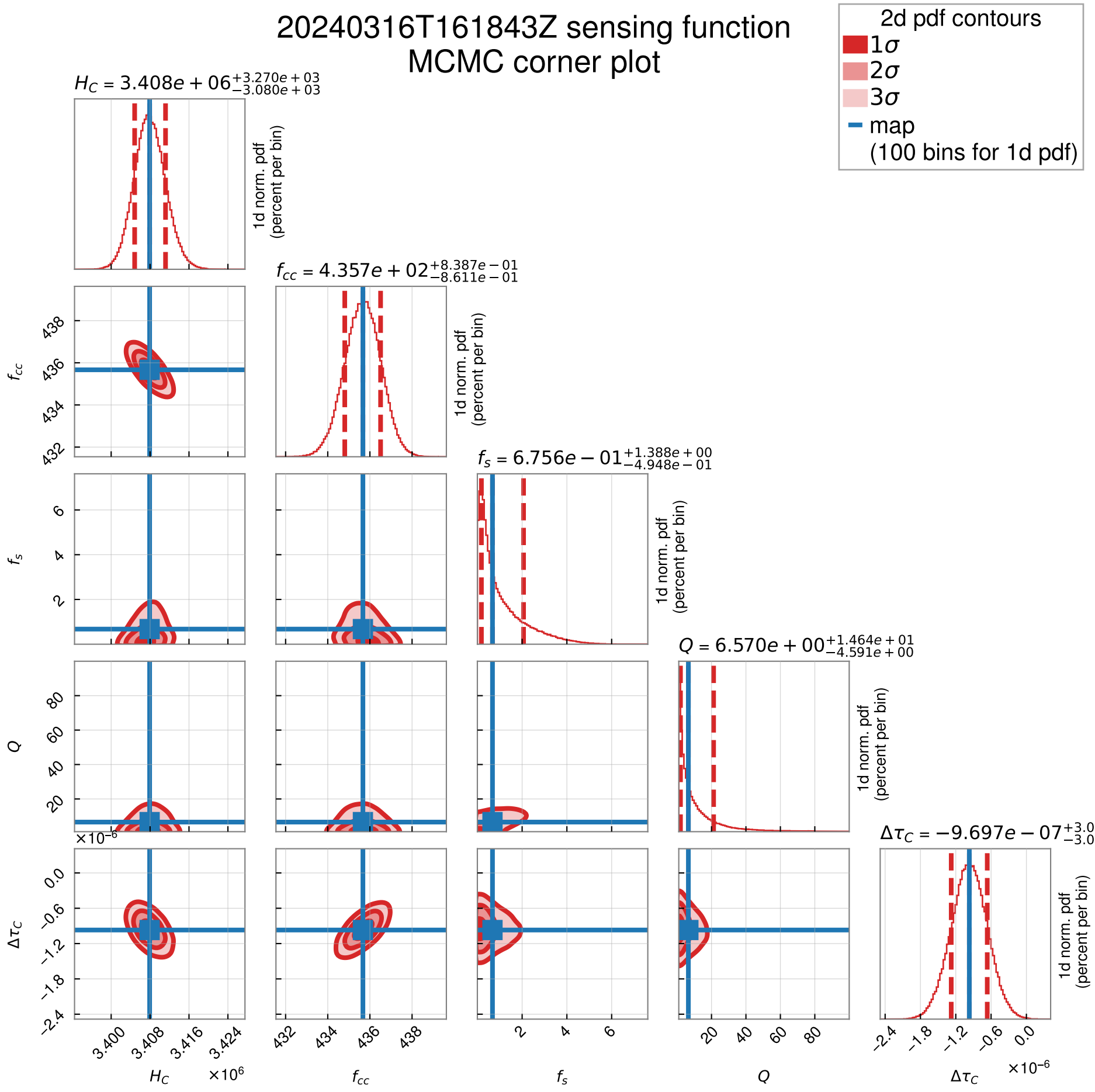
All fixed parameters drawn from /ligo/groups/cal/H1/reports/20240316T161823Z/pydarm_H1.ini







Parameter	(value +/-)	value	+	-
Optical gain, H_c (ct/m)		3.408e+06	3270 (0.10%)	3080 (0.09%)
Cavity_pole, f_cc (Hz)		435.7	0.8387 (0.19%)	0.8611 (0.20%)
Detuned SRC spring frequency, f_s (Hz)		0.6756	1.388 (205.50%)	0.4948 (73.24%)
Detuned SRC spring quality factor, Q_s		6.57	14.64 (222.92%)	4.591 (69.88%)
Residual time delay, tau_c (s)		-9.697e-07	3.045e-07 (-31.41%)	3.075e-07 (-31.71%)


20240316T161843Z sensing function
MCMC corner plot
2d pdf contours
1σ
2σ
3σ
map
(100 bins for 1d pdf)
$H_C = 3.408e+06^{+3.270e+03}_{-3.080e+03}$
$f_{cc} = 4.357e+02^{+8.387e-01}_{-8.611e-01}$
$f_s = 6.756e-01^{+1.388e+00}_{-4.948e-01}$
$Q = 6.570e+00^{+1.464e+01}_{-4.591e+00}$
$\Delta\tau_C = -9.697e-07^{+3.0}_{-3.0}$
1d norm. pdf
(percent per bin)
H_C
f_{cc}
f_s
Q
$\Delta\tau_C$
×10⁶
×10⁻⁶

H1 sensing model history

All fixed parameters drawn from /ligo/groups/cal/H1/reports/20240316T161823Z/pydarm_H1.ini

20240315T012231Z model
20240316T161843Z measurement
20240315T012231Z measurement
20240311T214031Z measurement
20231027T203619Z measurement
20231018T190729Z measurement
20231004T190945Z measurement
20230928T193609Z measurement
20230913T183650Z measurement
20230906T220850Z measurement
20230830T213653Z measurement
20230823T213958Z measurement
20230817T214248Z measurement
20230802T000812Z measurement
20230727T162112Z measurement
Fit range: [80.00, 1200.00] Hz

Optical response transfer functions
(scaled by $1/C_R$)

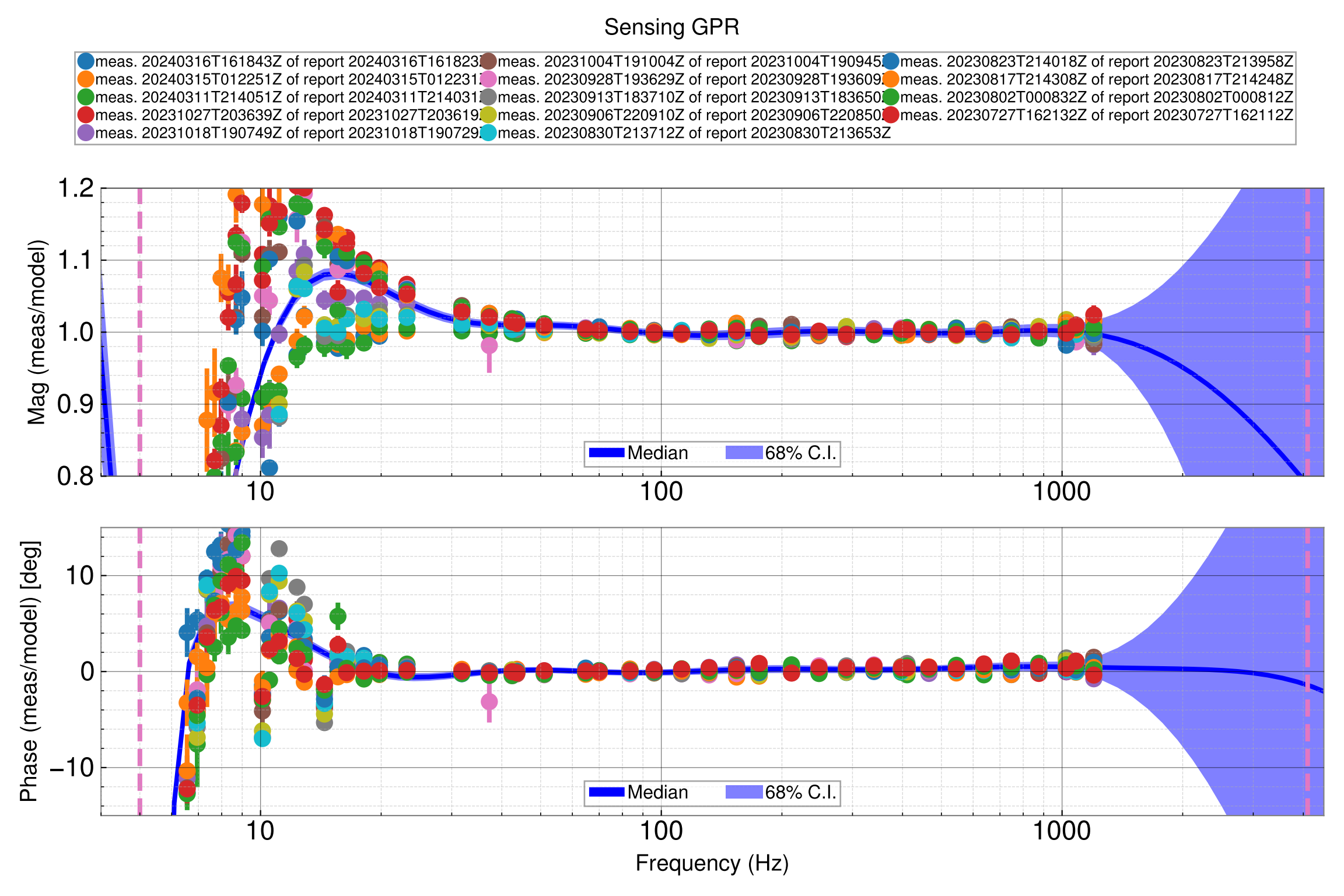
Magnitude (ct/m) x 10^6

Optical response residuals
(measurement/model)

Magnitude

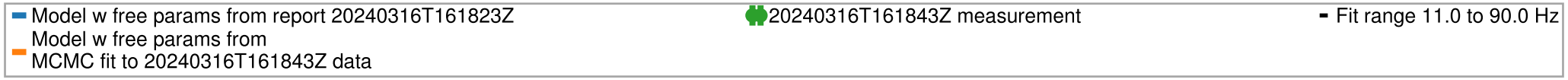
Phase [deg]

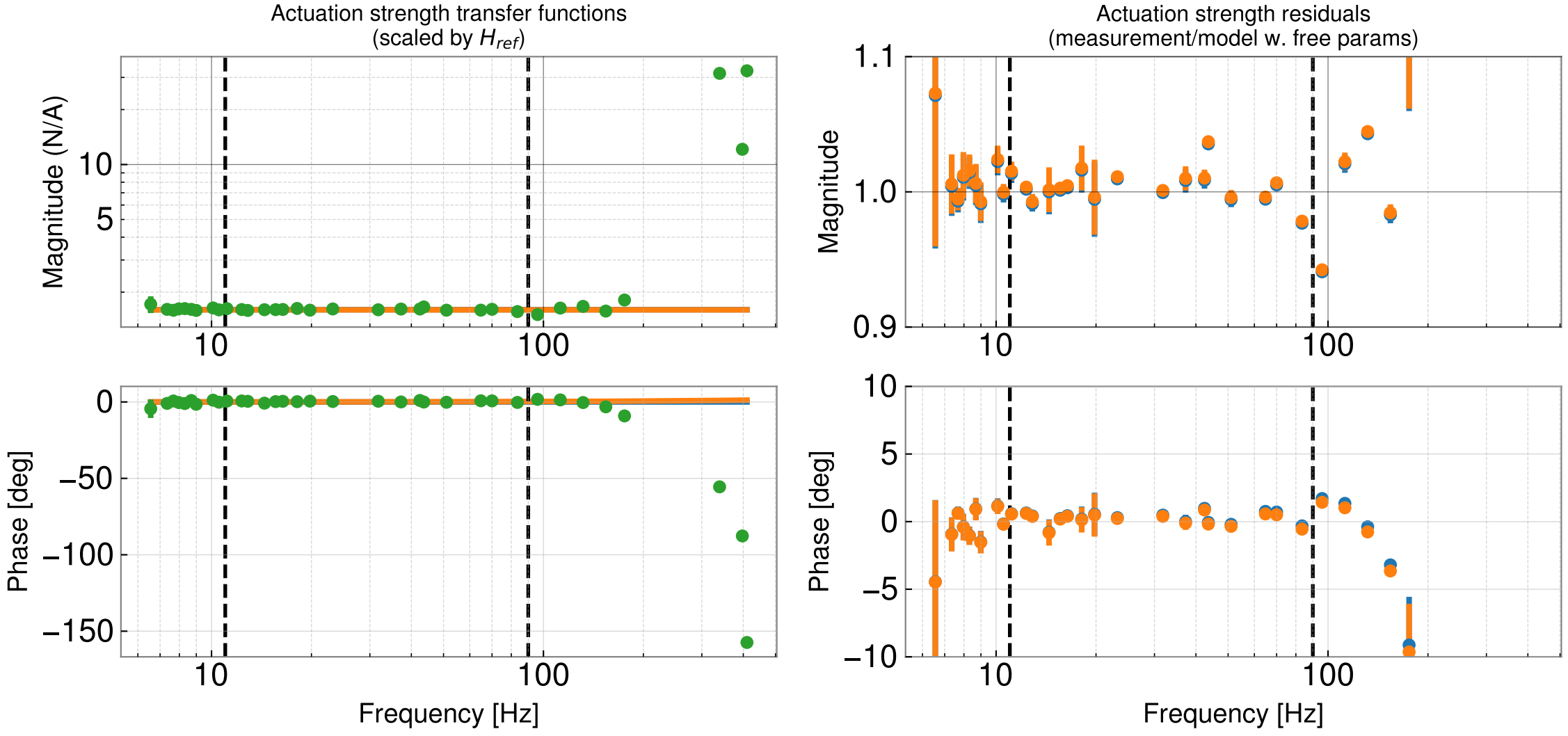
Frequency [Hz]


