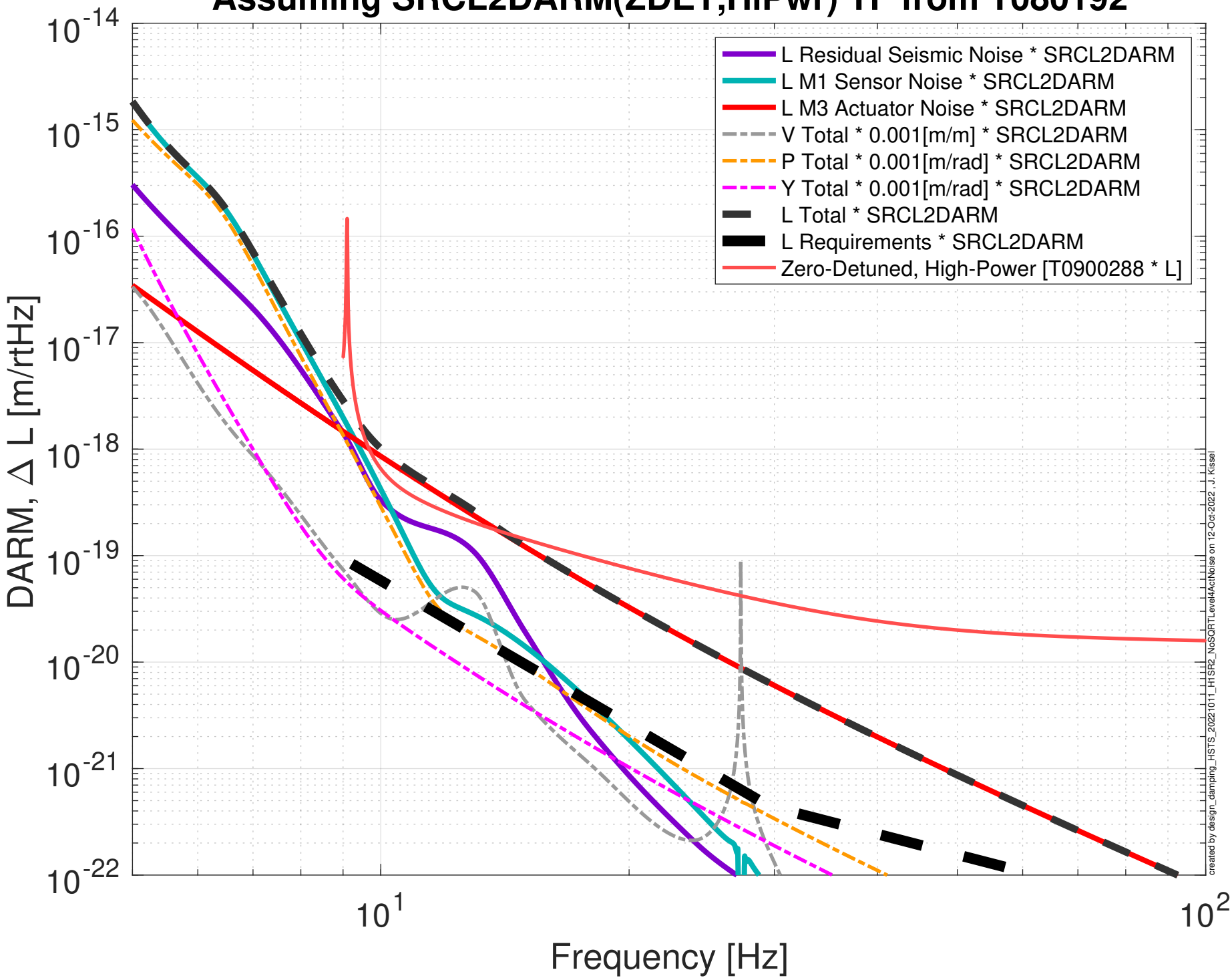
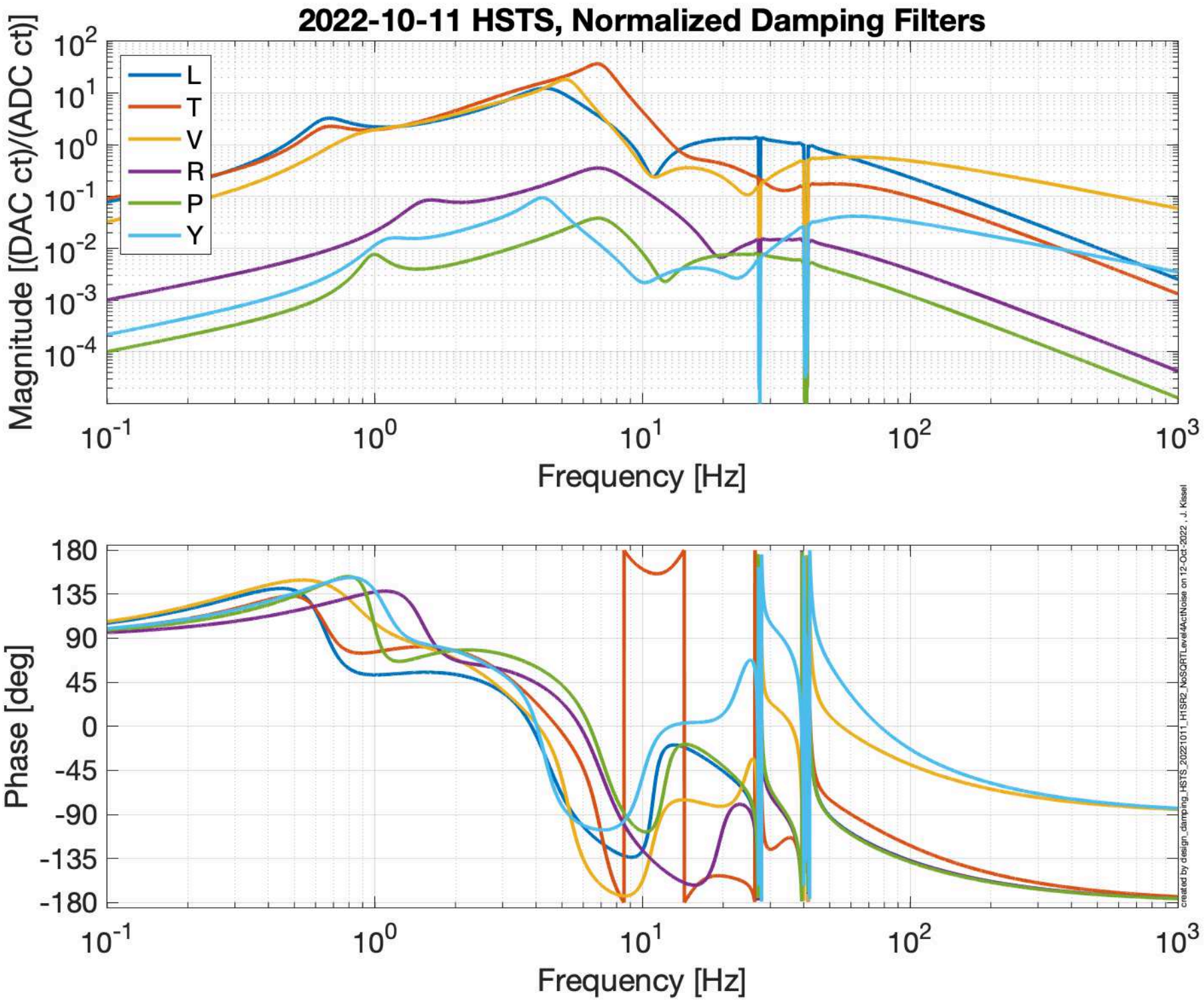
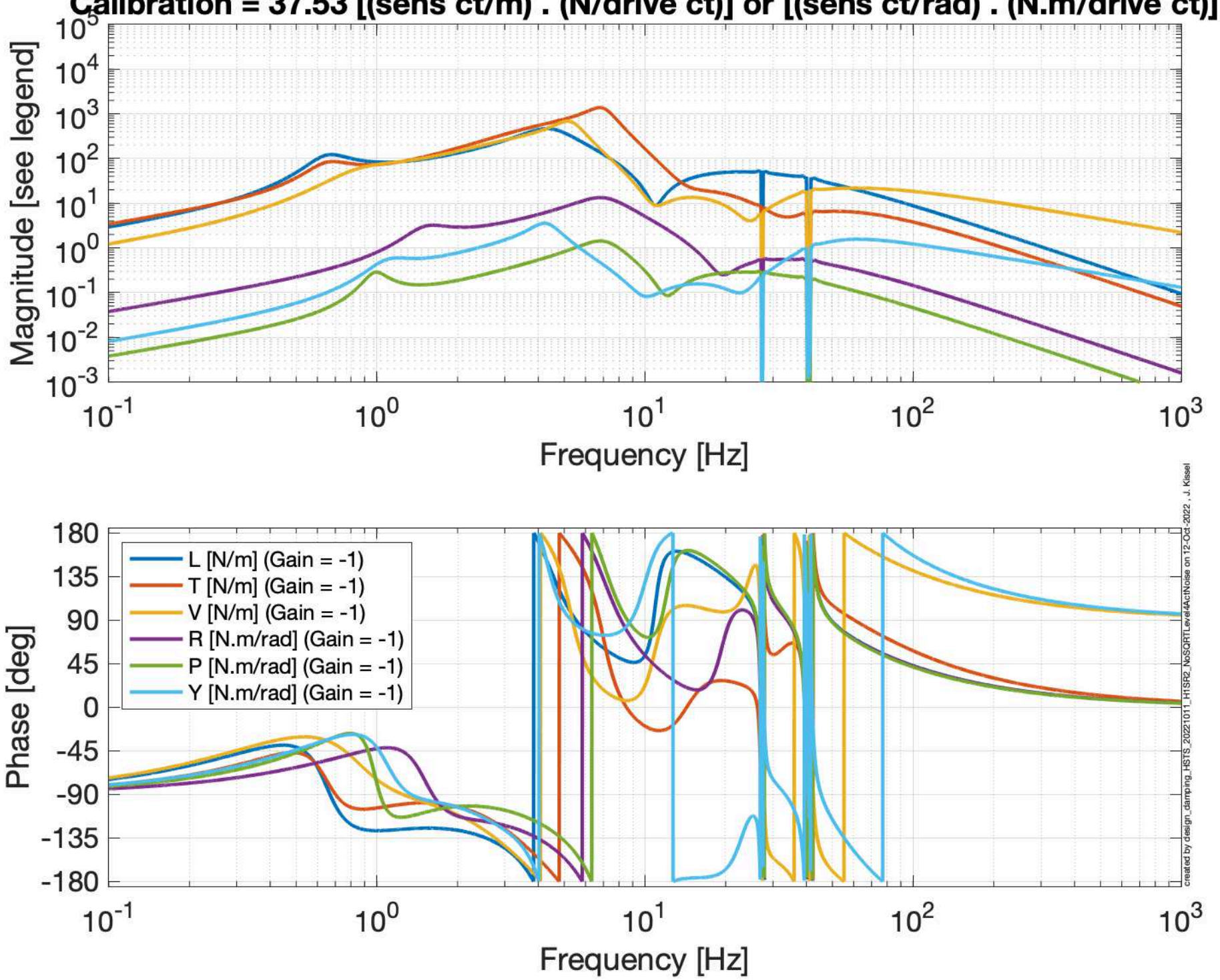
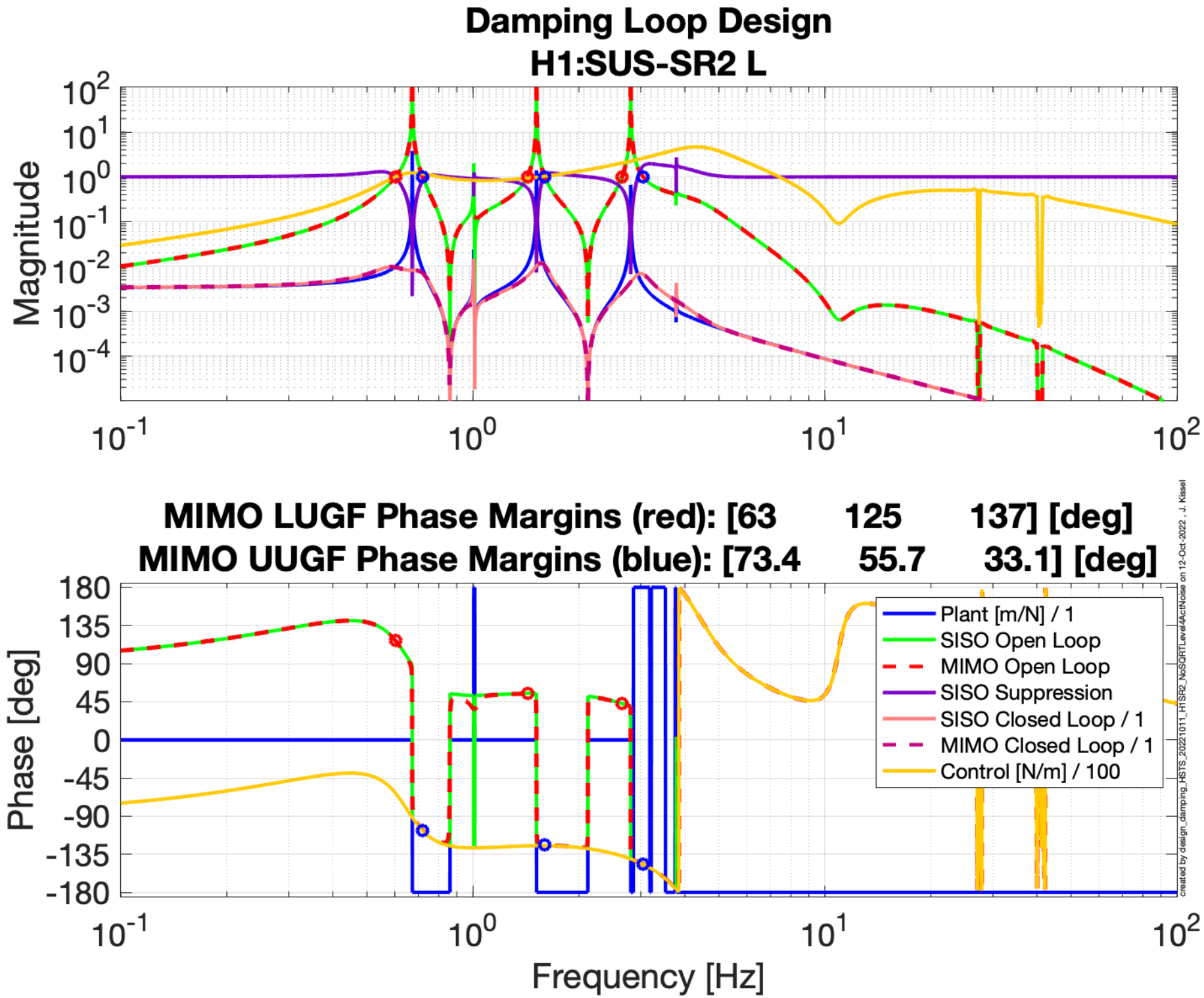
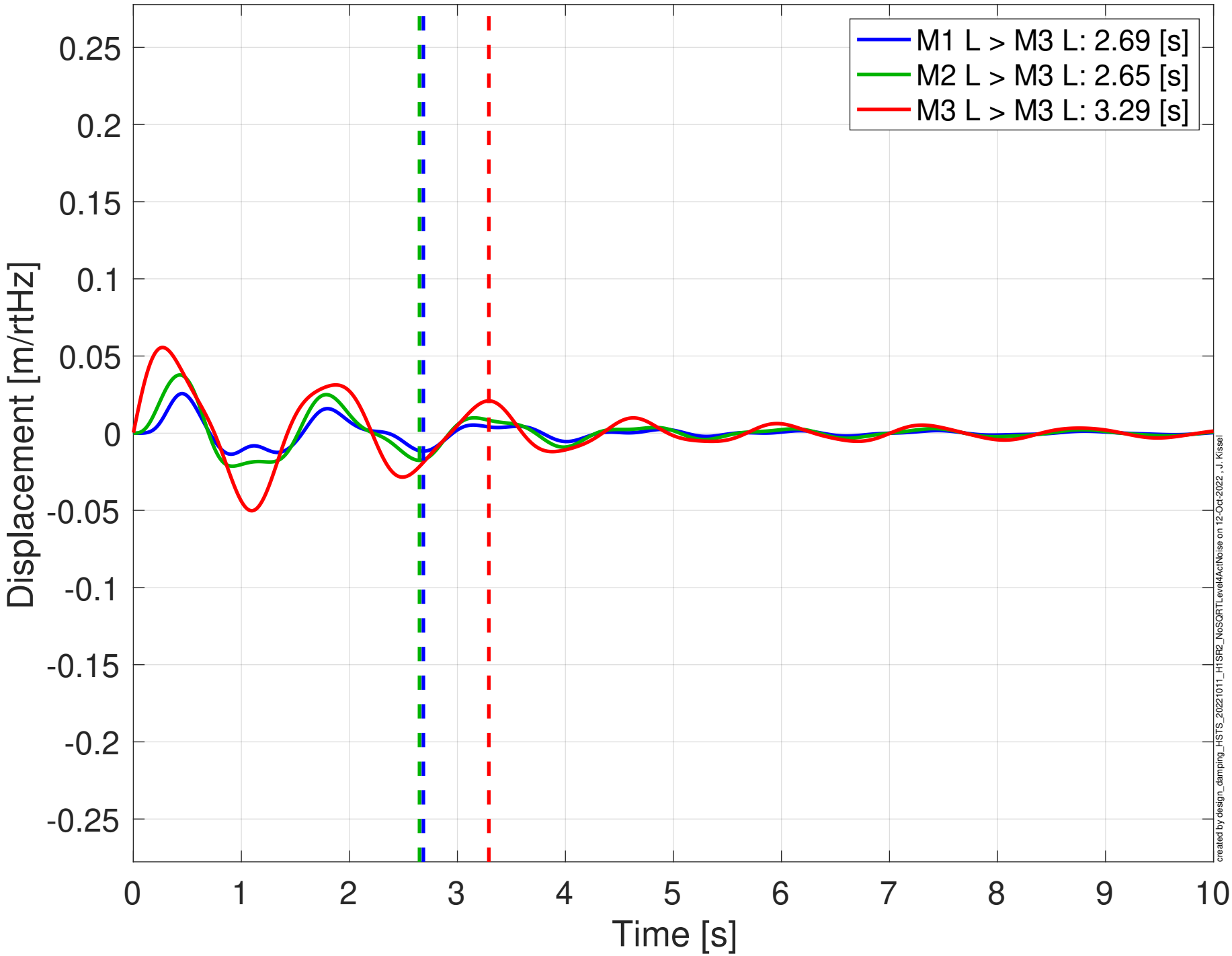
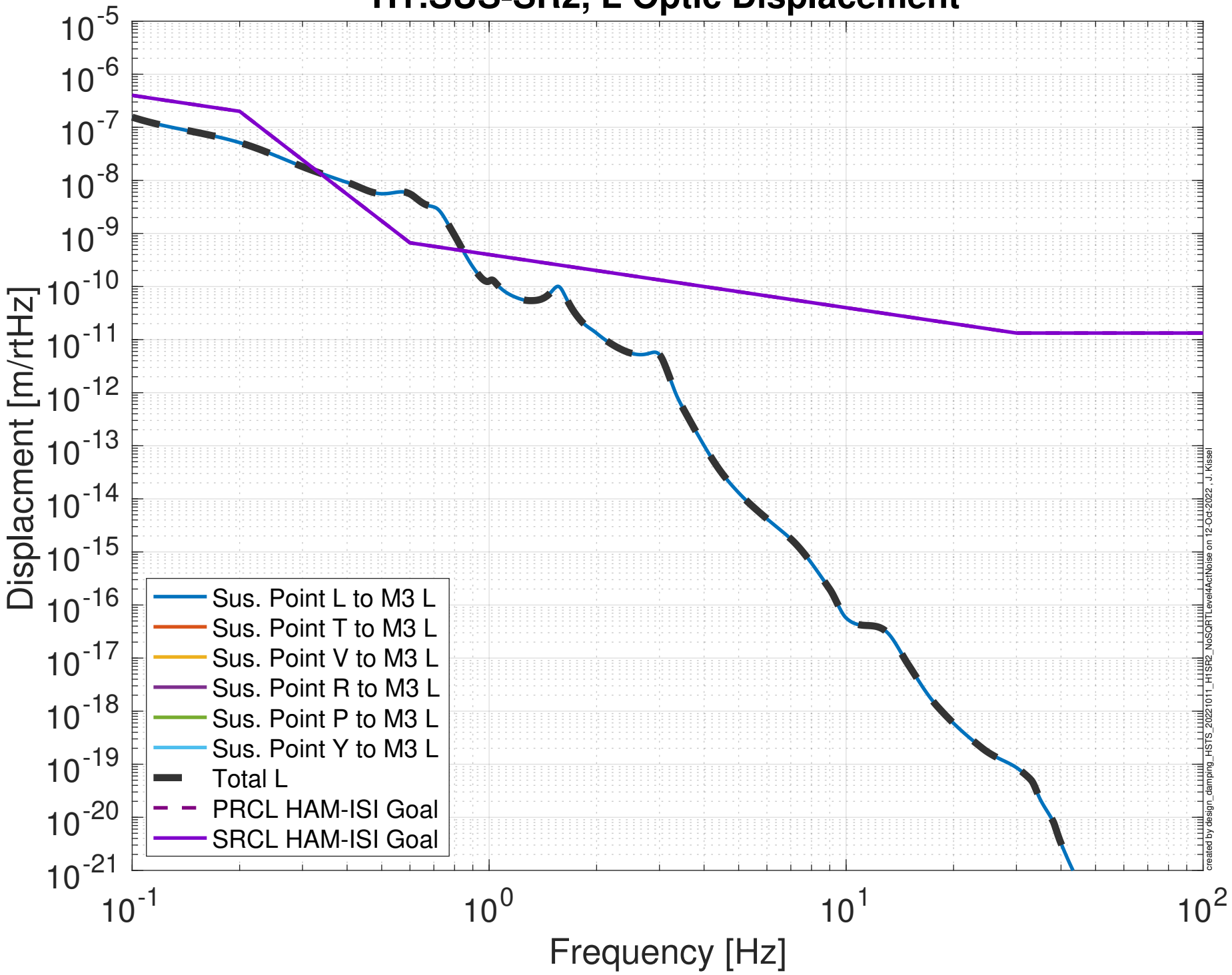

HSTS Damping Loop Performance; Differential Arm Displacement
Assuming SRCL2DARM(ZDET,HiPwr) TF from T080192
L Residual Seismic Noise * SRCL2DARM
L M1 Sensor Noise * SRCL2DARM
L M3 Actuator Noise * SRCL2DARM
V Total * 0.001[m/m] * SRCL2DARM
P Total * 0.001[m/rad] * SRCL2DARM
Y Total * 0.001[m/rad] * SRCL2DARM
L Total * SRCL2DARM
L Requirements * SRCL2DARM
Zero-Detuned, High-Power [T0900288 * L]
DARM, Δ L [m/rtHz]
Frequency [Hz]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

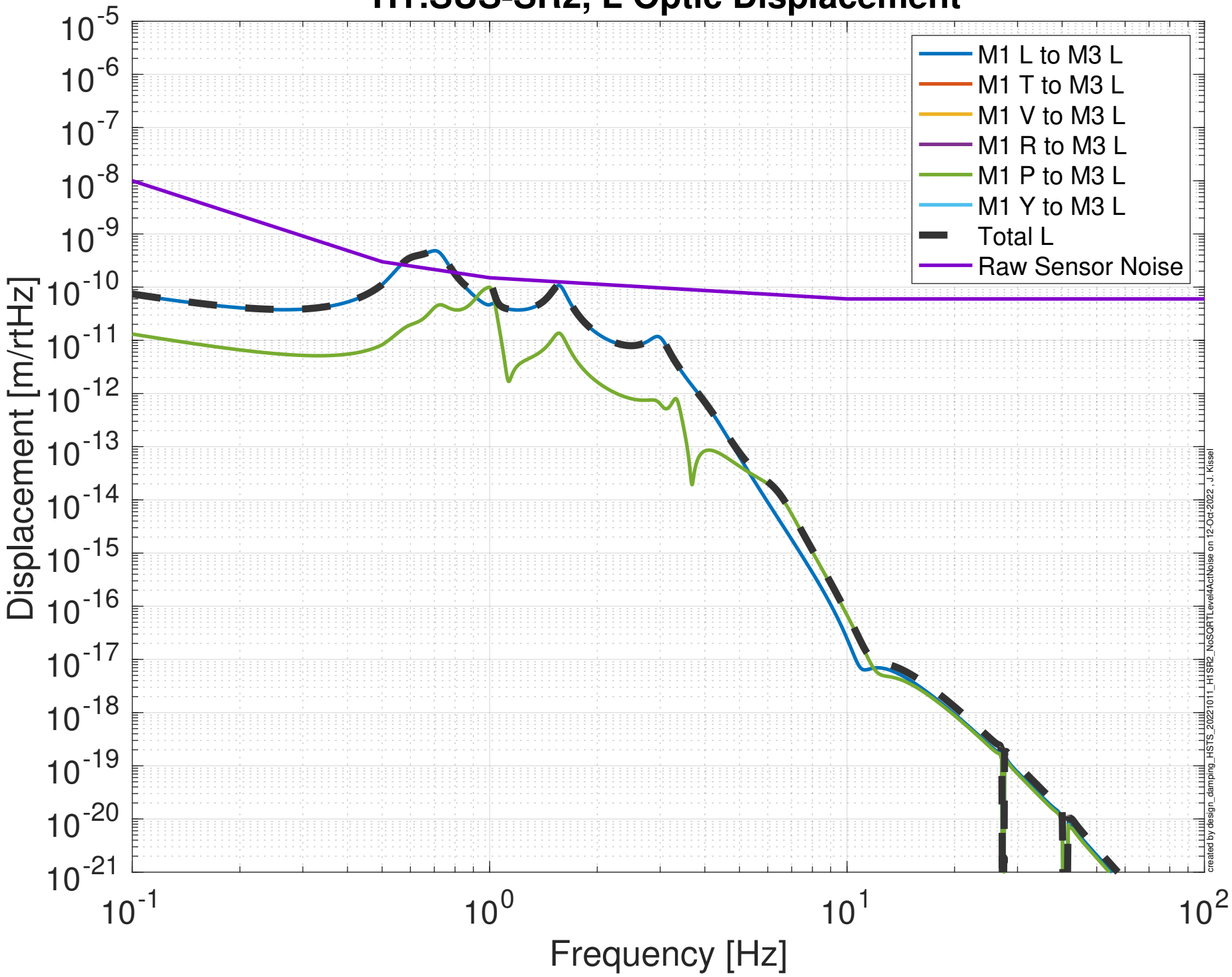

2022-10-11 HSTS, Normalized Damping Filters
Magnitude [(DAC ct)/(ADC ct)]
L
T
V
R
P
Y
Frequency [Hz]
Phase [deg]
Frequency [Hz]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

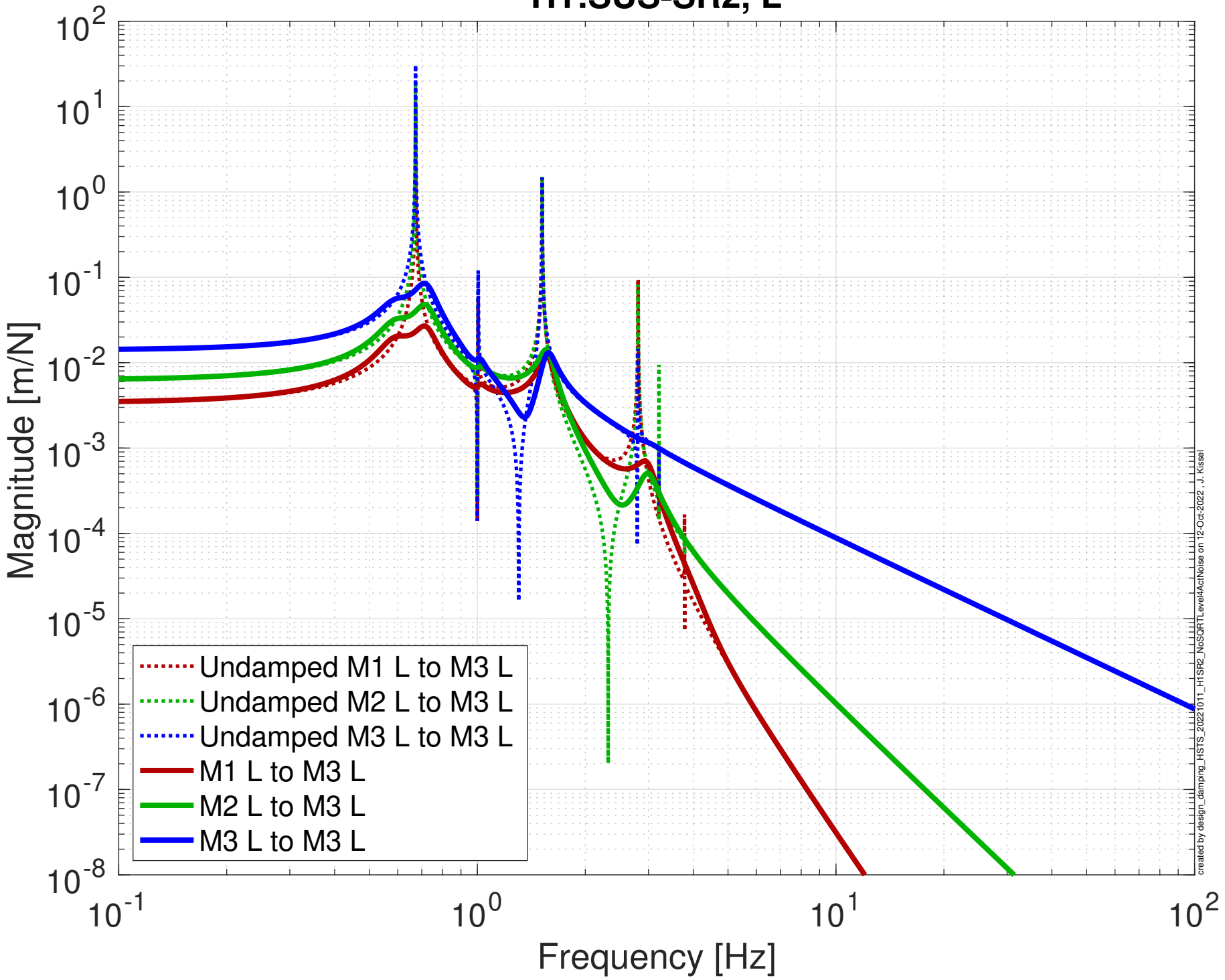

2022-10-11 HSTS, Calibrated Damping Filters
Calibration = 37.53 [(sens ct/m) . (N/drive ct)] or [(sens ct/rad) . (N.m/drive ct)]
Magnitude [see legend]
Frequency [Hz]
Phase [deg]
Frequency [Hz]
L [N/m] (Gain = -1)
T [N/m] (Gain = -1)
V [N/m] (Gain = -1)
R [N.m/rad] (Gain = -1)
P [N.m/rad] (Gain = -1)
Y [N.m/rad] (Gain = -1)
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