Sensing GPR
meas. 20240316T161843Z of report 20240316T161823
meas. 20240315T012251Z of report 20240315T012231
meas. 20240311T214051Z of report 20240311T214031
meas. 20231027T203639Z of report 20231027T203619
meas. 20231018T190749Z of report 20231018T190729
meas. 20231004T191004Z of report 20231004T190945
meas. 20230928T193629Z of report 20230928T193609
meas. 20230913T183710Z of report 20230913T183650
meas. 20230906T220910Z of report 20230906T220850
meas. 20230830T213712Z of report 20230830T213653Z
meas. 20230823T214018Z of report 20230823T213958Z
meas. 20230817T214308Z of report 20230817T214248Z
meas. 20230802T000832Z of report 20230802T000812Z
meas. 20230727T162132Z of report 20230727T162112Z
Mag (meas/model)
1.2
1.1
1.0
0.9
0.8
Median
68% C.I.
10
100
1000
Phase (meas/model) [deg]
10
0
−10
Median
68% C.I.
10
100
1000
Frequency (Hz)

H1SUSEX L1 actuation model MCMC summary

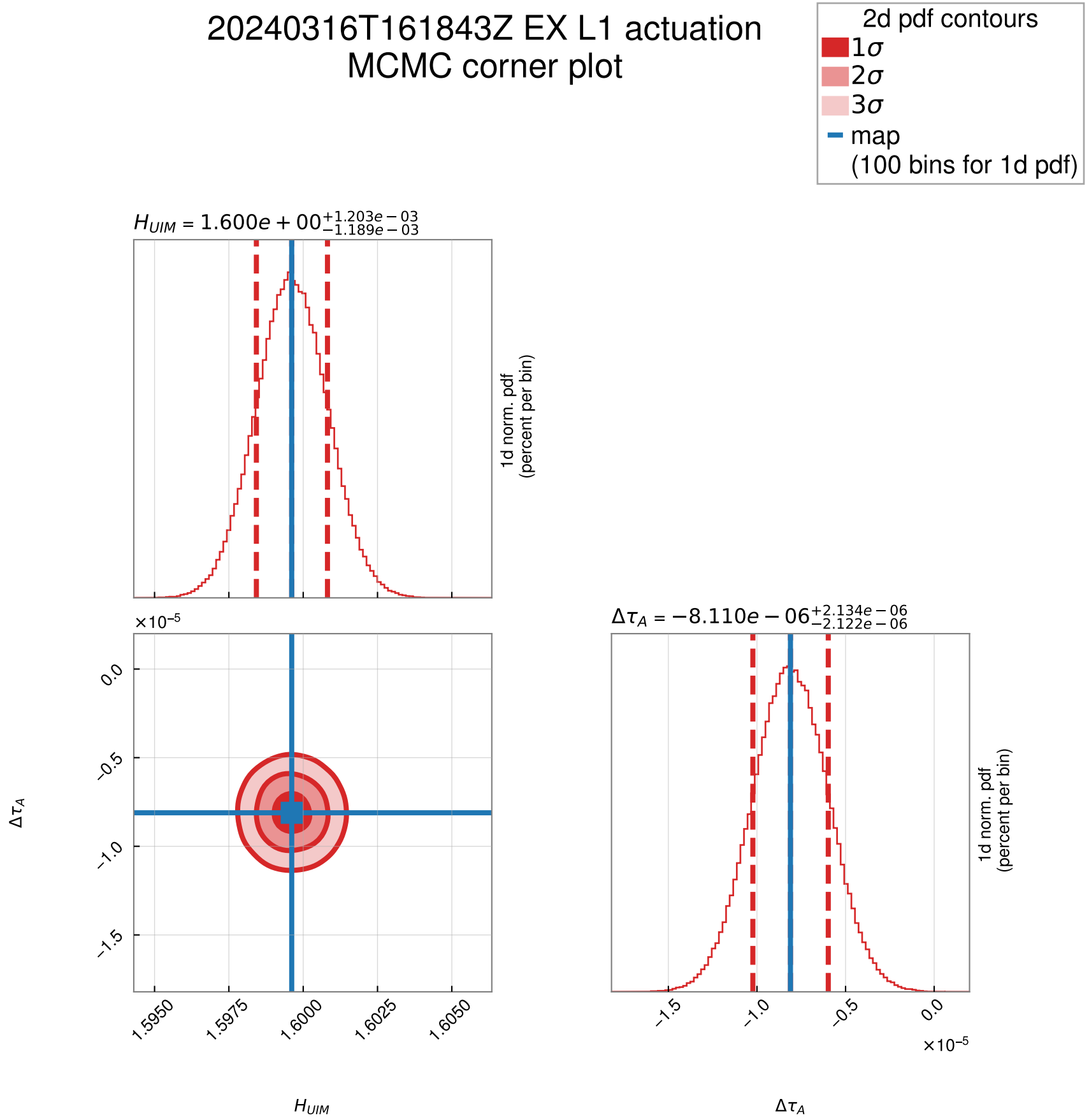
All fixed parameters drawn from /ligo/groups/cal/H1/reports/20240316T161823Z/pydarm_H1.ini





Parameter (value +/-)	value	+	-
Actuation Gain, Hau (N/A)	1.6	0.001203 (0.08%)	0.001189 (0.07%)
Residual time delay, tau_A (s)	-8.11e-06	2.134e-06 (-26.31%)	2.122e-06 (-26.17%)

20240316T161843Z EX L1 actuation
MCMC corner plot



H1SUSEX L1 actuation model history

All fixed parameters drawn from /ligo/groups/cal/H1/reports/20240316T161823Z/pydarm_H1.ini

20240315T012231Z model
20240316T161843Z measurement
20240315T012251Z measurement
20240311T214050Z measurement
20231027T203639Z measurement
20231018T190749Z measurement
20231004T191005Z measurement
20230928T193629Z measurement
20230913T183709Z measurement
20230906T220910Z measurement
20230830T213713Z measurement
20230823T214017Z measurement
20230817T214308Z measurement
MCMC Fit Range: 11 Hz to 90 Hz

Actuation strength transfer functions
(scaled by H_{ref})

Magnitude x 10^0 (N/A)

Actuation strength residuals
(measurement/model w. free params)

Magnitude

Phase [deg]

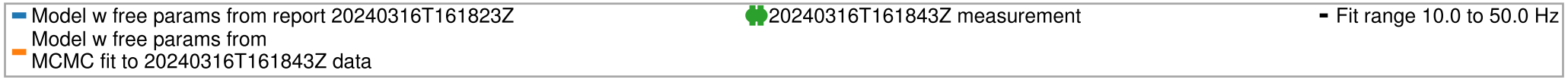
Frequency [Hz]

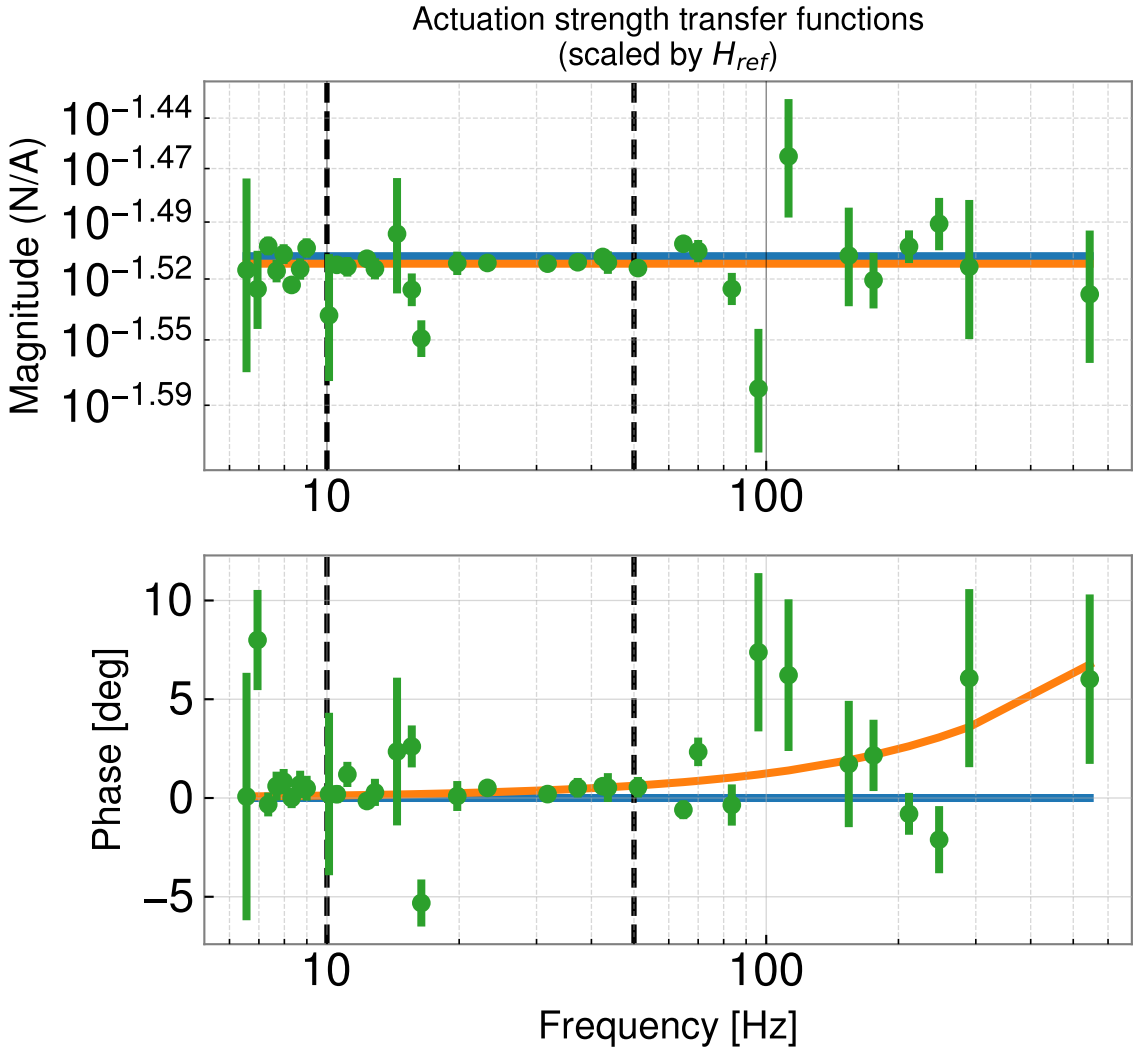
Phase [deg]

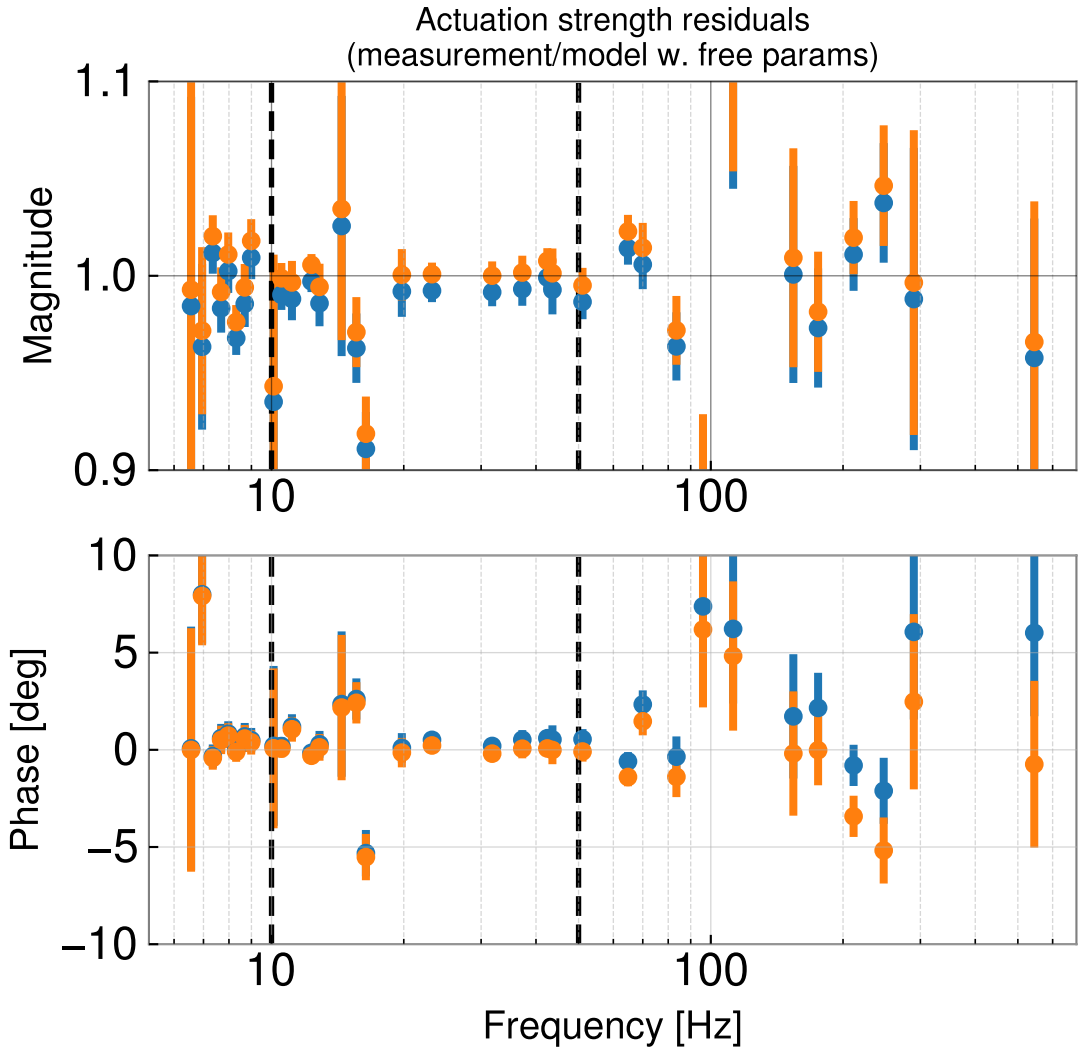
Frequency [Hz]

H1SUSEX L2 actuation model MCMC summary

All fixed parameters drawn from /ligo/groups/cal/H1/reports/20240316T161823Z/pydarm_H1.ini

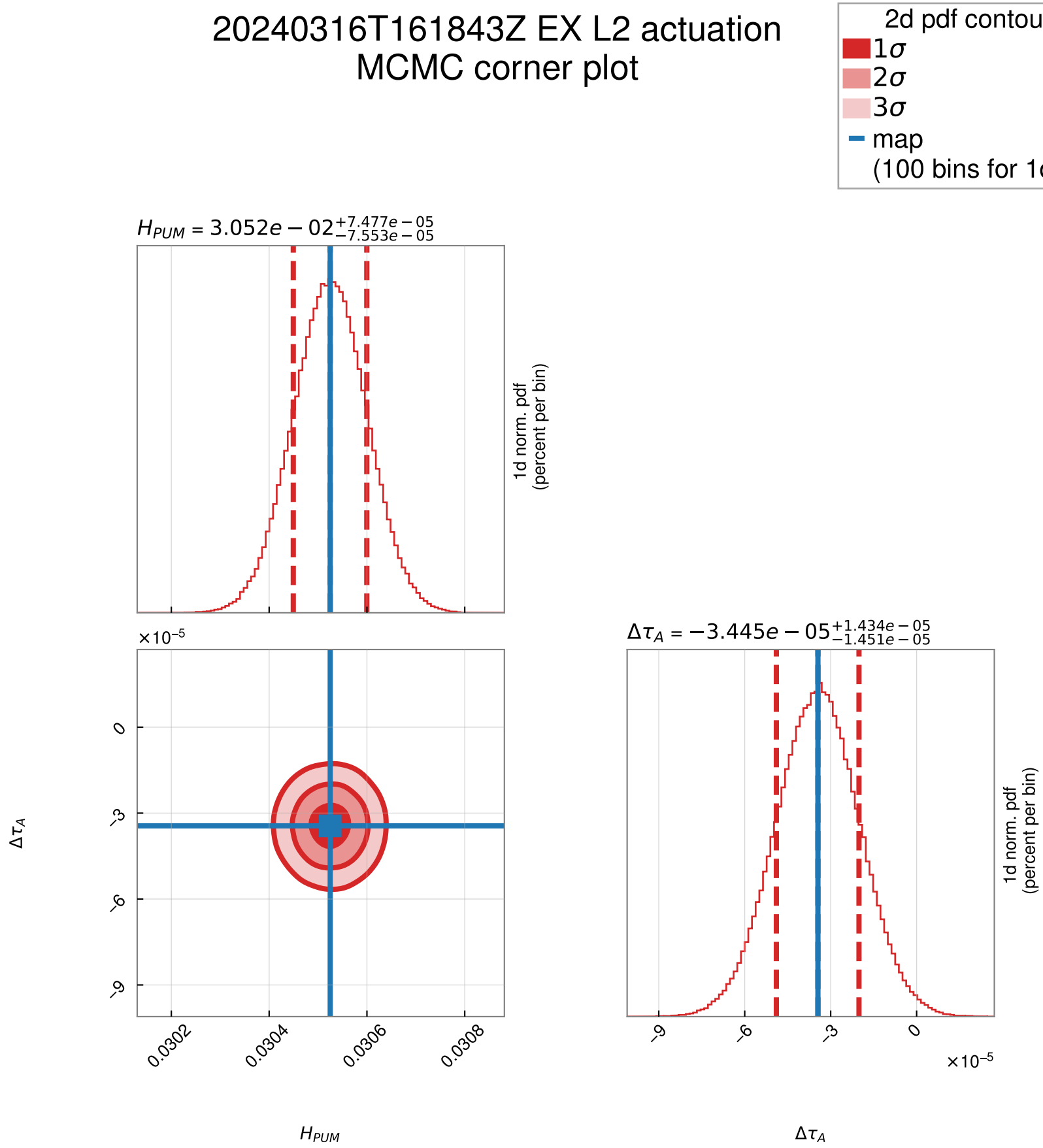






Parameter	(value +/-)	value	+	-
Actuation Gain, Hap (N/A)		0.03052	7.477e-05 (0.24%)	7.553e-05 (0.25%)
Residual time delay, tau_A (s)		-3.445e-05	1.434e-05 (-41.61%)	1.451e-05 (-42.12%)

20240316T161843Z EX L2 actuation
MCMC corner plot



H1SUSEX L2 actuation model history

All fixed parameters drawn from /ligo/groups/cal/H1/reports/20240316T161823Z/pydarm_H1.ini

20240315T012231Z model
20240316T161843Z measurement
20240315T012251Z measurement
20240311T214050Z measurement
20231027T203639Z measurement
20231018T190749Z measurement
20231004T191005Z measurement
20230928T193629Z measurement
20230913T183709Z measurement
20230906T220910Z measurement
20230830T213713Z measurement
20230823T214017Z measurement
20230817T214308Z measurement
MCMC Fit Range: 10 Hz to 50 Hz

Actuation strength transfer functions
(scaled by H_{ref})

Magnitude x 10^{-2} (N/A)

Actuation strength residuals
(measurement/model w. free params)

Magnitude

Phase [deg]

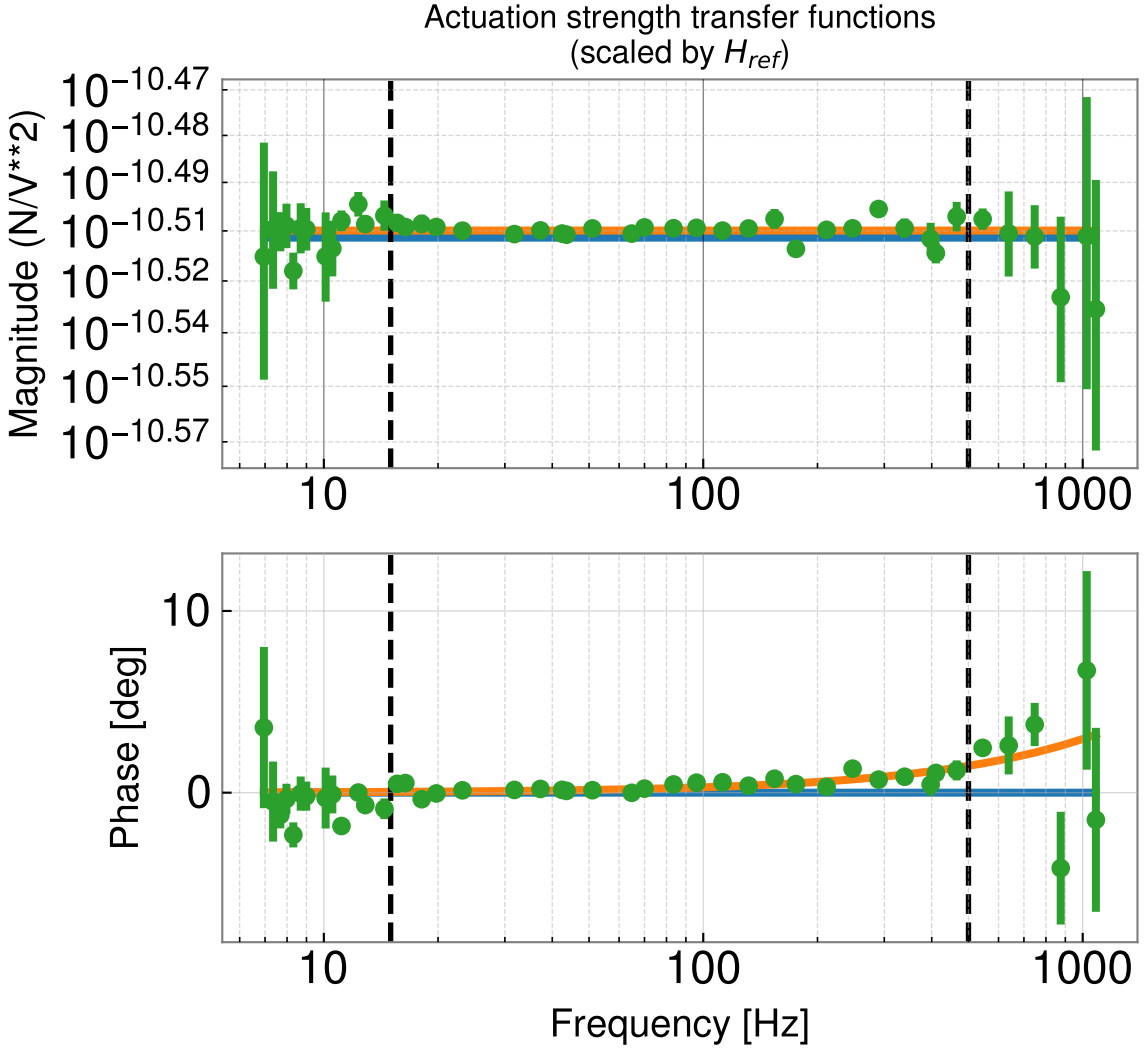
Phase [deg]