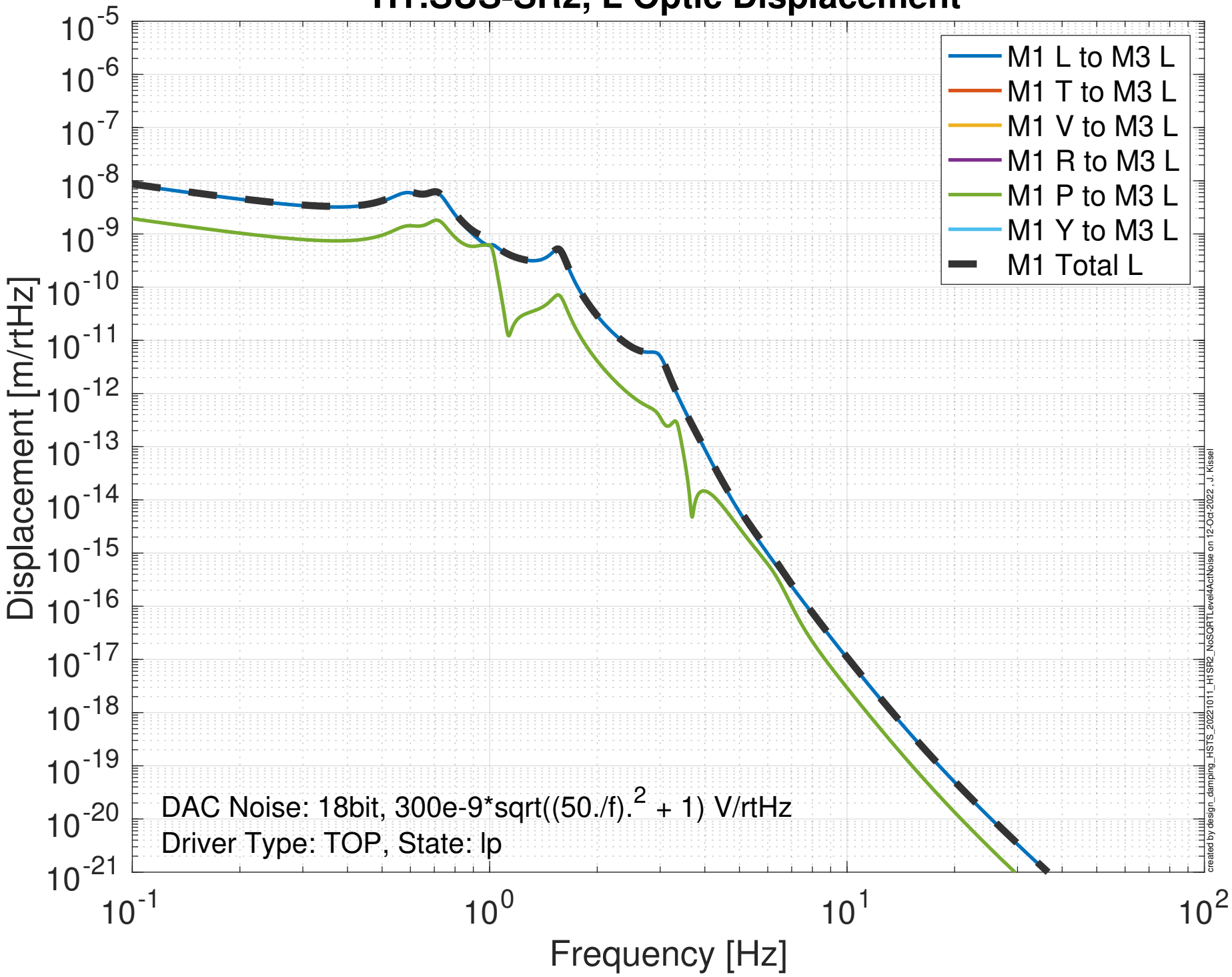

Damping Loop Design
H1:SUS-SR2 L
Magnitude
MIMO LUGF Phase Margins (red): [63 125 137] [deg]
MIMO UUGF Phase Margins (blue): [73.4 55.7 33.1] [deg]
Phase [deg]
Frequency [Hz]
Plant [m/N] / 1
SISO Open Loop
MIMO Open Loop
SISO Suppression
SISO Closed Loop / 1
MIMO Closed Loop / 1
Control [N/m] / 100
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

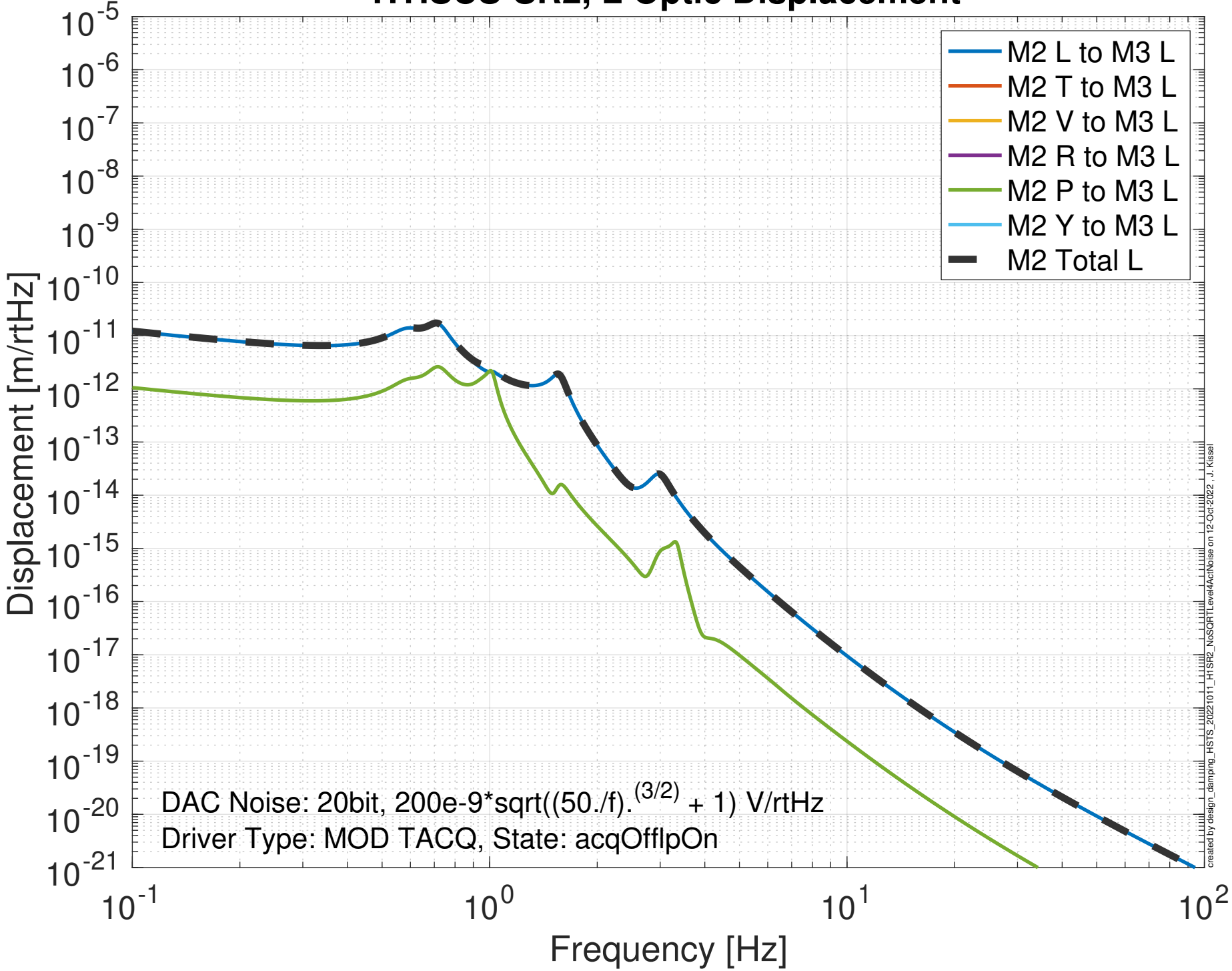

Damped Impulse Response
H1:SUS-SR2 L
M1 L > M3 L: 2.69 [s]
M2 L > M3 L: 2.65 [s]
M3 L > M3 L: 3.29 [s]
Displacement [m/rtHz]
Time [s]
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
0
1
2
3
4
5
6
7
8
9
10
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

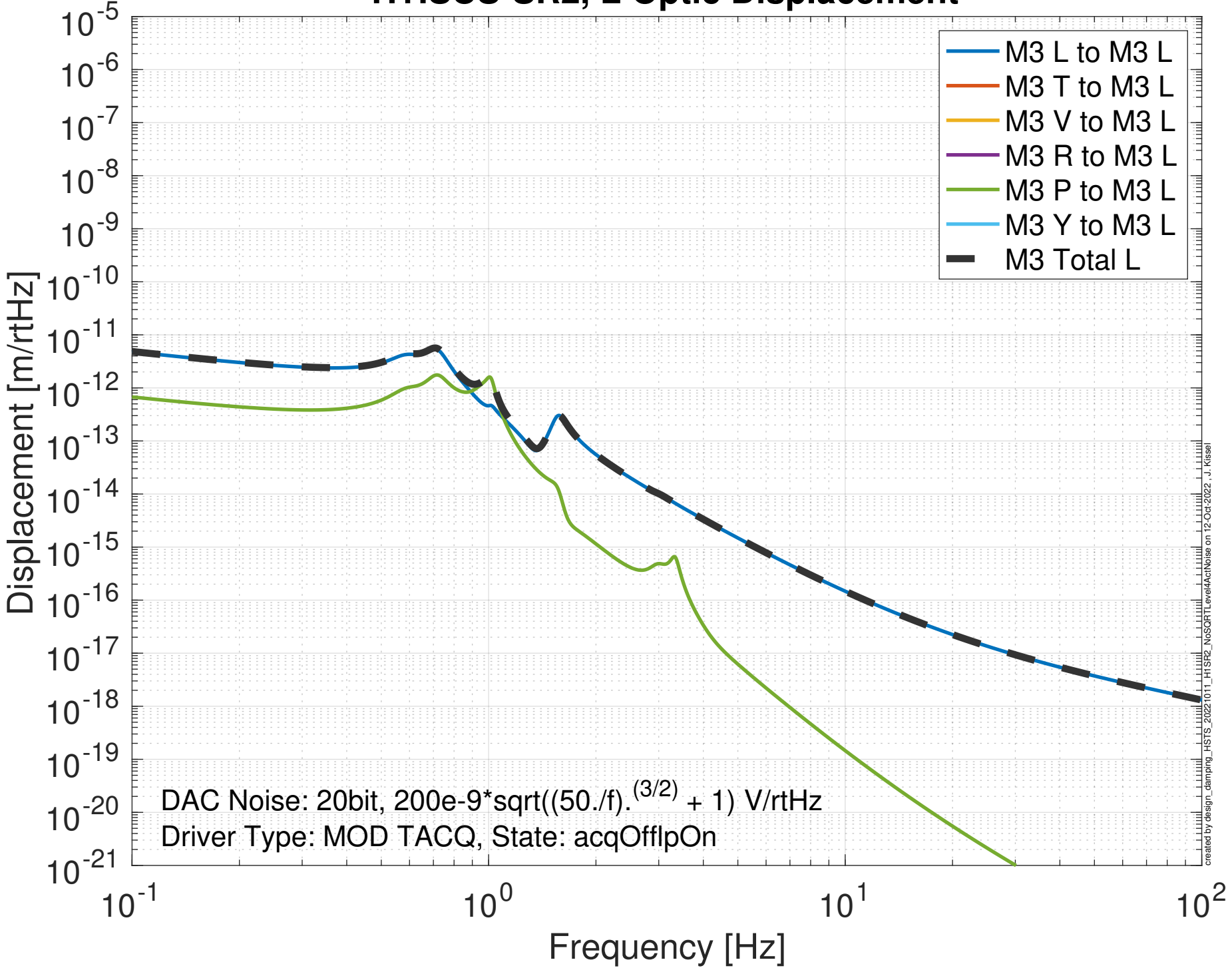

Projected Sus. Point > Optic Seismic Noise Budget
H1:SUS-SR2, L Optic Displacement
Displacment [m/rtHz]
Frequency [Hz]
Sus. Point L to M3 L
Sus. Point T to M3 L
Sus. Point V to M3 L
Sus. Point R to M3 L
Sus. Point P to M3 L
Sus. Point Y to M3 L
Total L
PRCL HAM-ISI Goal
SRCL HAM-ISI Goal
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AclNoise on 12-Oct-2022 , J. Kissel


Projected Top Mass Sensor > Optic Noise Budget
H1:SUS-SR2, L Optic Displacement
Displacement [m/rtHz]
Frequency [Hz]
M1 L to M3 L
M1 T to M3 L
M1 V to M3 L
M1 R to M3 L
M1 P to M3 L
M1 Y to M3 L
Total L
Raw Sensor Noise
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

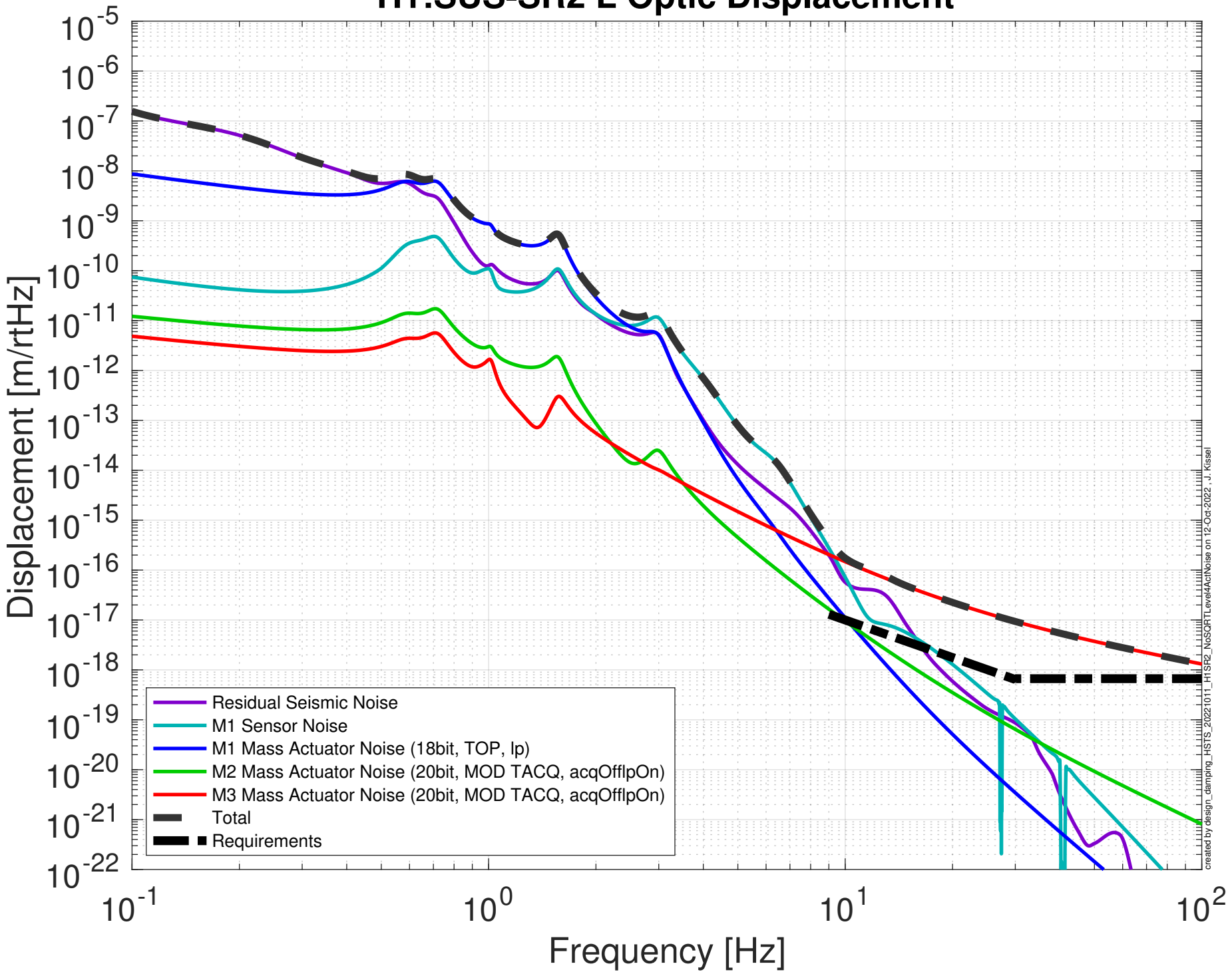

Global Control Transfer Functions to Optic
H1:SUS-SR2, L
Magnitude [m/N]
Frequency [Hz]
Undamped M1 L to M3 L
Undamped M2 L to M3 L
Undamped M3 L to M3 L
M1 L to M3 L
M2 L to M3 L
M3 L to M3 L
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

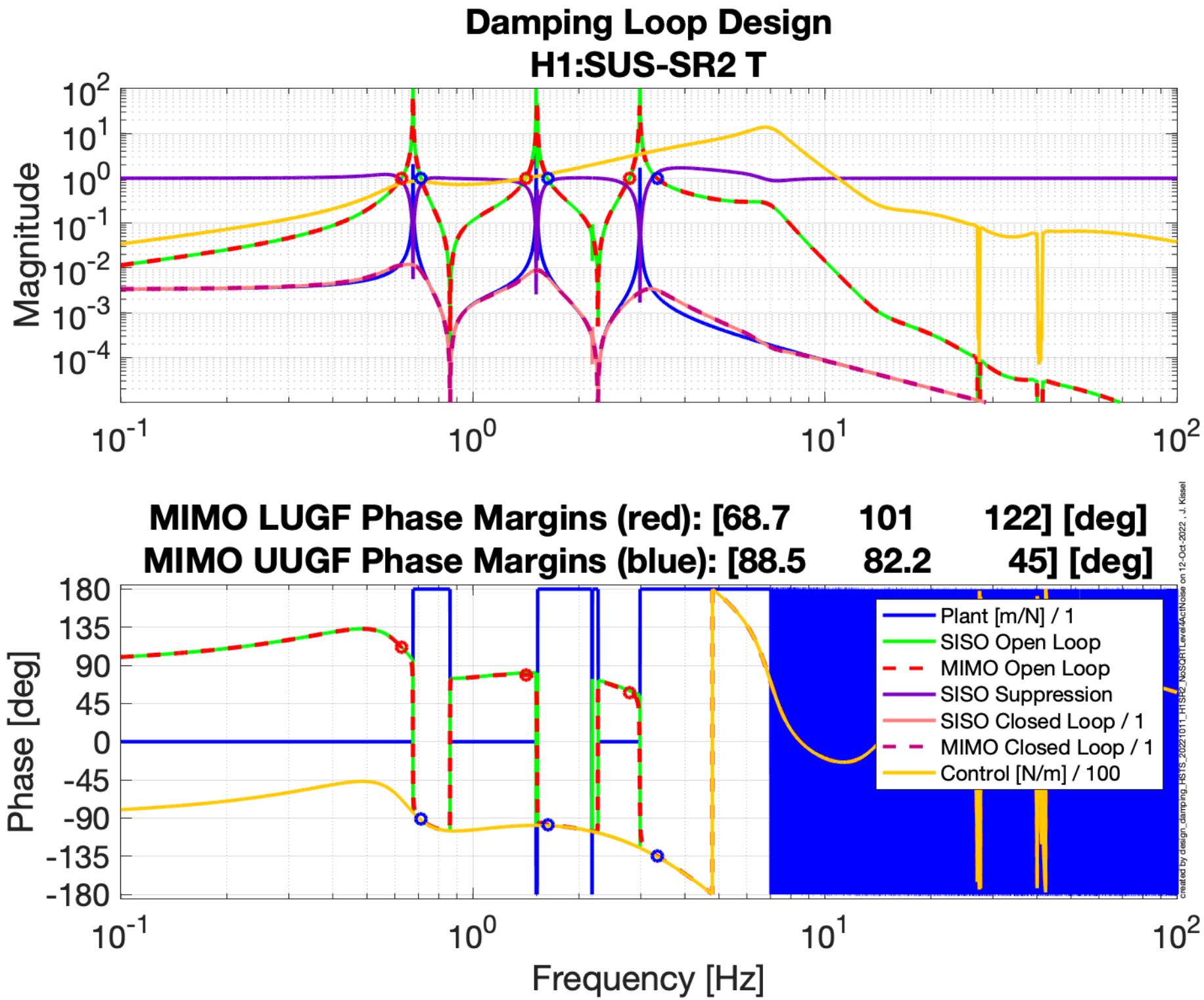

Projected M1 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, L Optic Displacement
Displacement [m/rtHz]
Frequency [Hz]
M1 L to M3 L
M1 T to M3 L
M1 V to M3 L
M1 R to M3 L
M1 P to M3 L
M1 Y to M3 L
M1 Total L
DAC Noise: 18bit, 300e-9*sqrt((50./f).^2 + 1) V/rtHz
Driver Type: TOP, State: lp
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

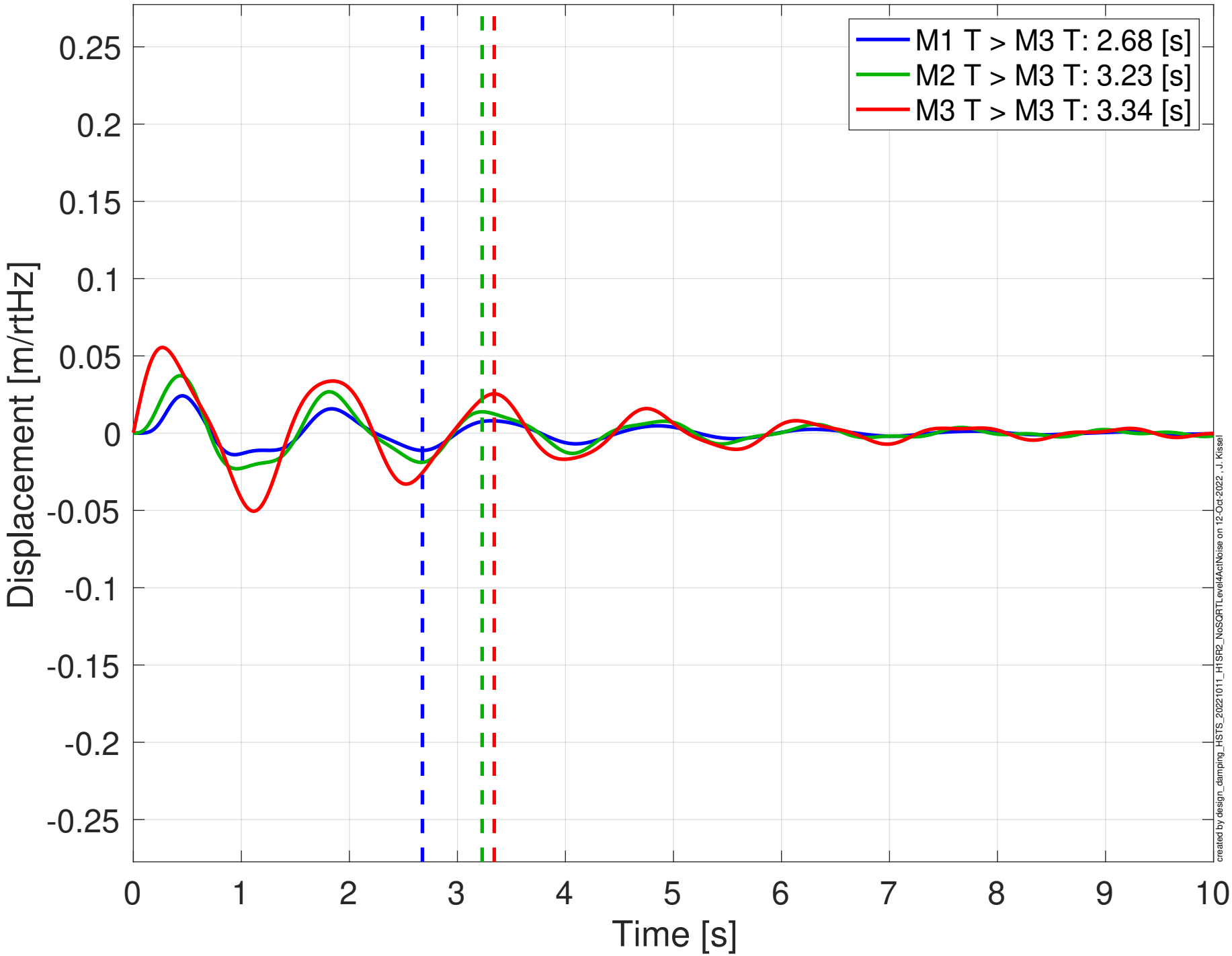

Projected M2 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, L Optic Displacement
M2 L to M3 L
M2 T to M3 L
M2 V to M3 L
M2 R to M3 L
M2 P to M3 L
M2 Y to M3 L
M2 Total L
Displacement [m/rtHz]
Frequency [Hz]
DAC Noise: 20bit, 200e-9*sqrt((50./f).^(3/2) + 1) V/rtHz
Driver Type: MOD TACQ, State: acqOfflpOn
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

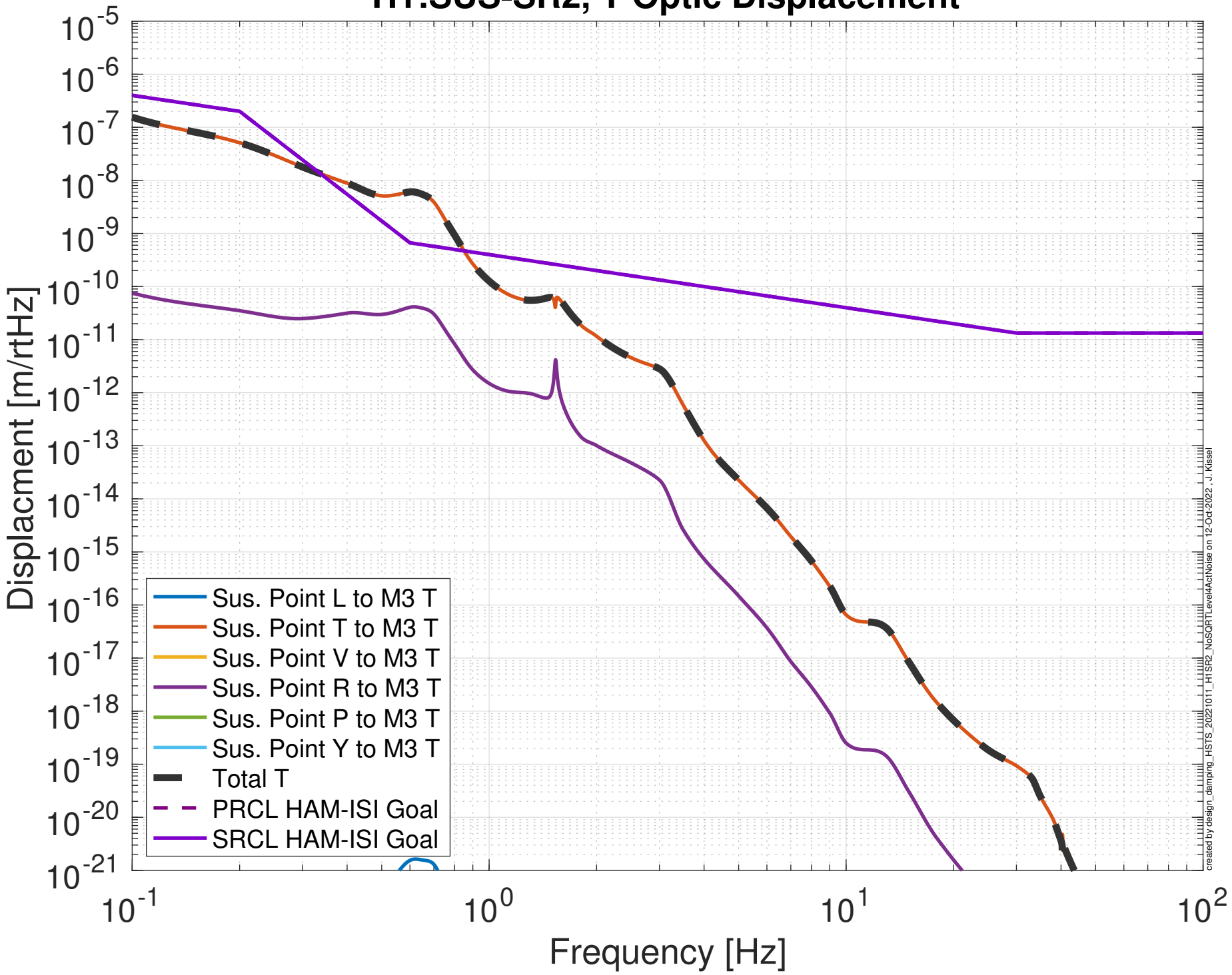

Projected M3 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, L Optic Displacement
M3 L to M3 L
M3 T to M3 L
M3 V to M3 L
M3 R to M3 L
M3 P to M3 L
M3 Y to M3 L
M3 Total L
Displacement [m/rtHz]
Frequency [Hz]
DAC Noise: 20bit, 200e-9*sqrt((50./f).^(3/2) + 1) V/rtHz
Driver Type: MOD TACQ, State: acqOfflpOn
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

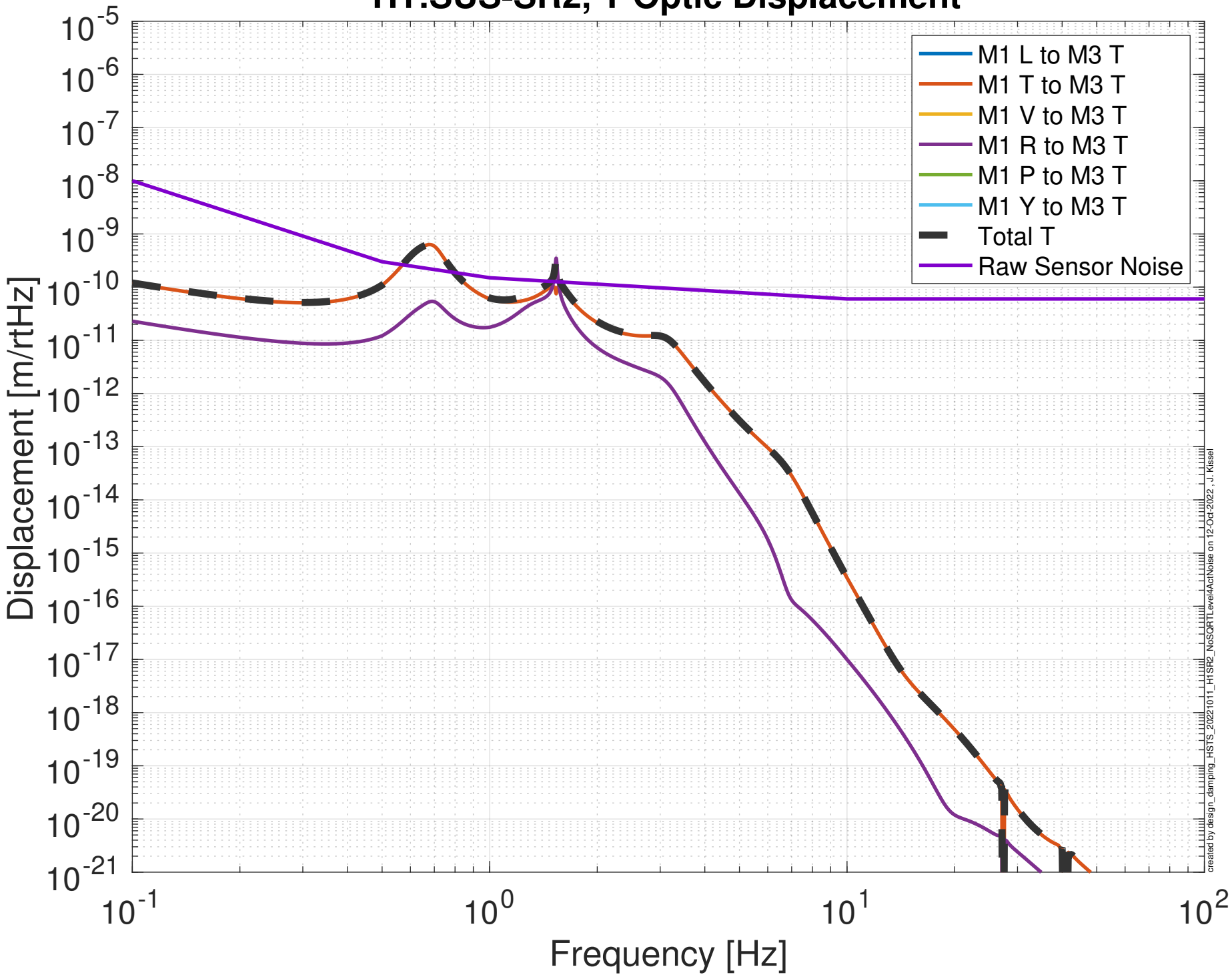
Damping Loop Performance
H1:SUS-SR2 L Optic Displacement