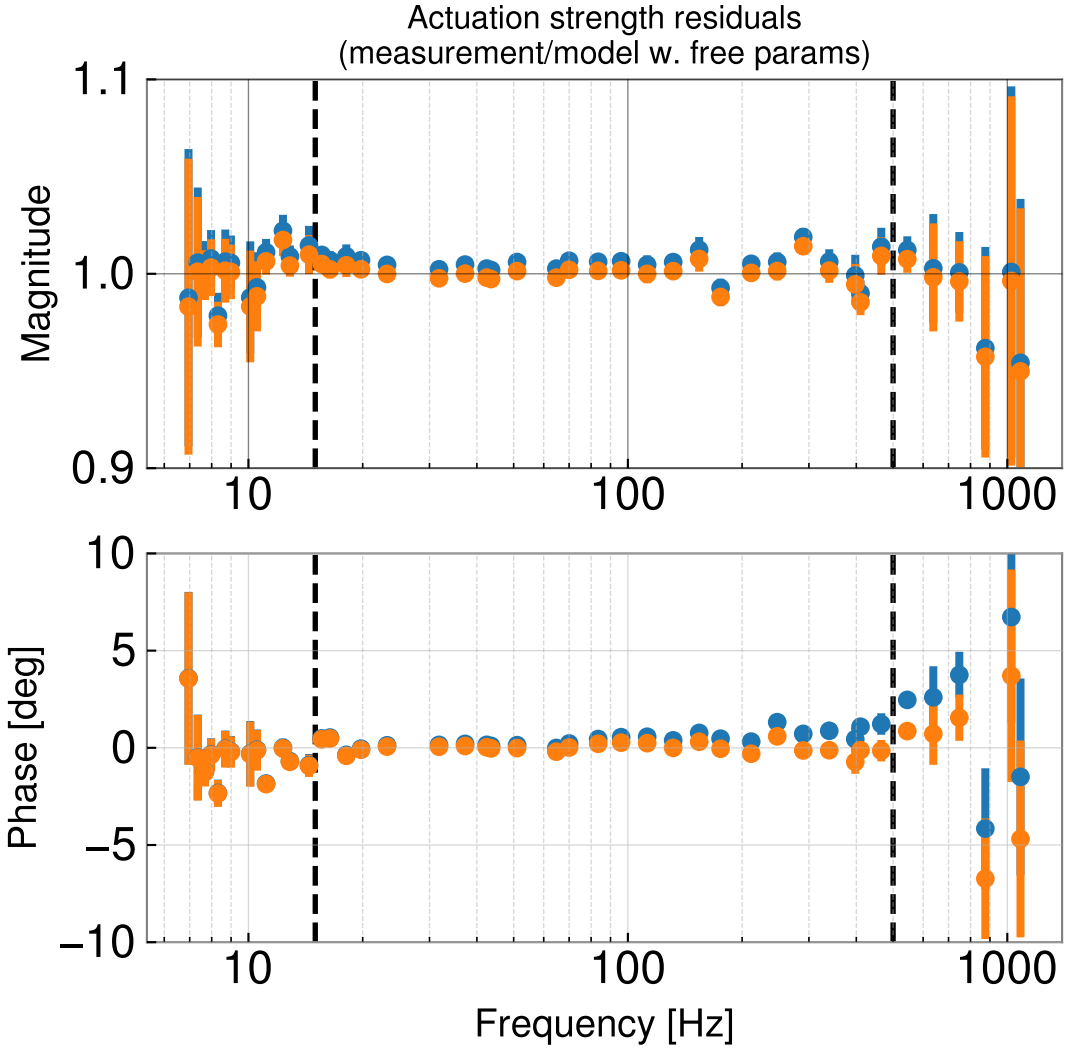
Frequency [Hz]

Frequency [Hz]

H1SUSEX L3 actuation model MCMC summary

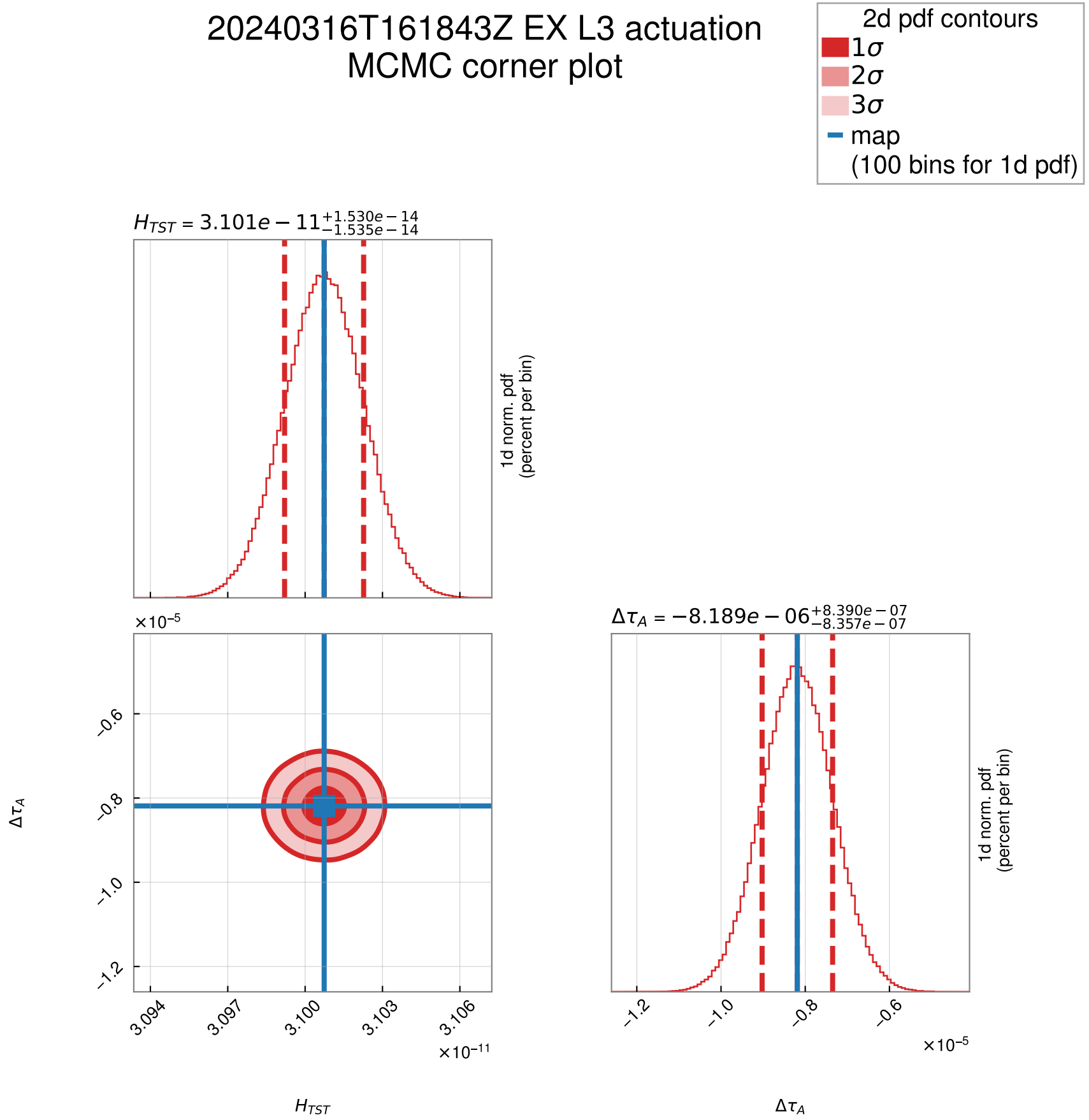
All fixed parameters drawn from /ligo/groups/cal/H1/reports/20240316T161823Z/pydarm_H1.ini





Parameter (value +/-)	value	+	-
Actuation Gain, Hat (N/V**2)	3.101e-11	1.53e-14 (0.05%)	1.535e-14 (0.05%)
Residual time delay, tau_A (s)	-8.189e-06	8.39e-07 (-10.25%)	8.357e-07 (-10.21%)

20240316T161843Z EX L3 actuation
MCMC corner plot

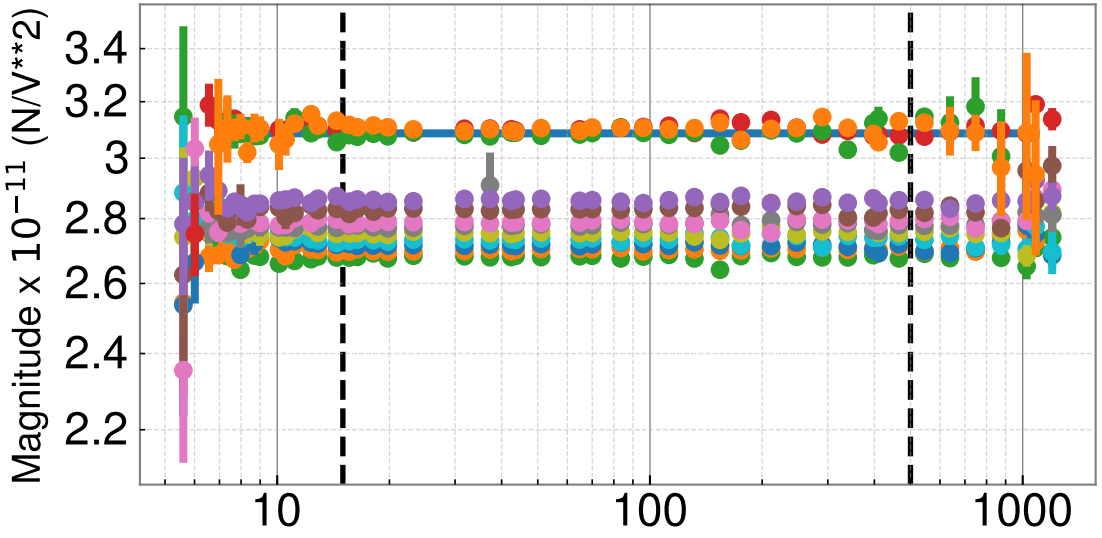


H1SUSEX L3 actuation model history

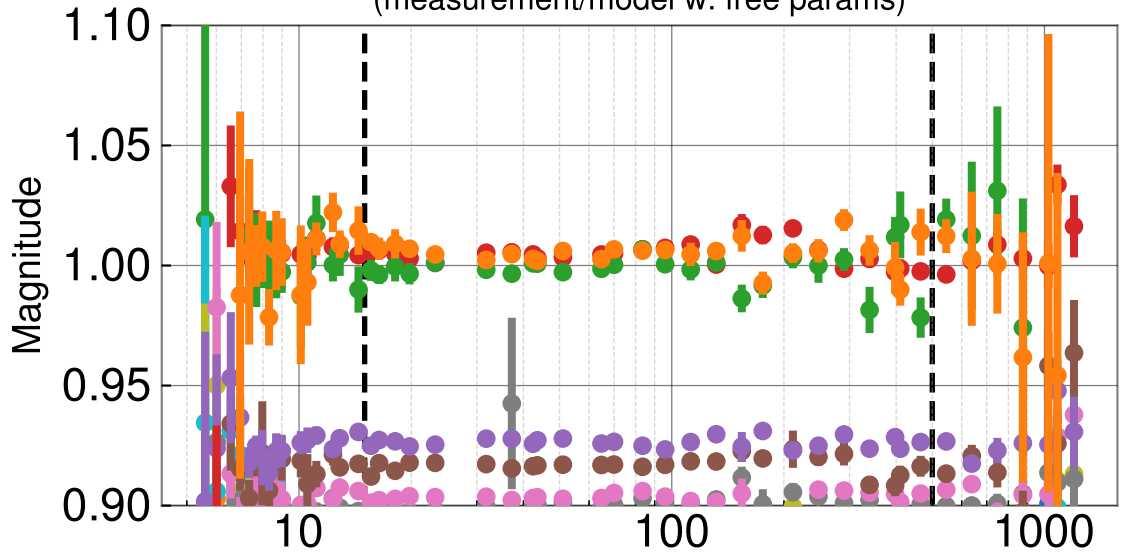
All fixed parameters drawn from /ligo/groups/cal/H1/reports/20240316T161823Z/pydarm_H1.ini