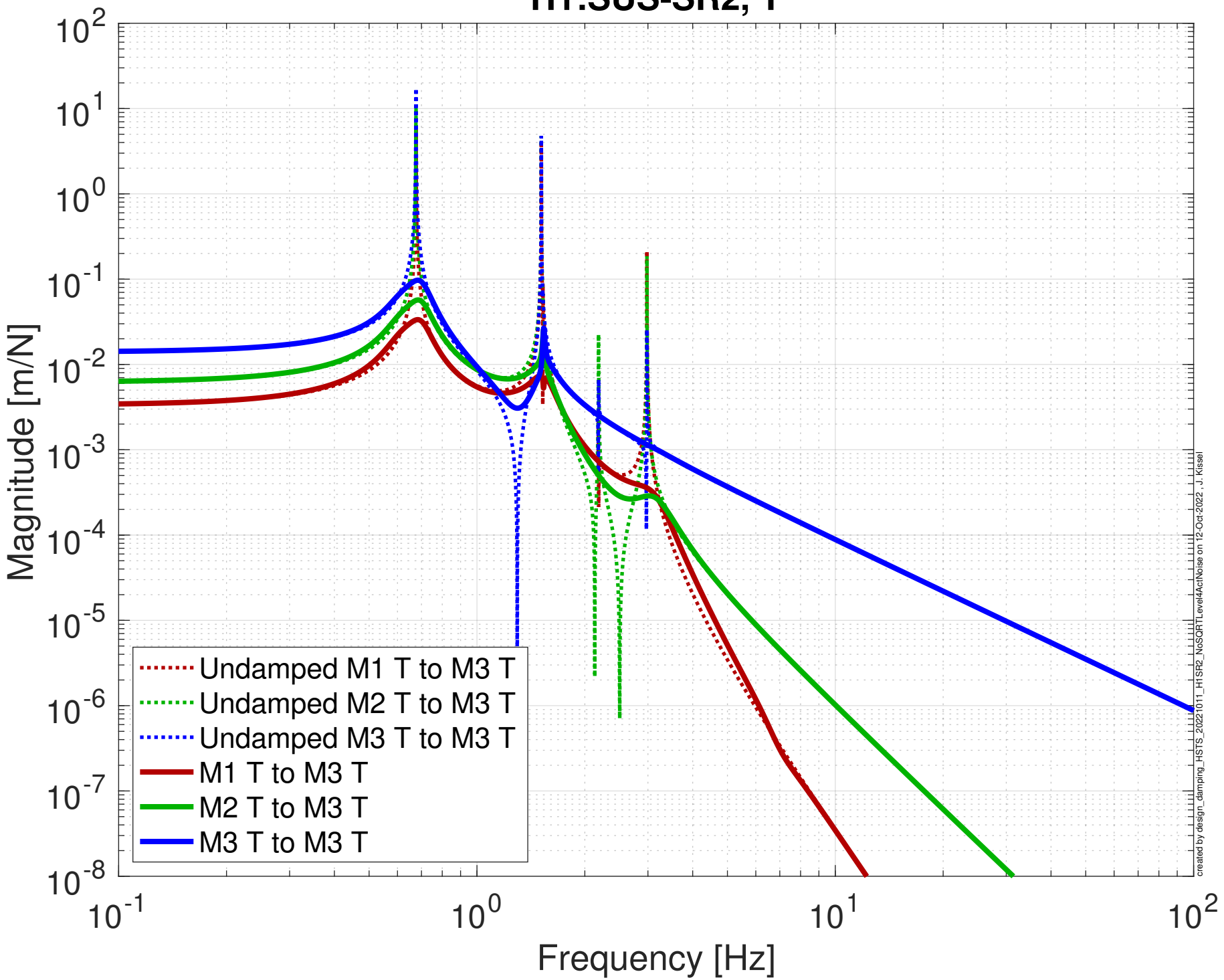


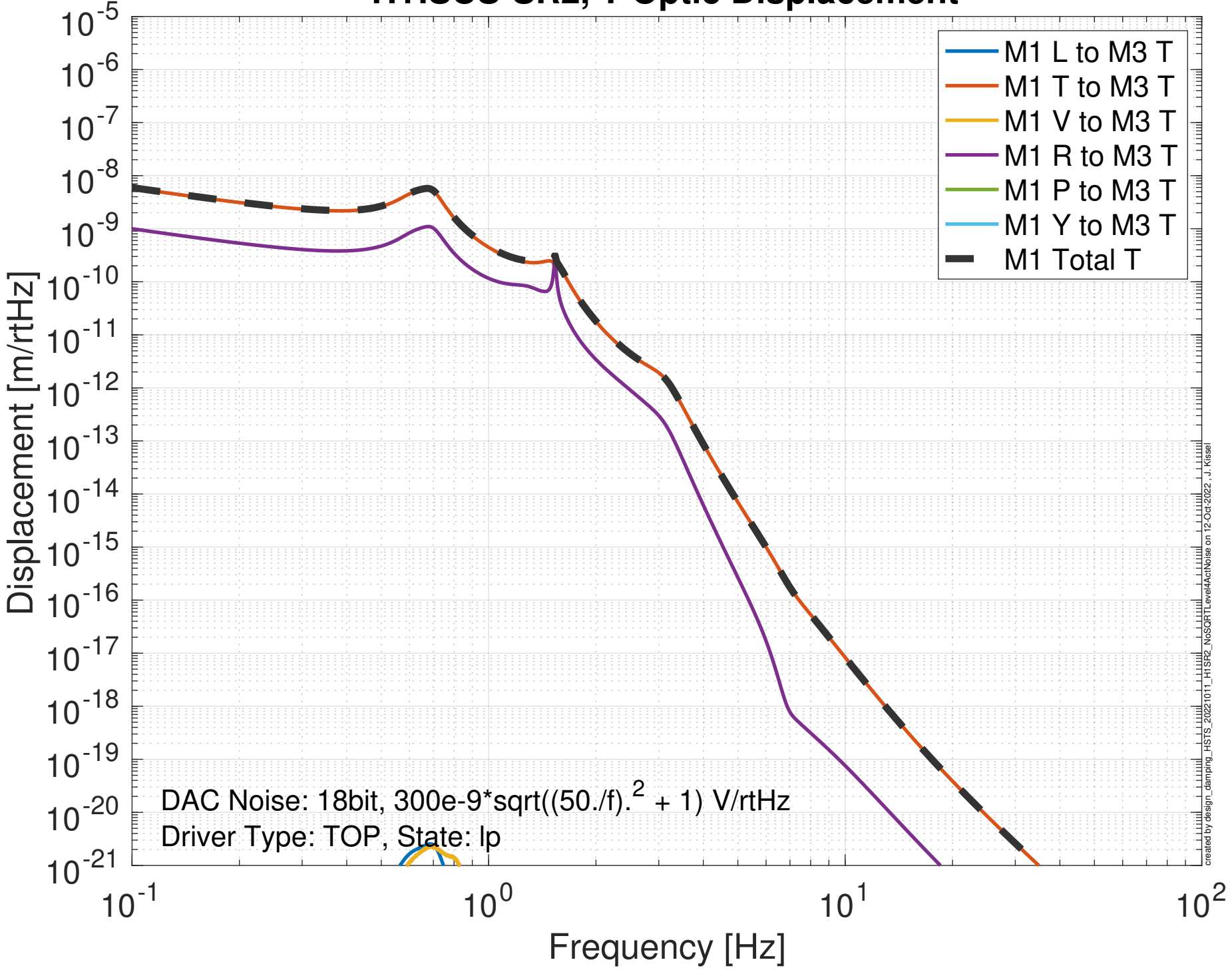

Damping Loop Design
H1:SUS-SR2 T
Magnitude
MIMO LUGF Phase Margins (red): [68.7 101 122] [deg]
MIMO UUGF Phase Margins (blue): [88.5 82.2 45] [deg]
Phase [deg]
Frequency [Hz]
Plant [m/N] / 1
SISO Open Loop
MIMO Open Loop
SISO Suppression
SISO Closed Loop / 1
MIMO Closed Loop / 1
Control [N/m] / 100
created by design_damping_HSTS_20221011_H1SR2_NoSQR1Level4ActNoise on 12-Oct-2022 , J. Kissel


Damped Impulse Response
H1:SUS-SR2 T
M1 T > M3 T: 2.68 [s]
M2 T > M3 T: 3.23 [s]
M3 T > M3 T: 3.34 [s]
Displacement [m/rtHz]
Time [s]
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
0
1
2
3
4
5
6
7
8
9
10
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

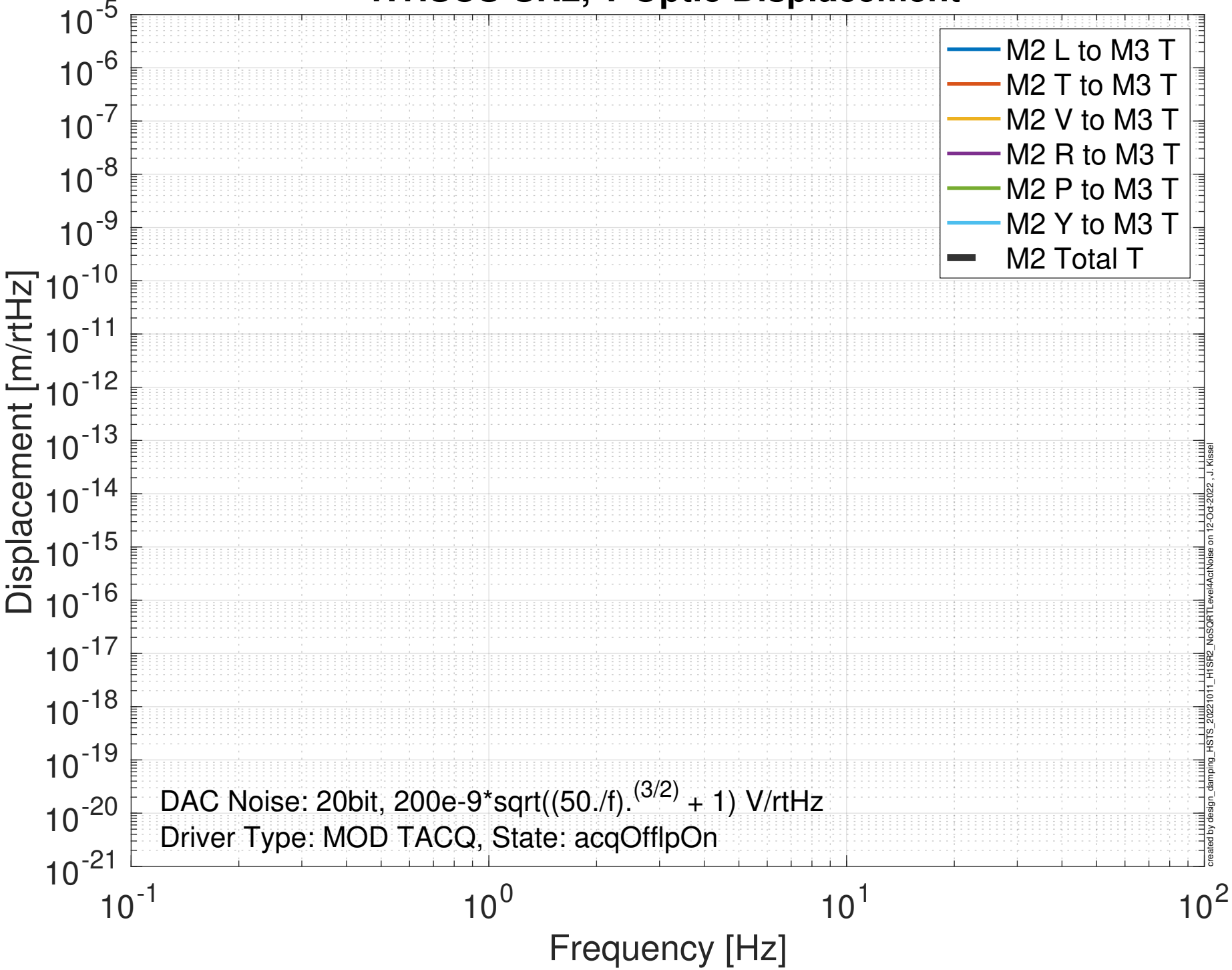

Projected Sus. Point > Optic Seismic Noise Budget
H1:SUS-SR2, T Optic Displacement
Displacment [m/rtHz]
Frequency [Hz]
Sus. Point L to M3 T
Sus. Point T to M3 T
Sus. Point V to M3 T
Sus. Point R to M3 T
Sus. Point P to M3 T
Sus. Point Y to M3 T
Total T
PRCL HAM-ISI Goal
SRCL HAM-ISI Goal
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AclNoise on 12-Oct-2022 , J. Kissel


Projected Top Mass Sensor > Optic Noise Budget
H1:SUS-SR2, T Optic Displacement
Displacement [m/rtHz]
Frequency [Hz]
M1 L to M3 T
M1 T to M3 T
M1 V to M3 T
M1 R to M3 T
M1 P to M3 T
M1 Y to M3 T
Total T
Raw Sensor Noise
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

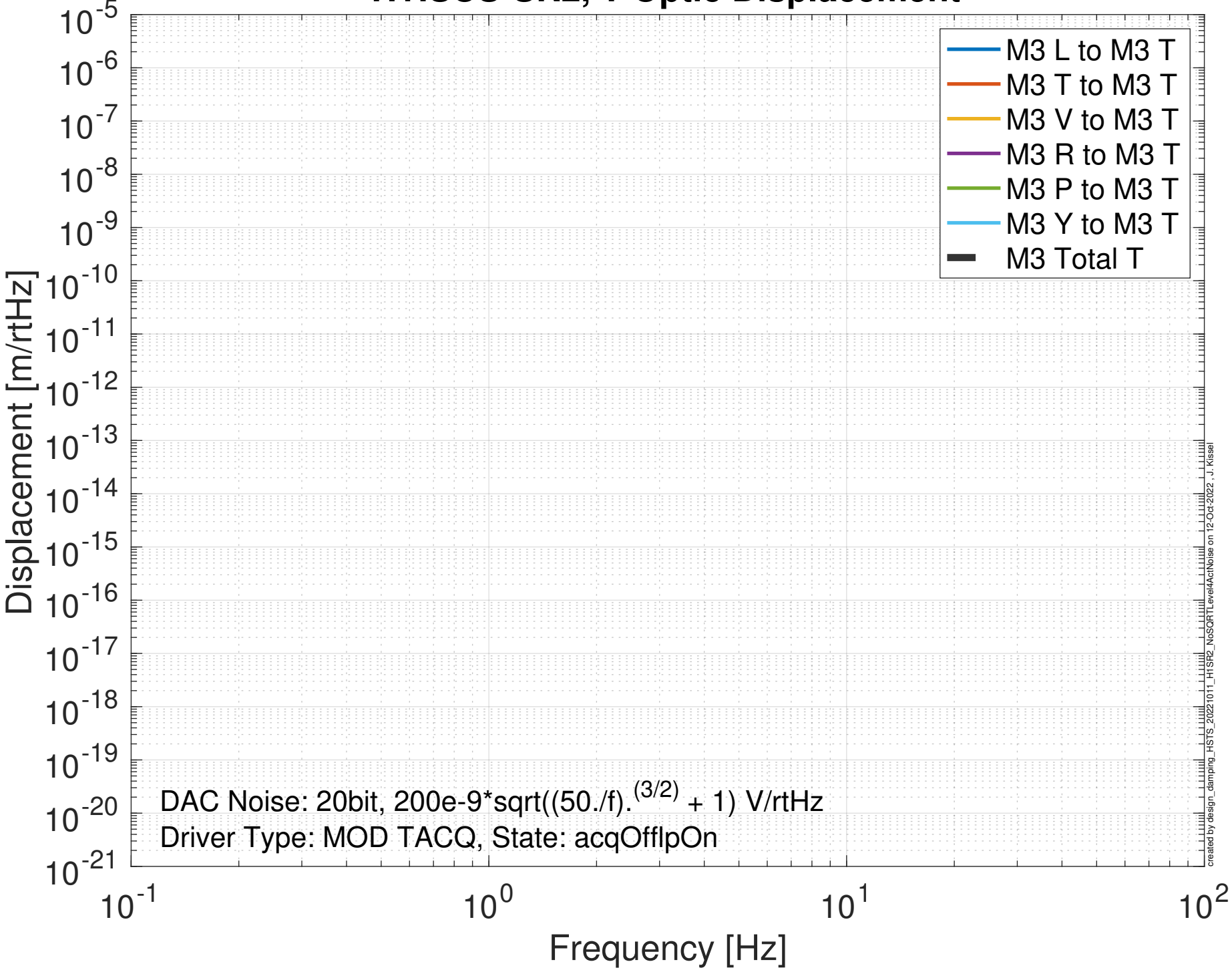

Global Control Transfer Functions to Optic
H1:SUS-SR2, T
Magnitude [m/N]
Frequency [Hz]
Undamped M1 T to M3 T
Undamped M2 T to M3 T
Undamped M3 T to M3 T
M1 T to M3 T
M2 T to M3 T
M3 T to M3 T
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel


Projected M1 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, T Optic Displacement
M1 L to M3 T
M1 T to M3 T
M1 V to M3 T
M1 R to M3 T
M1 P to M3 T
M1 Y to M3 T
M1 Total T
DAC Noise: 18bit, 300e-9*sqrt((50./f).^2 + 1) V/rtHz
Driver Type: TOP, State: lp
Displacement [m/rtHz]
Frequency [Hz]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

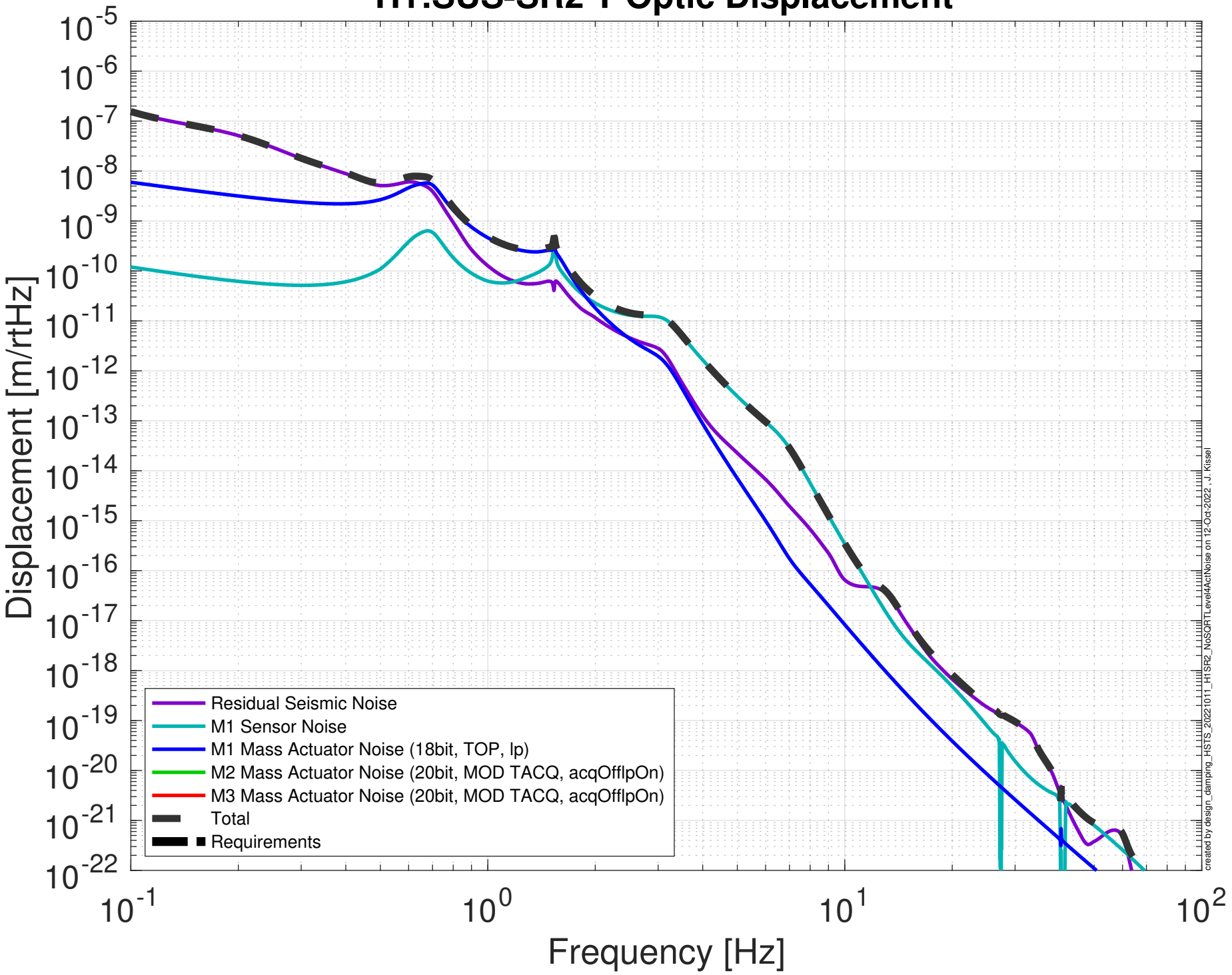
Projected M2 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, T Optic Displacement

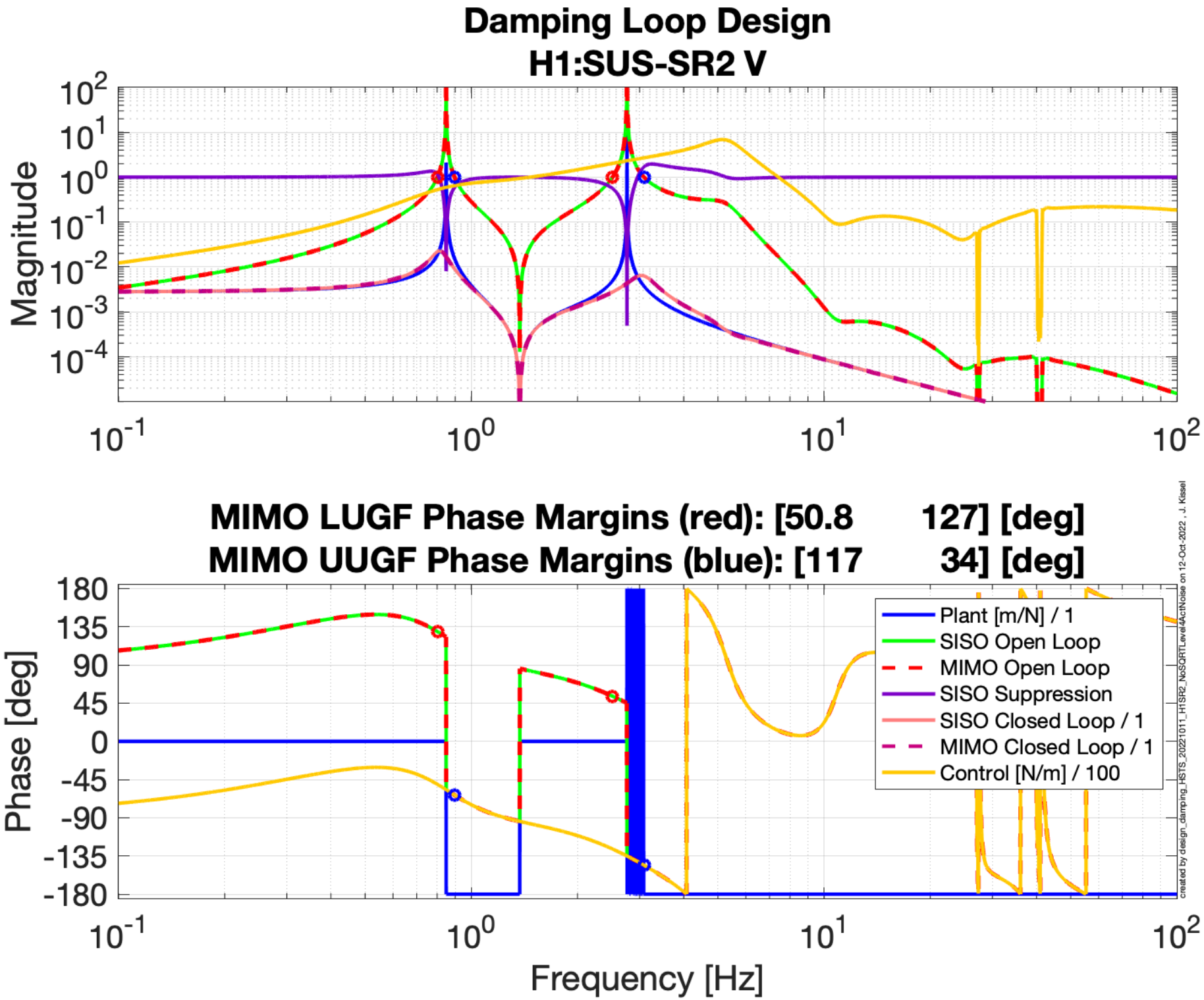


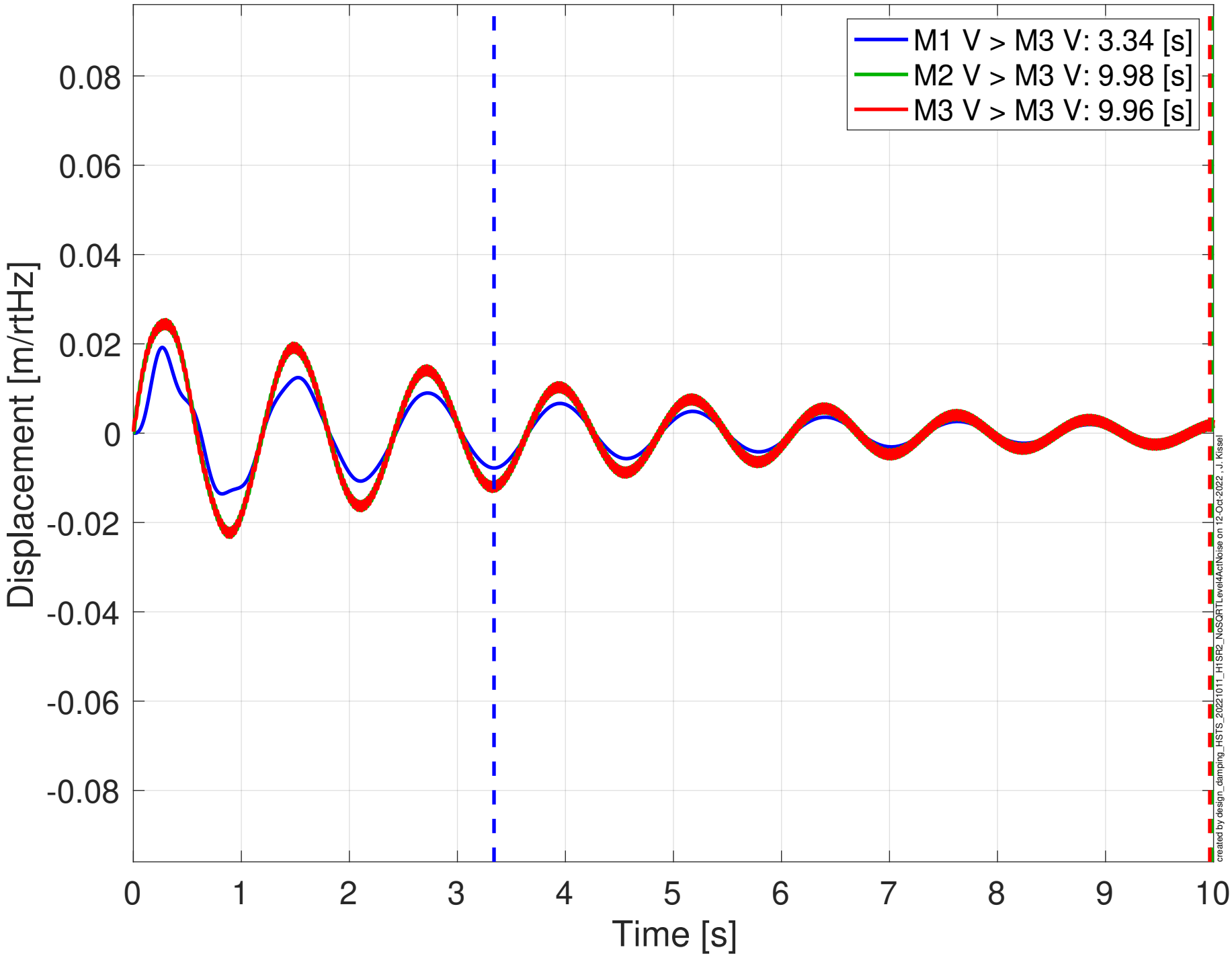
Projected M3 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, T Optic Displacement