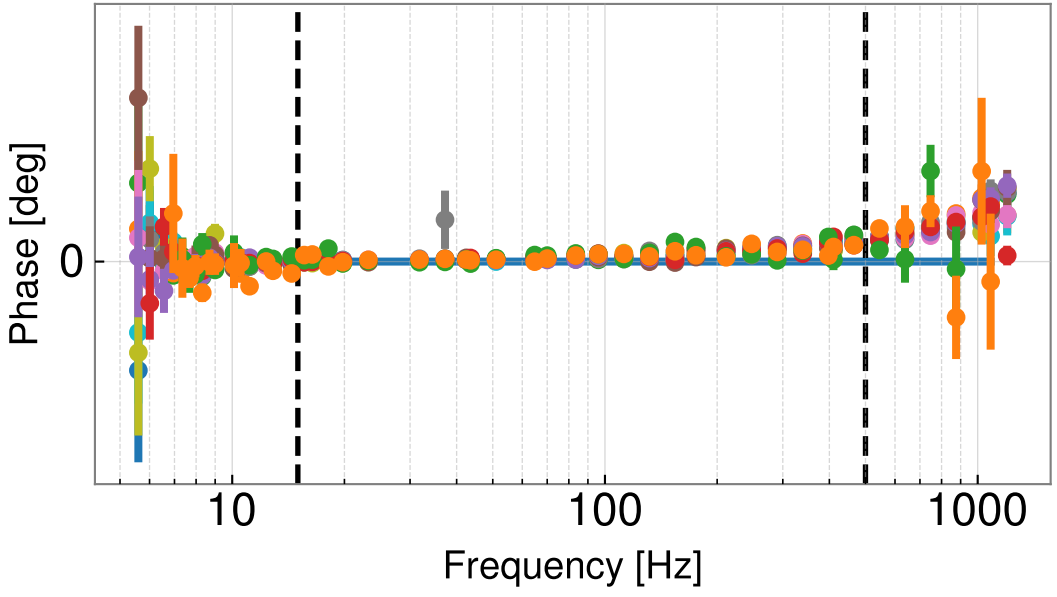
20240315T012231Z model
20240316T161843Z measurement
20240315T012251Z measurement
20240311T214051Z measurement
20231027T203639Z measurement
20231018T190749Z measurement
20231004T191004Z measurement
20230928T193629Z measurement
20230913T183710Z measurement
20230906T220910Z measurement
20230830T213712Z measurement
20230823T214018Z measurement
20230817T214308Z measurement
MCMC Fit Range: 15 Hz to 500 Hz

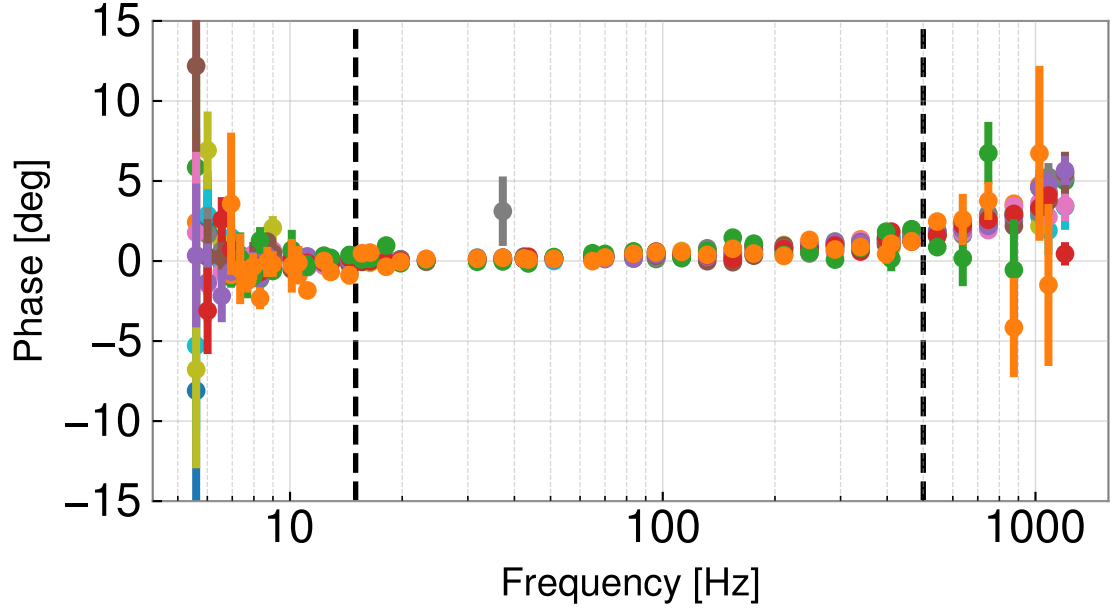
Actuation strength transfer functions
(scaled by H_{ref})

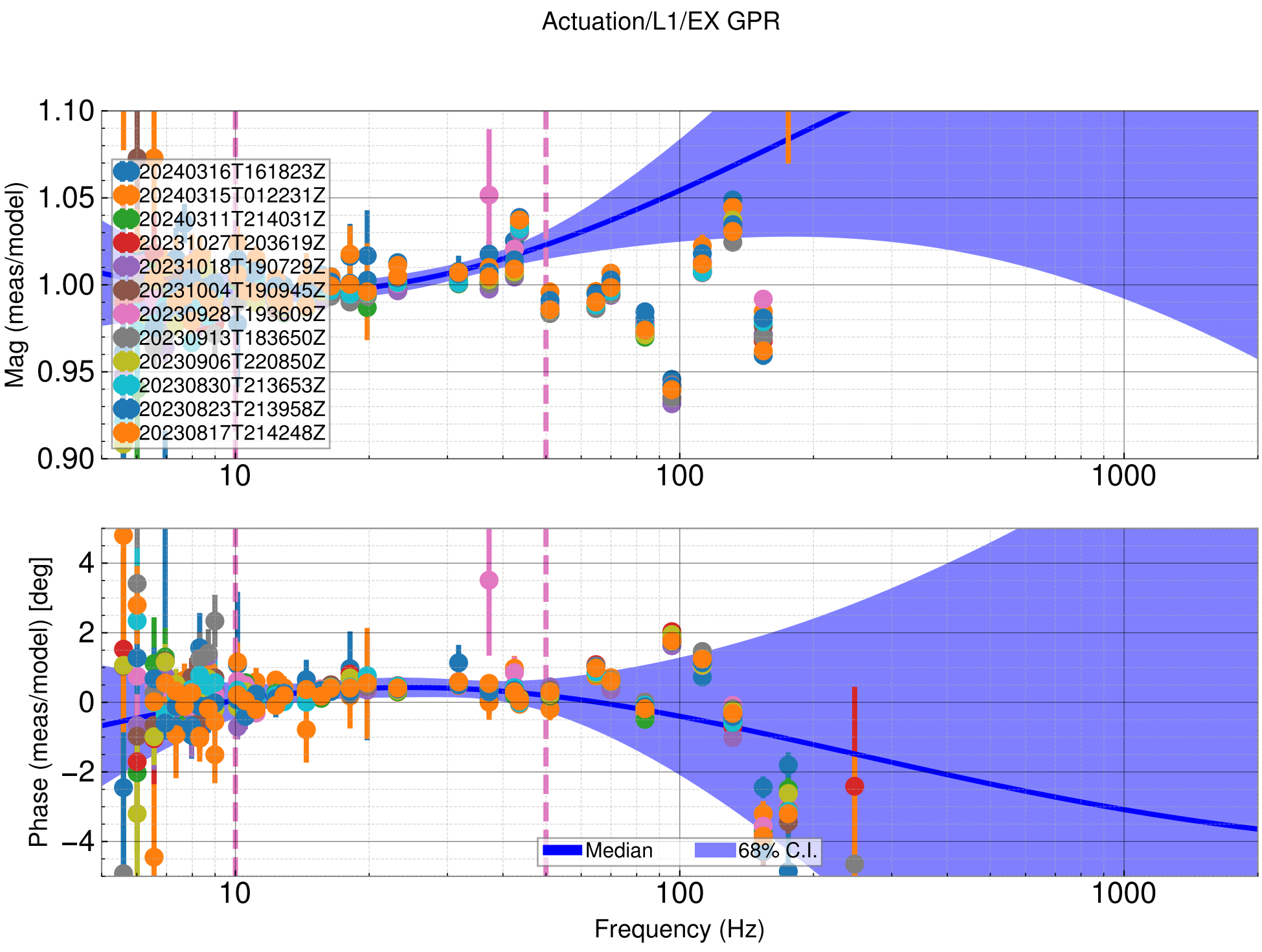


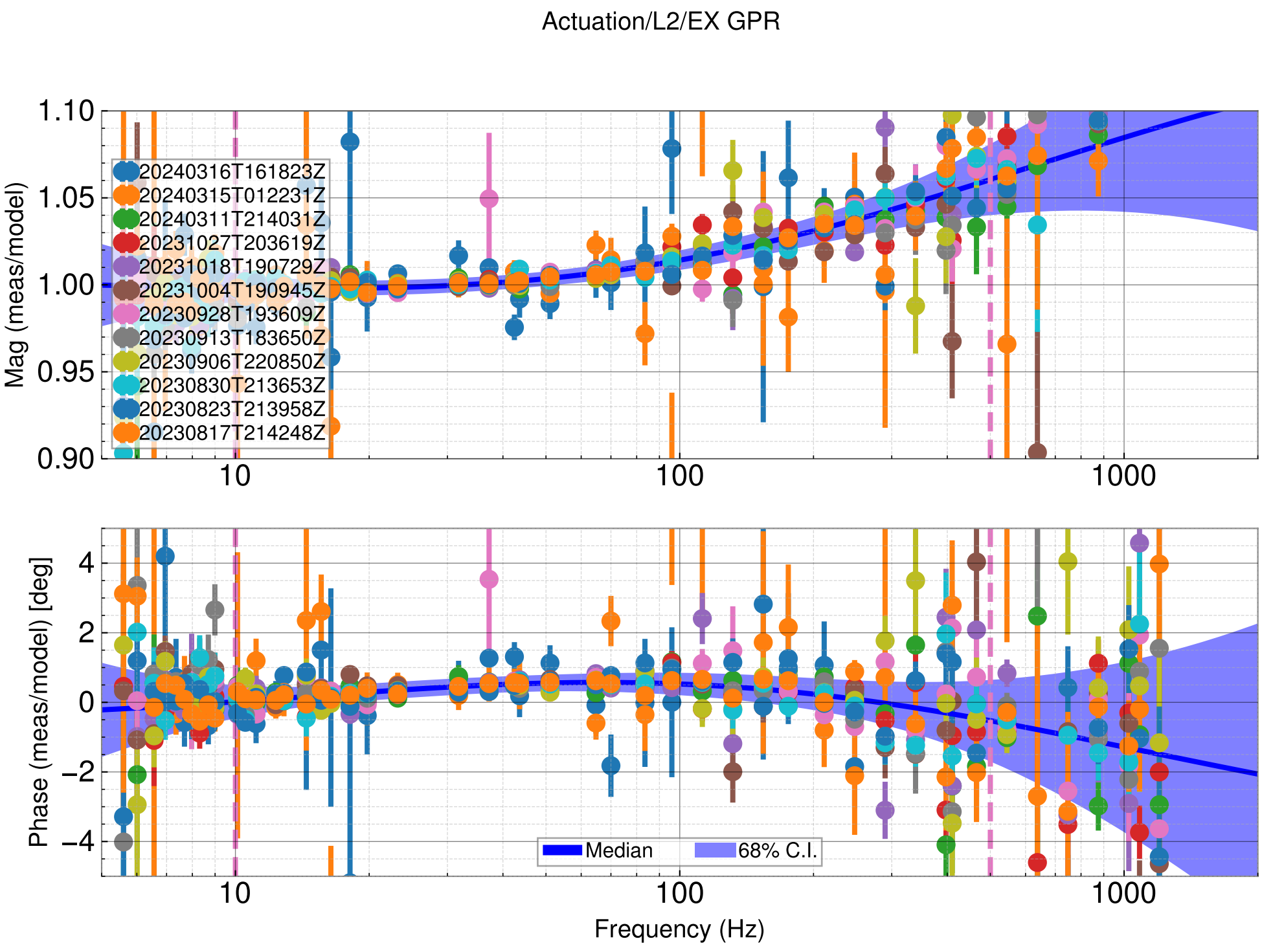
Actuation strength residuals
(measurement/model w. free params)

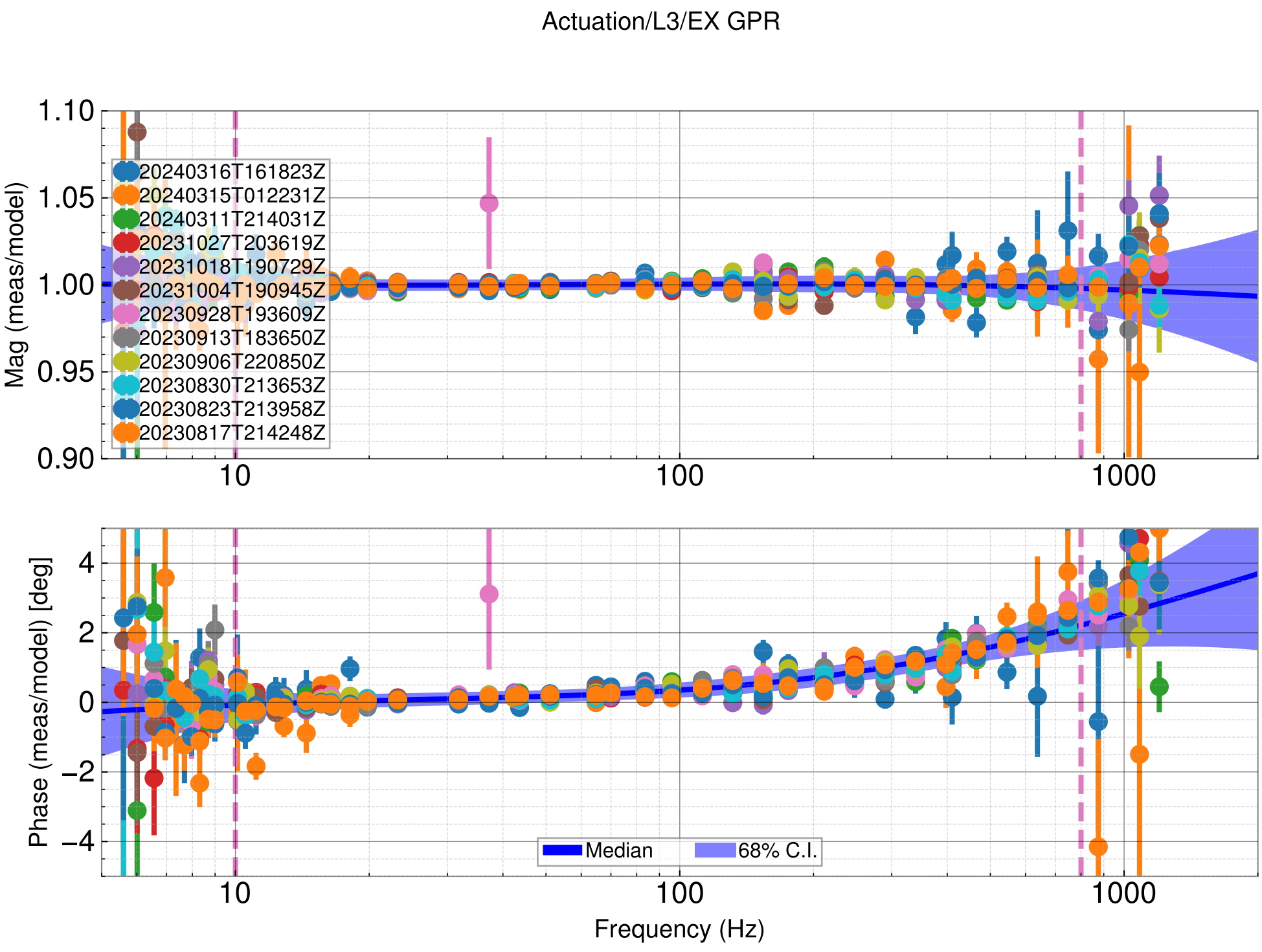


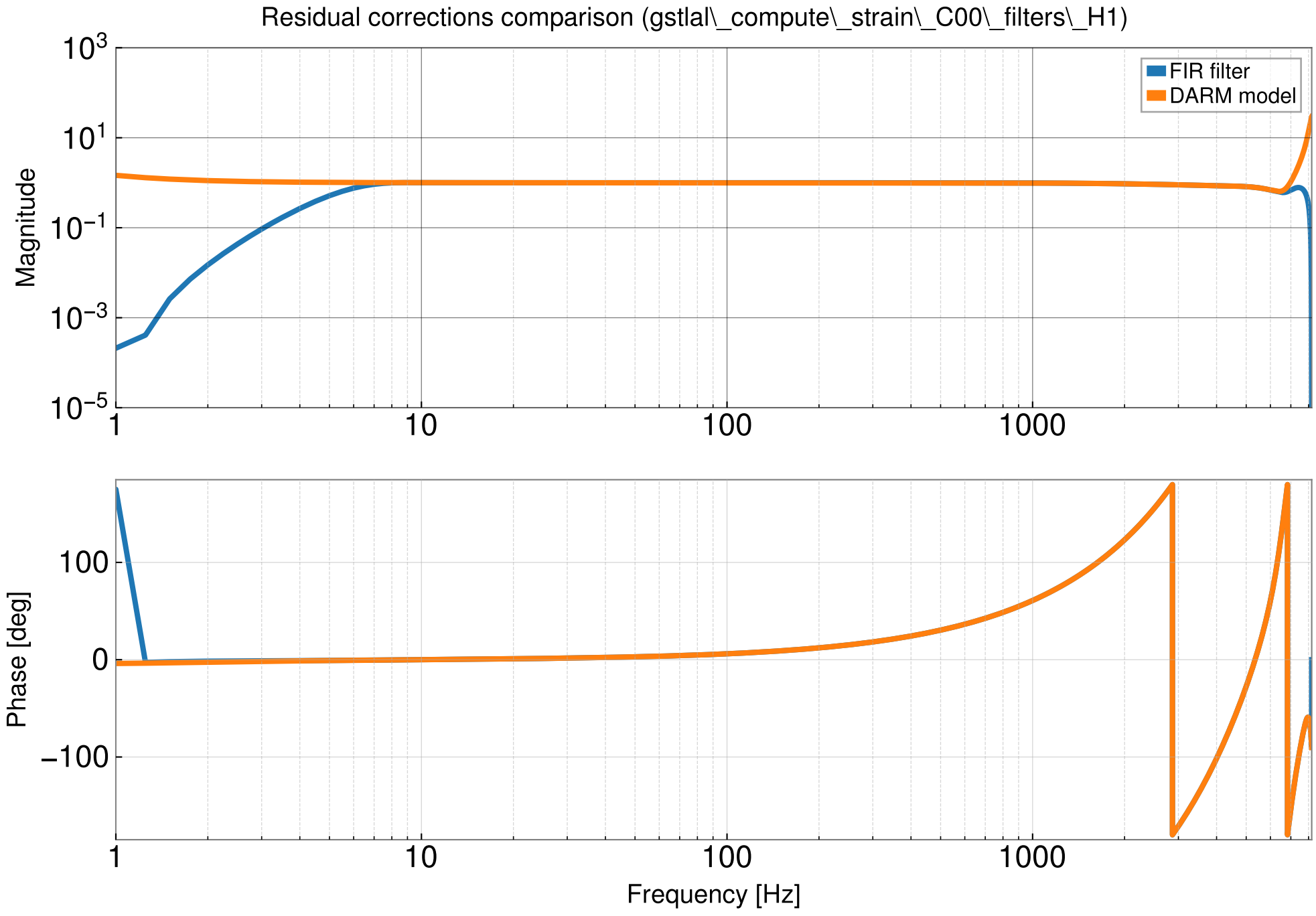


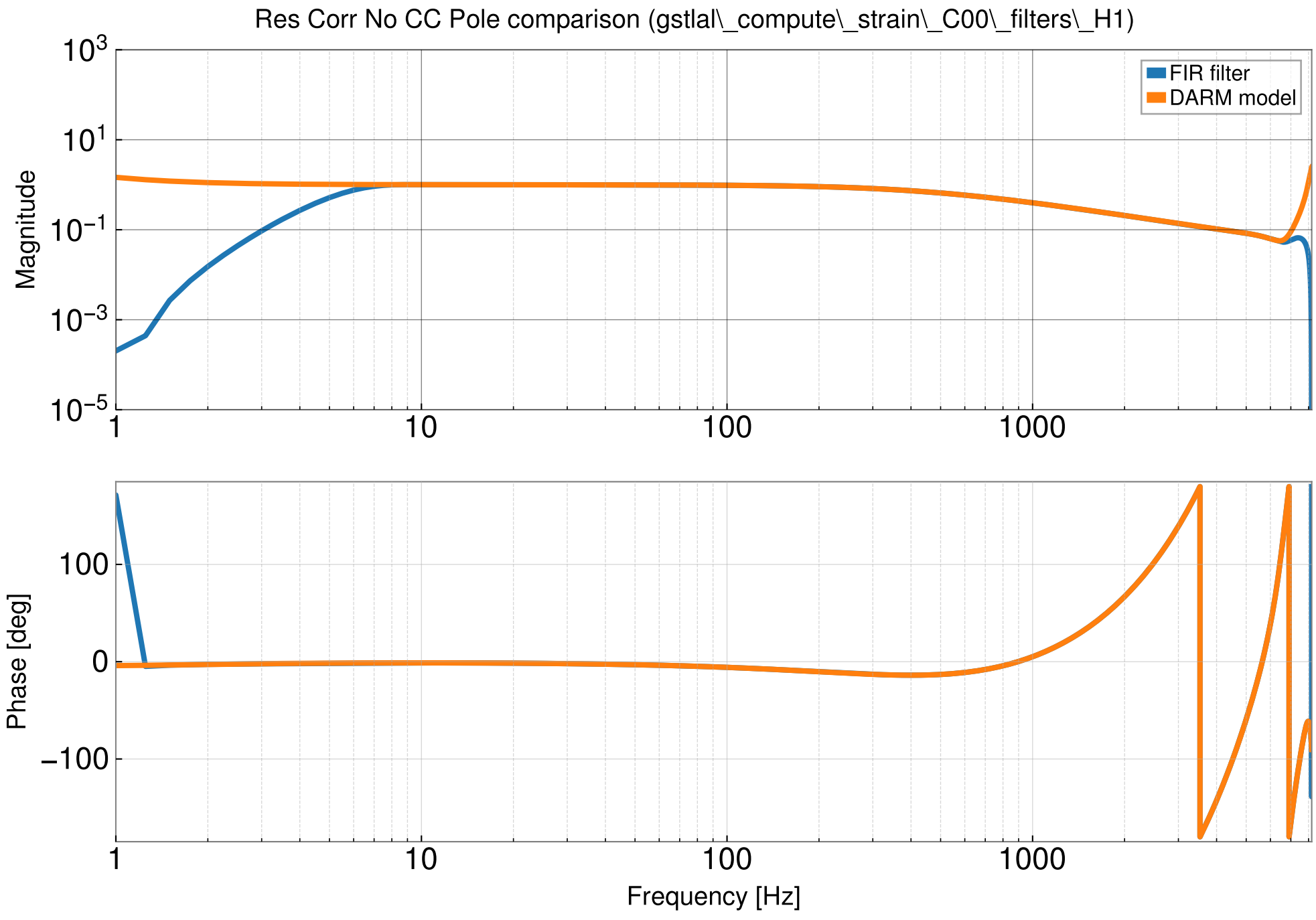


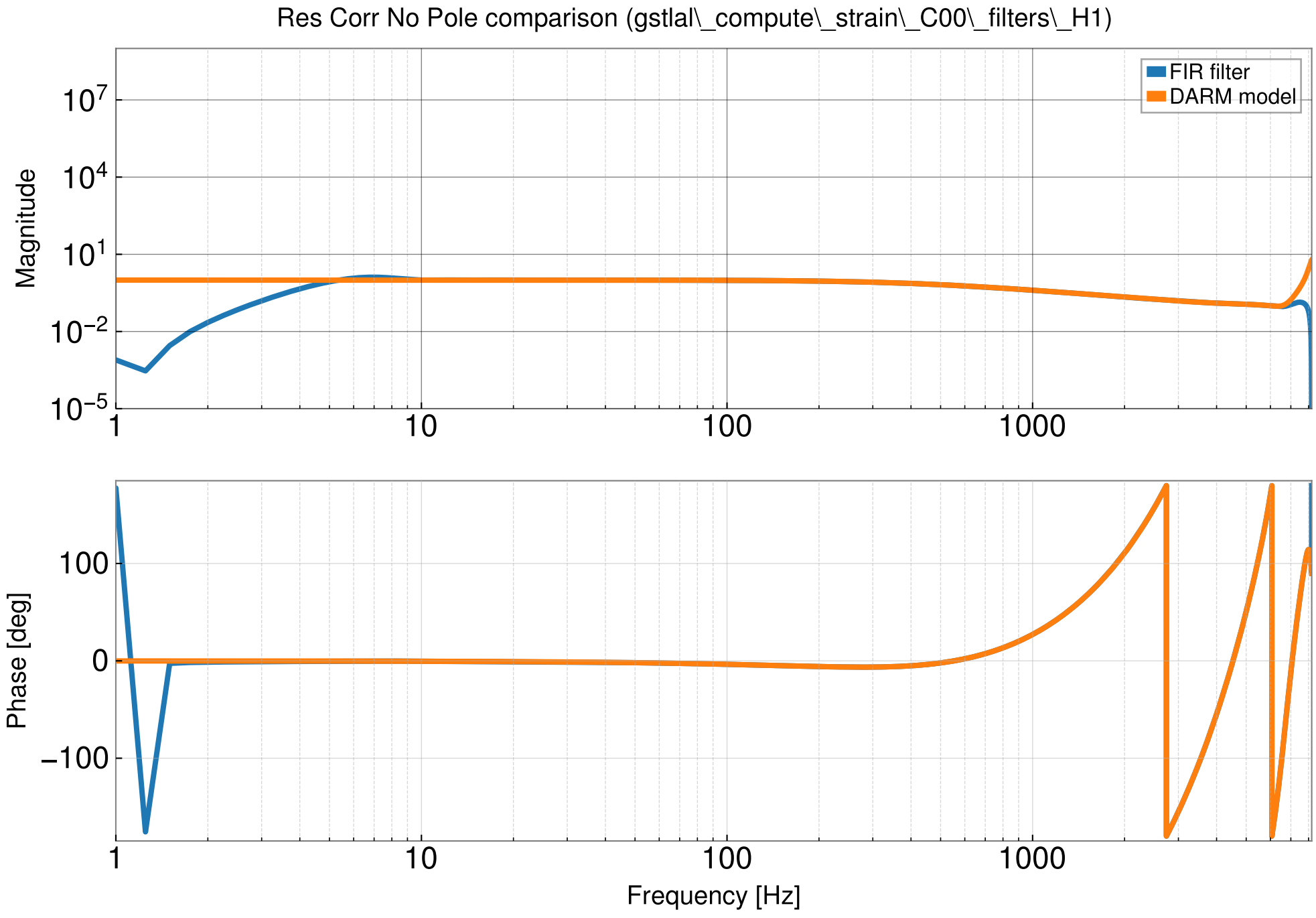

Actuation/L1/EX GPR
Mag (meas/model)
1.10
1.05
1.00
0.95
0.90
20240316T161823Z
20240315T012231Z
20240311T214031Z
20231027T203619Z
20231018T190729Z
20231004T190945Z
20230928T193609Z
20230913T183650Z
20230906T220850Z
20230830T213653Z
20230823T213958Z
20230817T214248Z
10
100
1000
Phase (meas/model) [deg]
4
2
0
−2
−4
Median
68% C.I.
10
100
1000
Frequency (Hz)

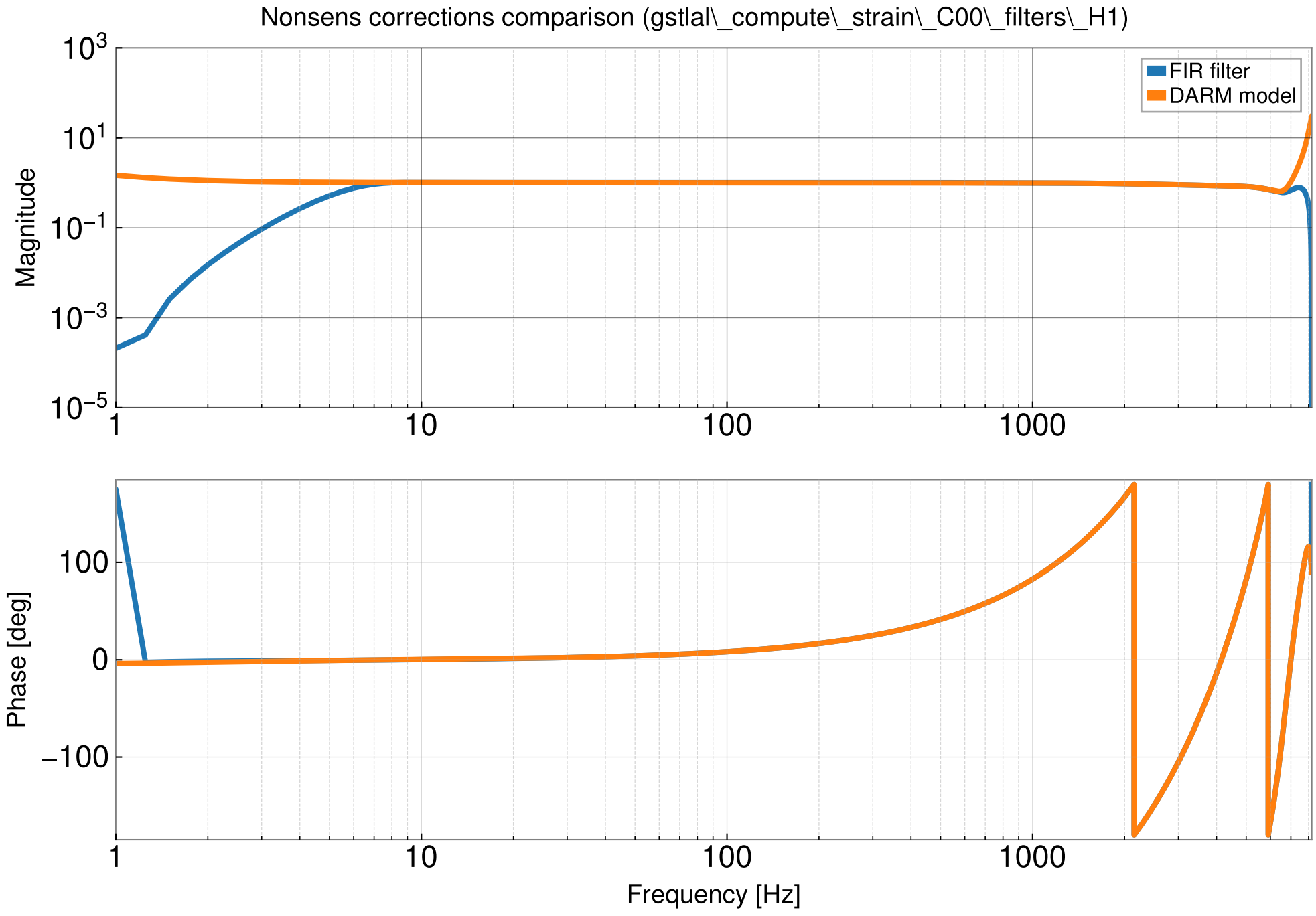

Actuation/L2/EX GPR
Mag (meas/model)
1.10
1.05
1.00
0.95
0.90
20240316T161823Z
20240315T012231Z