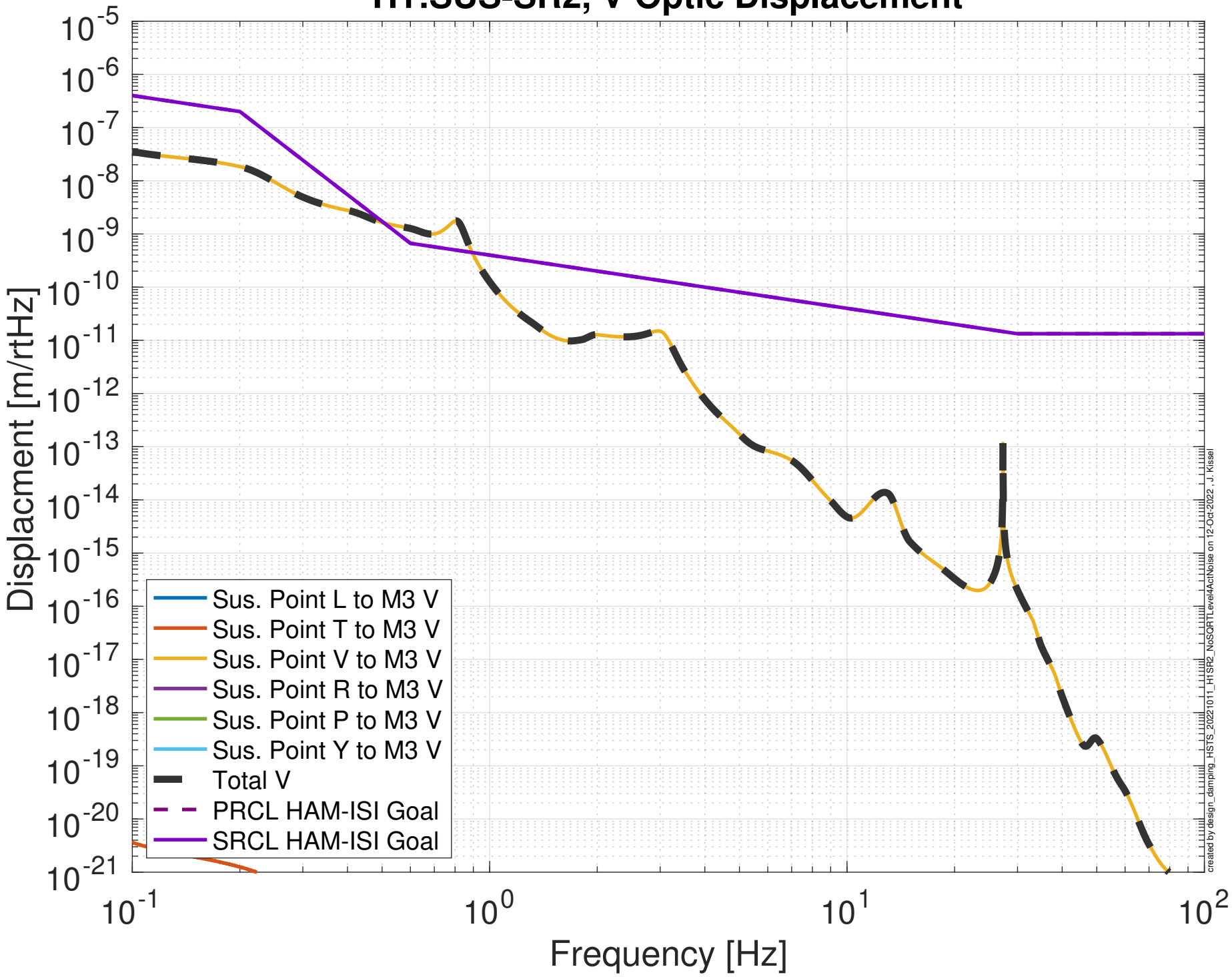


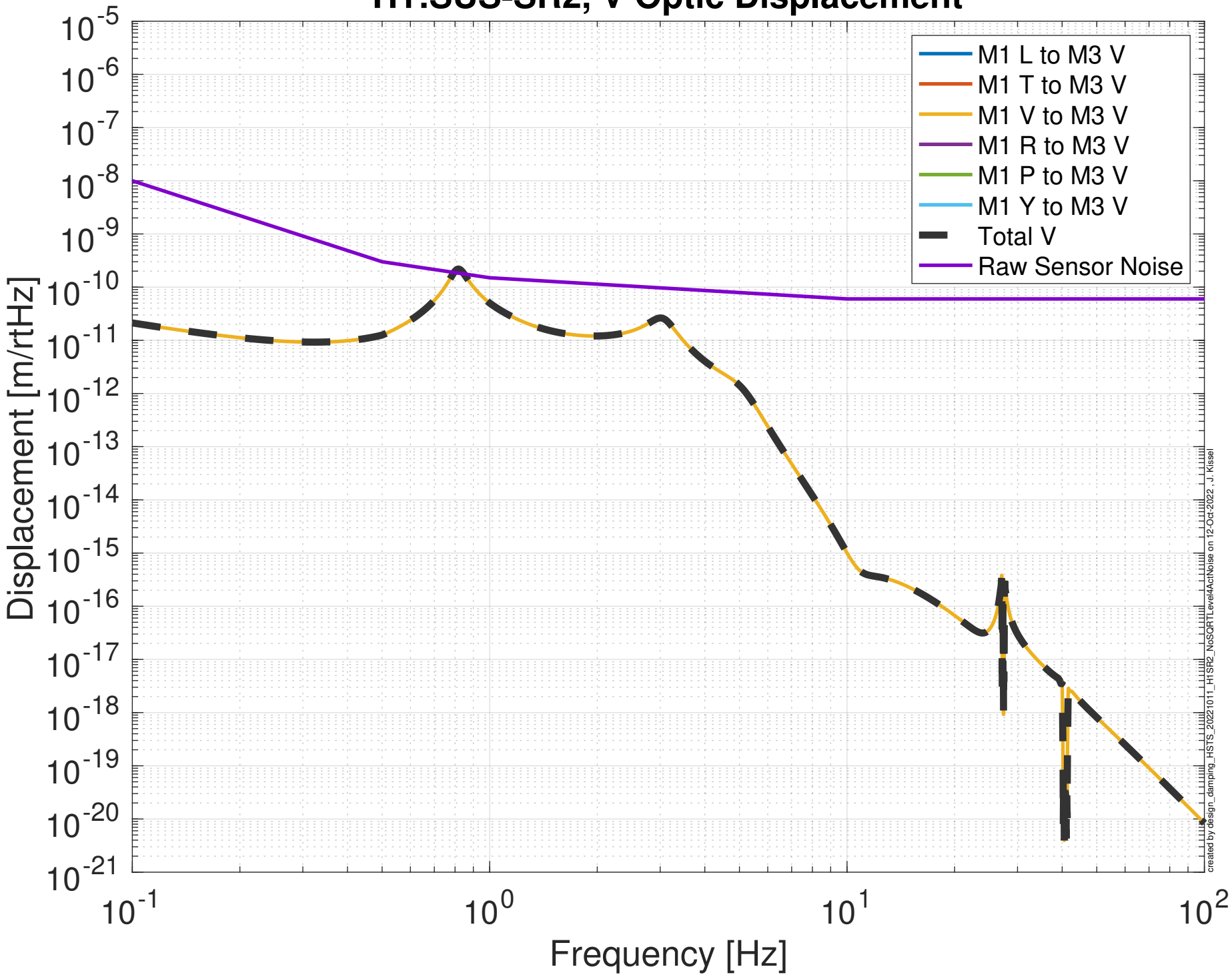
Damping Loop Performance
H1:SUS-SR2 T Optic Displacement

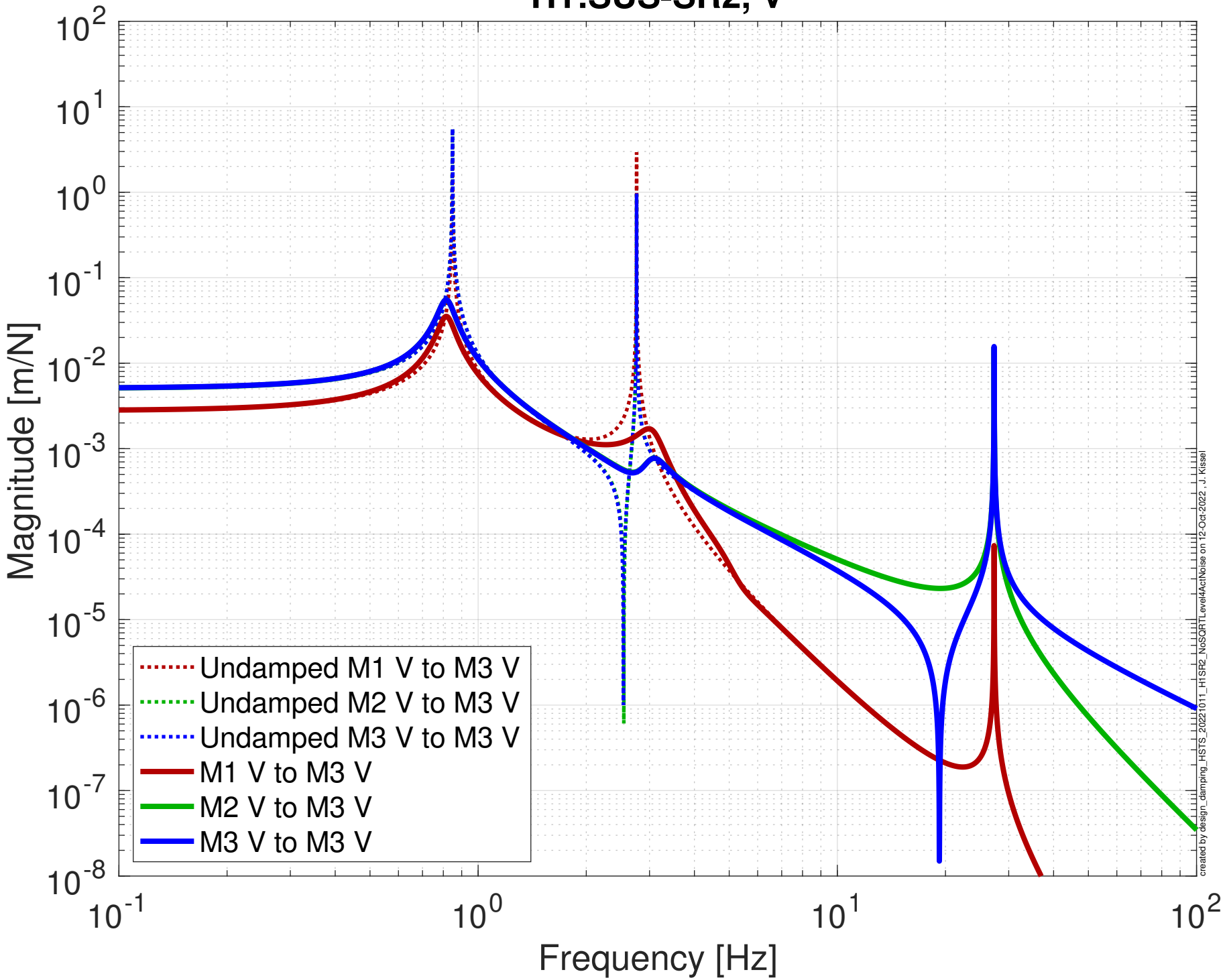


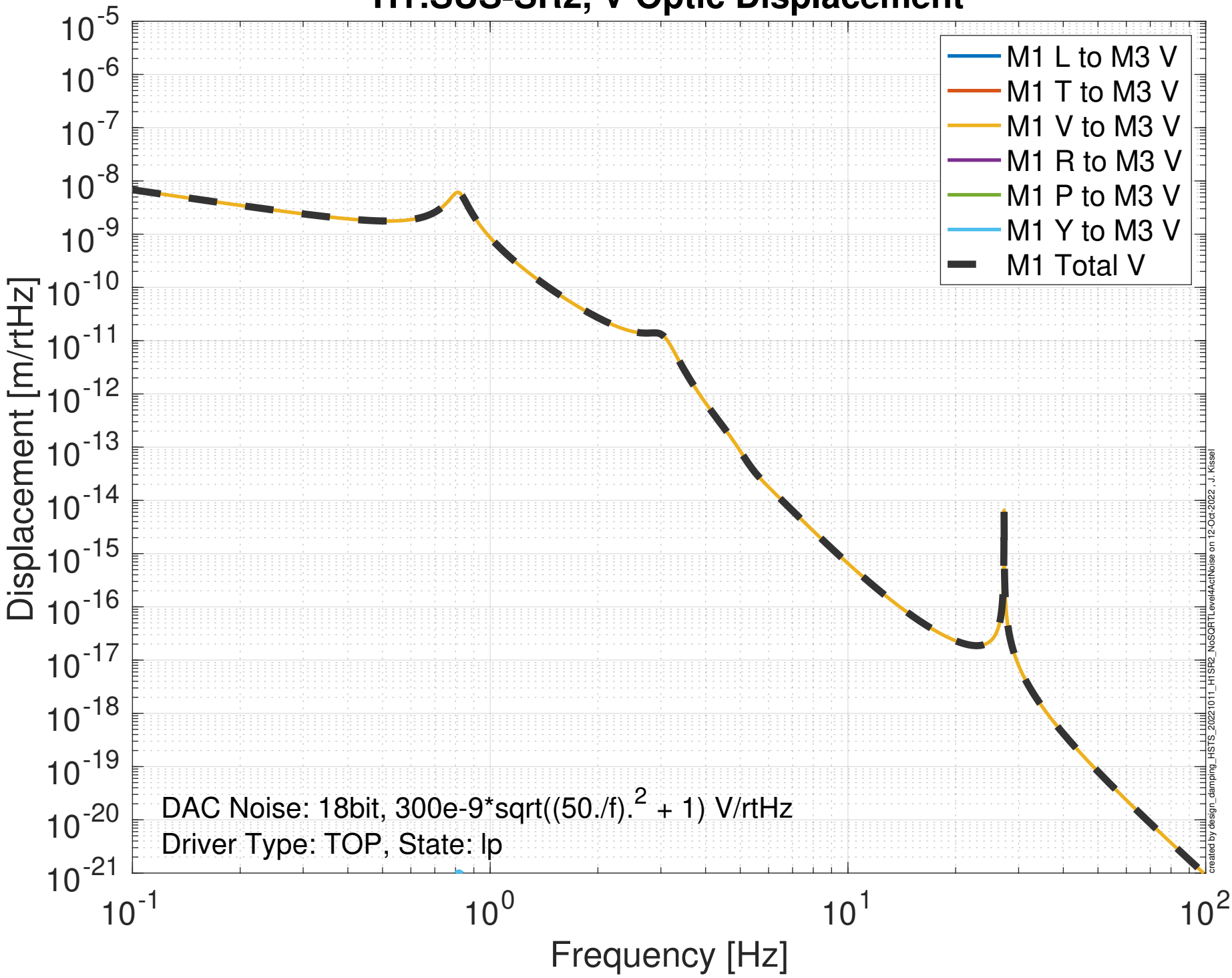

Damping Loop Design
H1:SUS-SR2 V
Magnitude
MIMO LUGF Phase Margins (red): [50.8 127] [deg]
MIMO UUGF Phase Margins (blue): [117 34] [deg]
Phase [deg]
Frequency [Hz]
Plant [m/N] / 1
SISO Open Loop
MIMO Open Loop
SISO Suppression
SISO Closed Loop / 1
MIMO Closed Loop / 1
Control [N/m] / 100
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