20240311T214031Z
20231027T203619Z
20231018T190729Z
20231004T190945Z
20230928T193609Z
20230913T183650Z
20230906T220850Z
20230830T213653Z
20230823T213958Z
20230817T214248Z
10
100
1000
Phase (meas/model) [deg]
4
2
0
−2
−4
Median
68% C.I.
10
100
1000
Frequency (Hz)

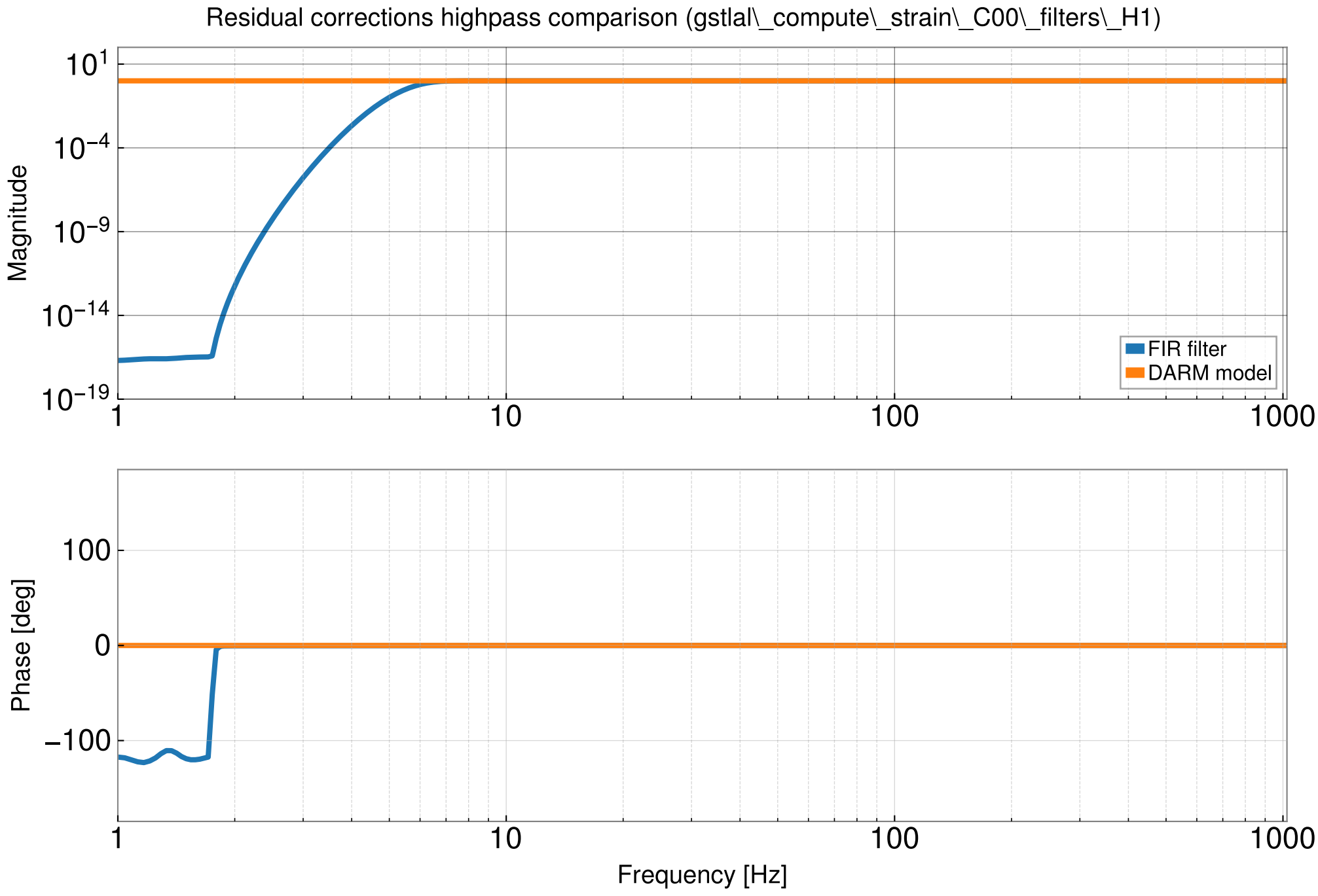

Actuation/L3/EX GPR
Mag (meas/model)
1.10
1.05
1.00
0.95
0.90
20240316T161823Z
20240315T012231Z
20240311T214031Z
20231027T203619Z
20231018T190729Z
20231004T190945Z
20230928T193609Z
20230913T183650Z
20230906T220850Z
20230830T213653Z
20230823T213958Z
20230817T214248Z
10
100
1000
Phase (meas/model) [deg]
4
2
0
−2
−4
Median
68% C.I.
10
100
1000
Frequency (Hz)

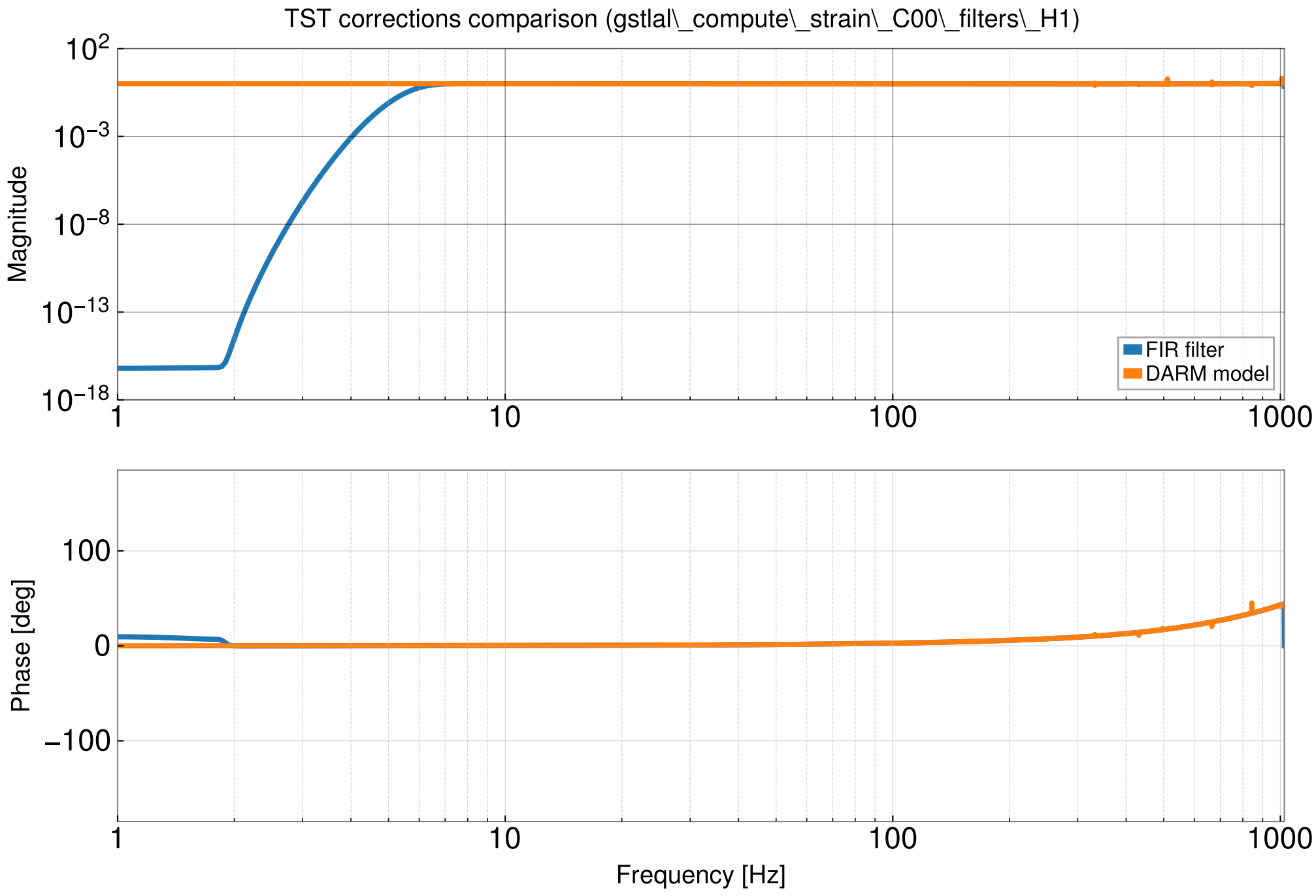

Residual corrections comparison (gstlal_compute_strain_C00_filters_H1)
FIR filter
DARM model
Magnitude
10^{3}
10^{1}
10^{-1}
10^{-3}
10^{-5}
1
10
100
1000
Phase [deg]
100
0
−100
1
10
100
1000
Frequency [Hz]

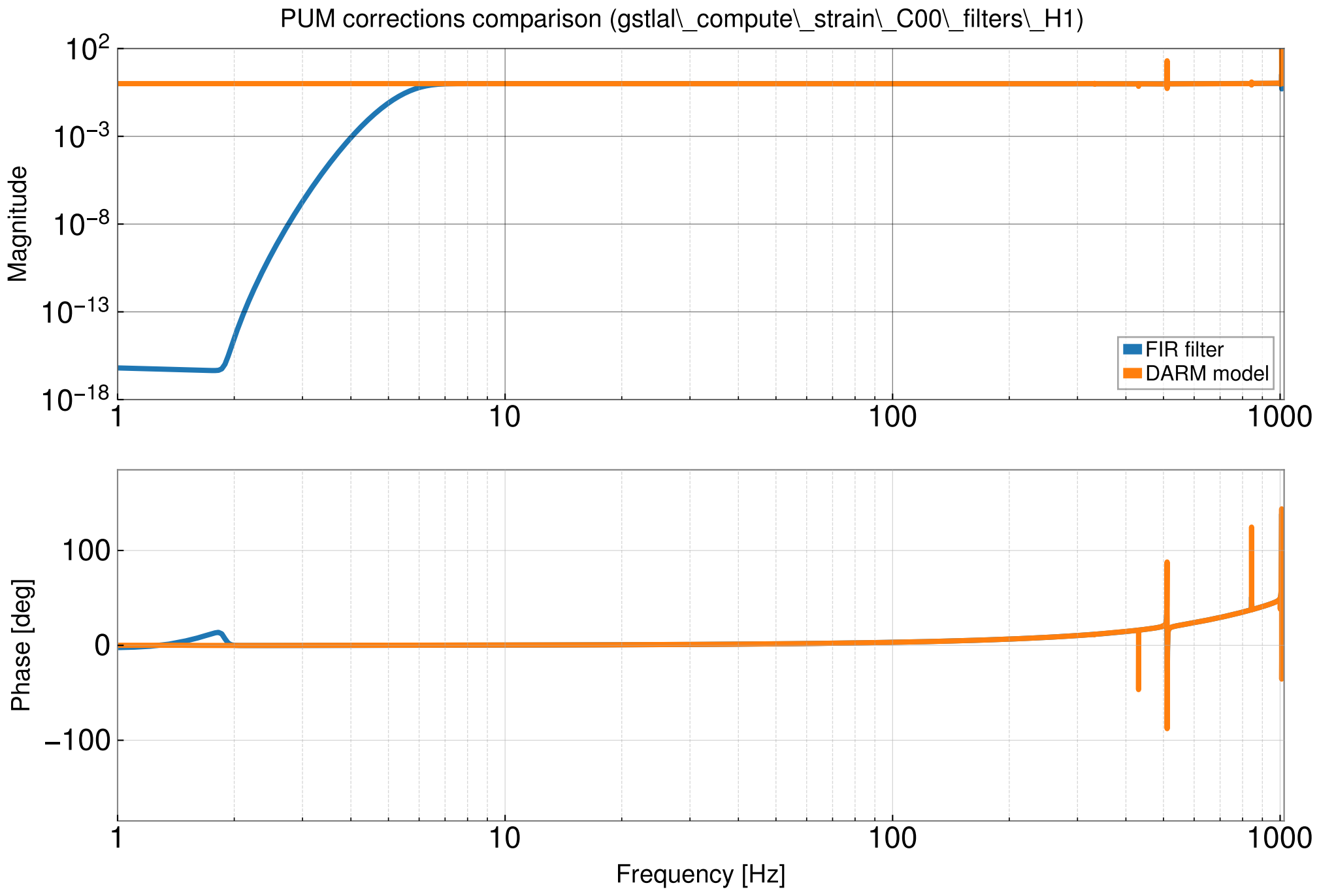

Res Corr No CC Pole comparison (gstlal_compute_strain_C00_filters_H1)
FIR filter
DARM model
Magnitude
10^3
10^1
10^{-1}
10^{-3}
10^{-5}
1
10
100
1000
Phase [deg]
100
0
−100
1
10
100
1000
Frequency [Hz]

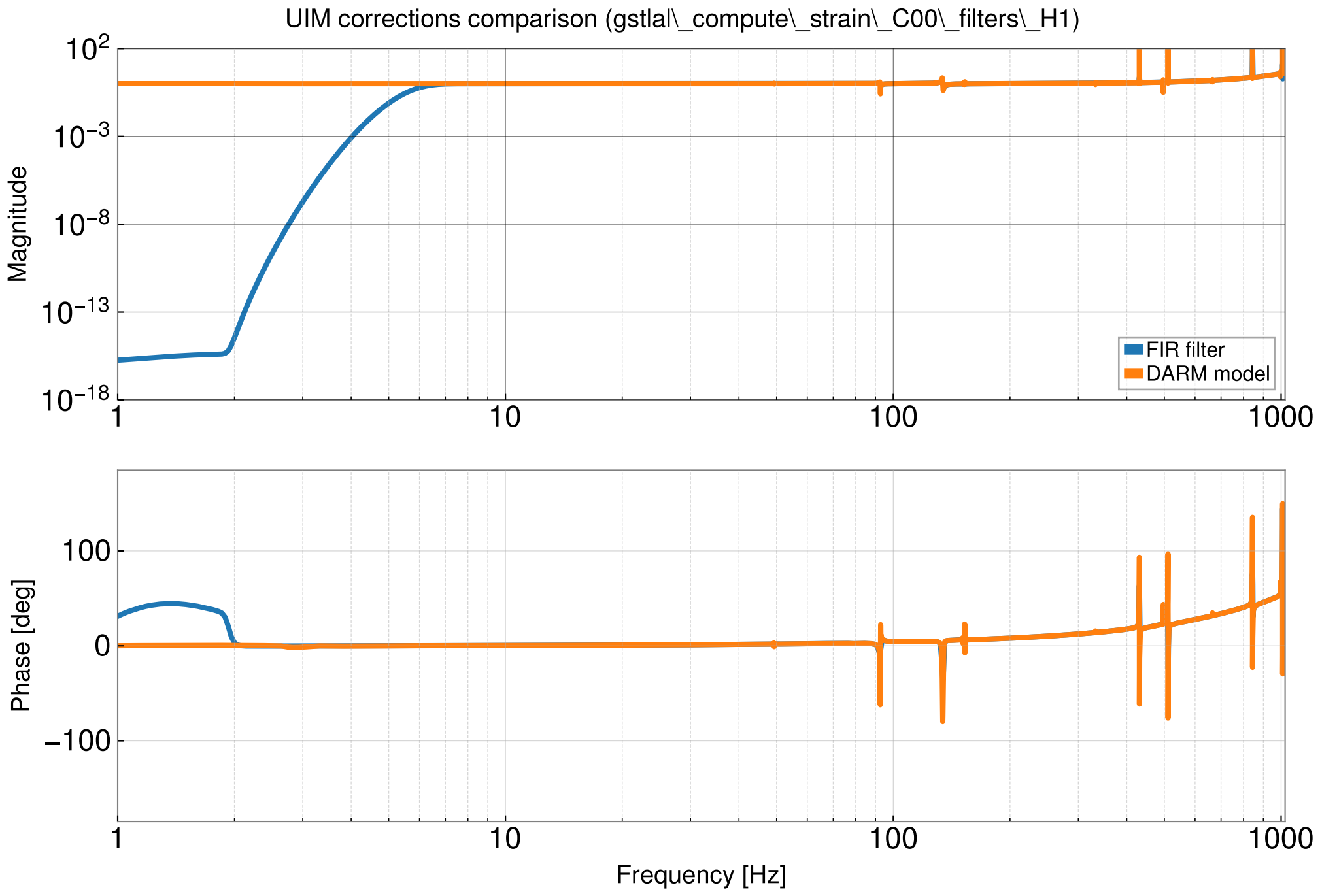

Res Corr No Pole comparison (gstlal_compute_strain_C00_filters_H1)
FIR filter
DARM model
Magnitude
10^{7}
10^{4}
10^{1}
10^{-2}
10^{-5}
1
10
100
1000
Phase [deg]
100
0
−100
1
10
100
1000
Frequency [Hz]


Nonsens corrections comparison (gstlal_compute_strain_C00_filters_H1)
FIR filter
DARM model
Magnitude
10^3
10^1
10^{-1}
10^{-3}
10^{-5}
1
10
100
1000
Phase [deg]
100
0
−100
1
10
100
1000
Frequency [Hz]


Residual corrections highpass comparison (gstlal_compute_strain_C00_filters_H1)
Magnitude
10^{1}
10^{-4}
10^{-9}
10^{-14}
10^{-19}
1
10
100
1000
FIR filter
DARM model
Phase [deg]
100
0
−100
1
10
100
1000
Frequency [Hz]


TST corrections comparison (gstlal_compute_strain_C00_filters_H1)
Magnitude
10^{2}
10^{-3}
10^{-8}
10^{-13}
10^{-18}
1
10
100
1000
FIR filter
DARM model
Phase [deg]
100
0
−100
1
10
100
1000
Frequency [Hz]


PUM corrections comparison (gstlal_compute_strain_C00_filters_H1)
Magnitude
10^{2}
10^{-3}
10^{-8}
10^{-13}
10^{-18}
1
10
100
1000
FIR filter
DARM model
Phase [deg]
100
0
−100
1
10
100
1000
Frequency [Hz]


UIM corrections comparison (gstlal_compute_strain_C00_filters_H1)
Magnitude
10^{2}
10^{-3}
10^{-8}
10^{-13}
10^{-18}
1
10
100
1000
FIR filter
DARM model
Phase [deg]
100
0
−100
1
10
100
1000
Frequency [Hz]