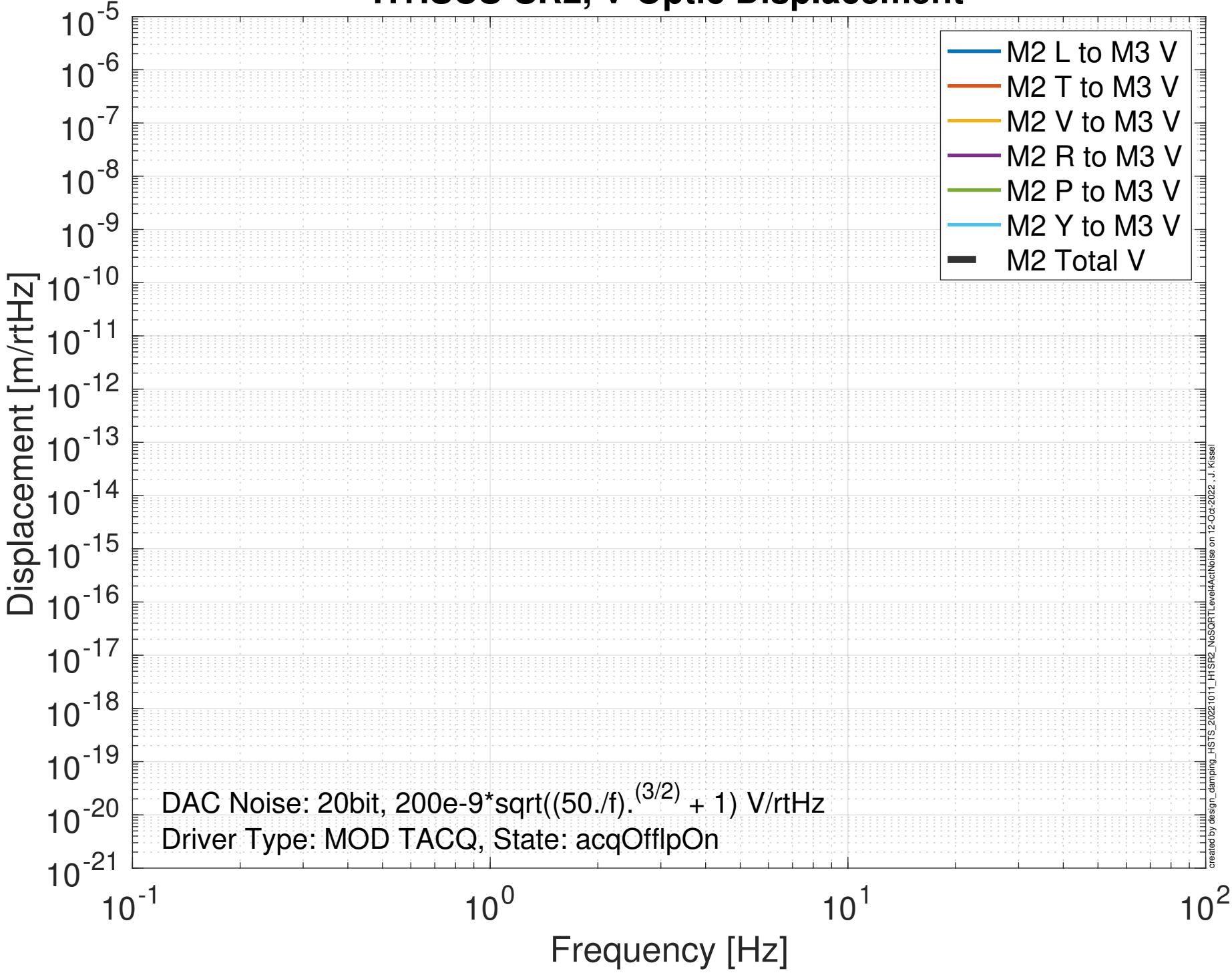

Damped Impulse Response
H1:SUS-SR2 V
M1 V > M3 V: 3.34 [s]
M2 V > M3 V: 9.98 [s]
M3 V > M3 V: 9.96 [s]
Displacement [m/rtHz]
0.08
0.06
0.04
0.02
0
-0.02
-0.04
-0.06
-0.08
0
1
2
3
4
5
6
7
8
9
10
Time [s]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel


Projected Sus. Point > Optic Seismic Noise Budget
H1:SUS-SR2, V Optic Displacement
Displacment [m/rtHz]
Frequency [Hz]
Sus. Point L to M3 V
Sus. Point T to M3 V
Sus. Point V to M3 V
Sus. Point R to M3 V
Sus. Point P to M3 V
Sus. Point Y to M3 V
Total V
PRCL HAM-ISI Goal
SRCL HAM-ISI Goal
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AclNoise on 12-Oct-2022 , J. Kissel

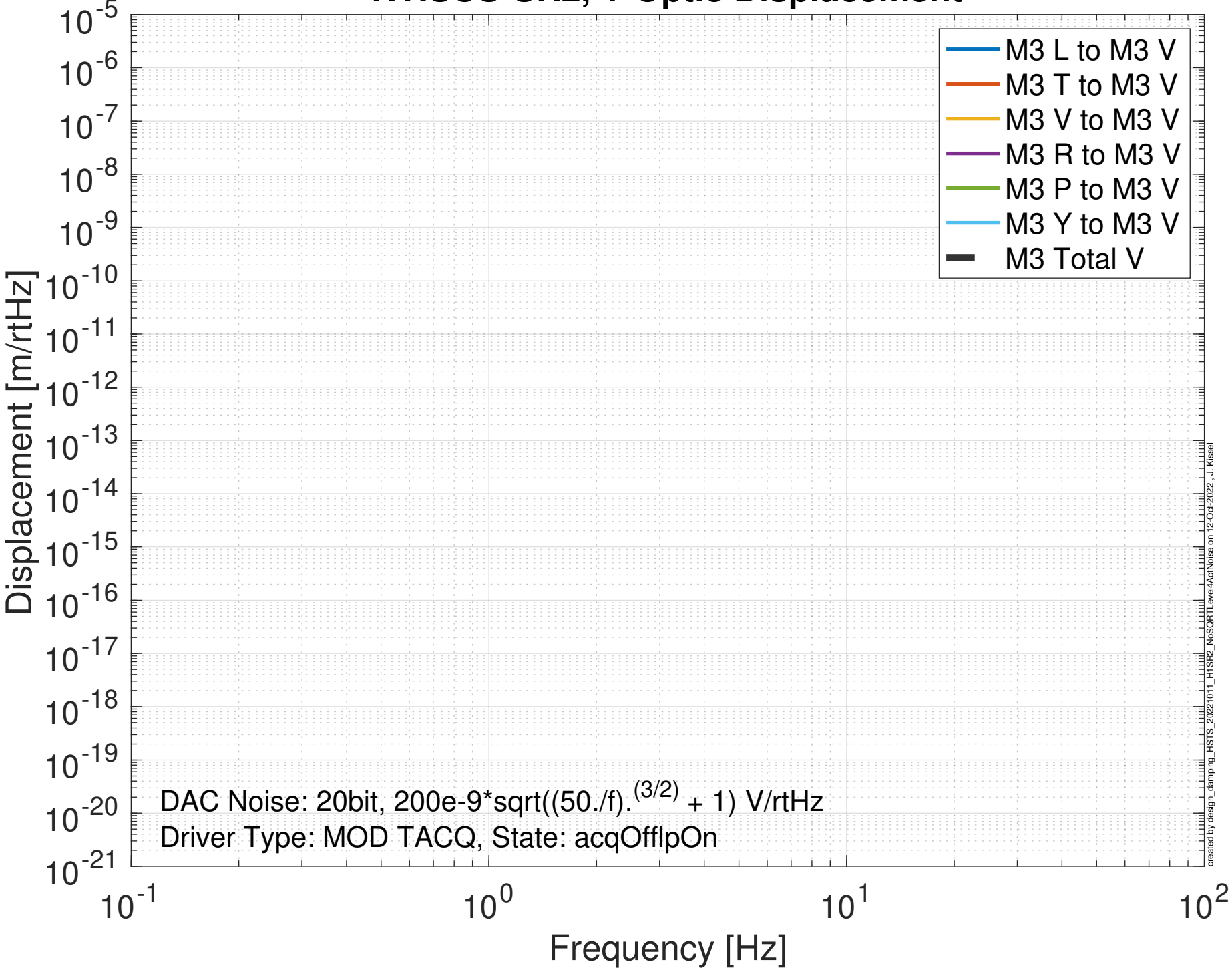

Projected Top Mass Sensor > Optic Noise Budget
H1:SUS-SR2, V Optic Displacement
M1 L to M3 V
M1 T to M3 V
M1 V to M3 V
M1 R to M3 V
M1 P to M3 V
M1 Y to M3 V
Total V
Raw Sensor Noise
Displacement [m/rtHz]
Frequency [Hz]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

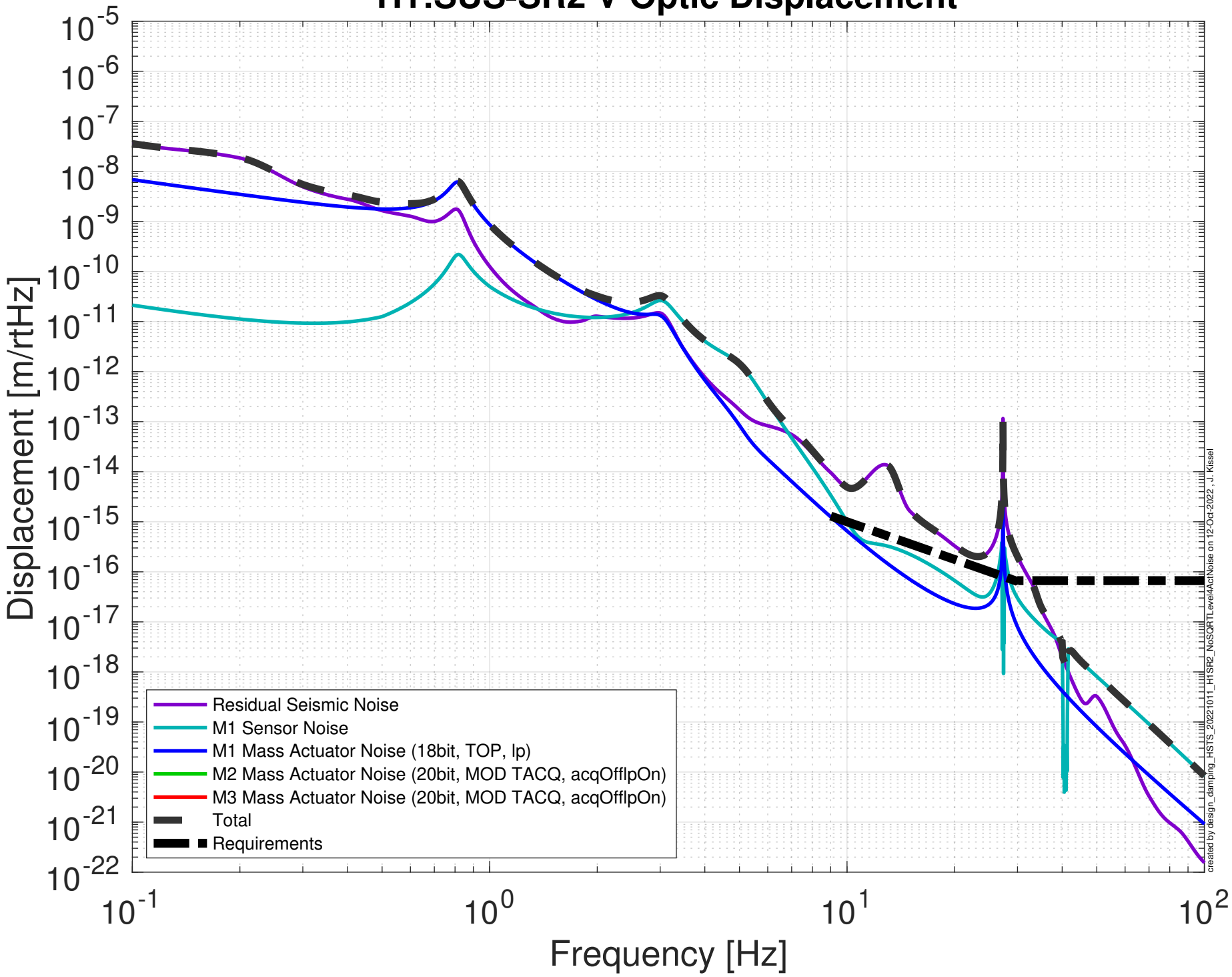

Global Control Transfer Functions to Optic
H1:SUS-SR2, V
Magnitude [m/N]
Frequency [Hz]
Undamped M1 V to M3 V
Undamped M2 V to M3 V
Undamped M3 V to M3 V
M1 V to M3 V
M2 V to M3 V
M3 V to M3 V
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

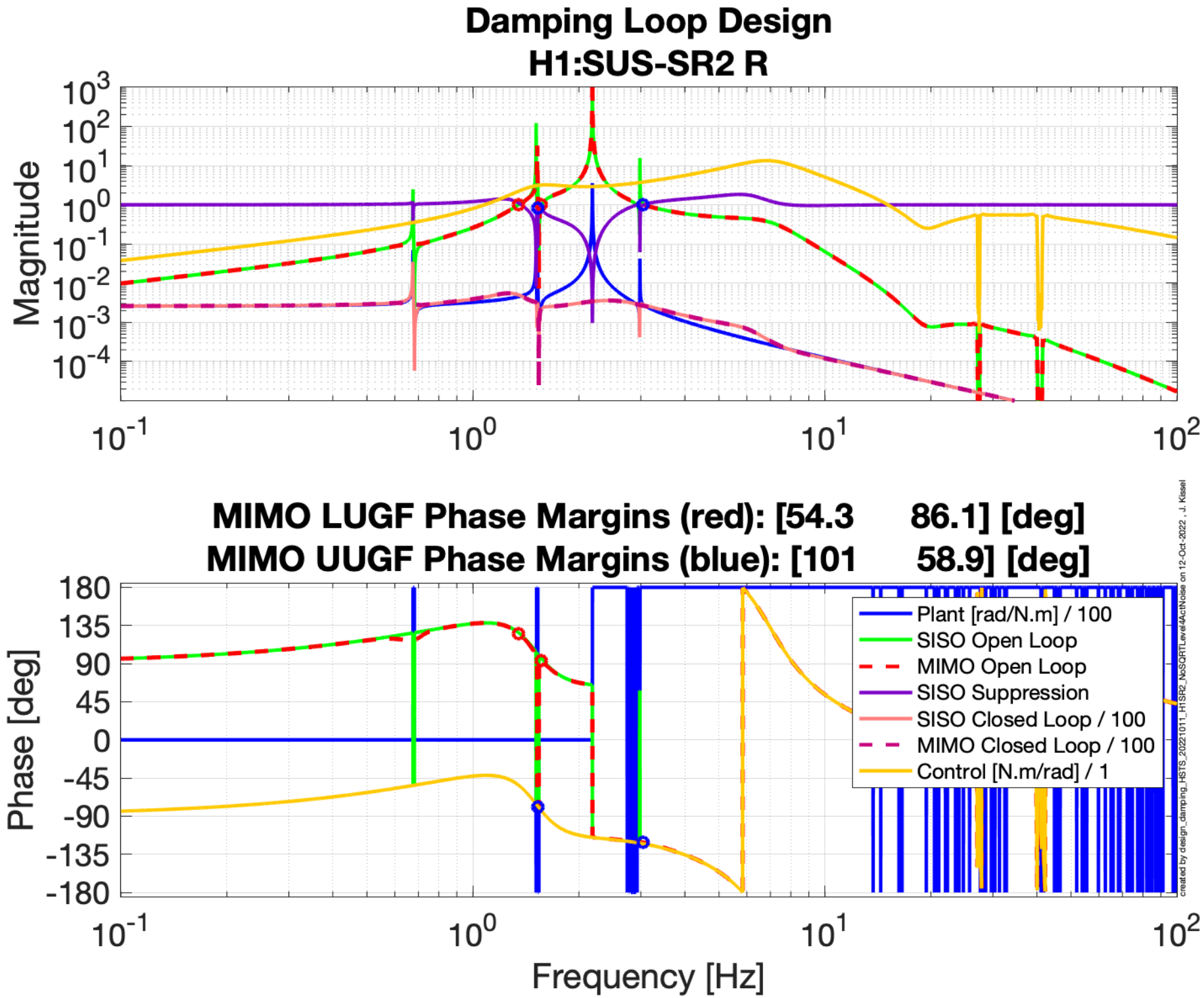

Projected M1 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, V Optic Displacement
M1 L to M3 V
M1 T to M3 V
M1 V to M3 V
M1 R to M3 V
M1 P to M3 V
M1 Y to M3 V
M1 Total V
Displacement [m/rtHz]
Frequency [Hz]
DAC Noise: 18bit, 300e-9*sqrt((50./f).^2 + 1) V/rtHz
Driver Type: TOP, State: lp
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

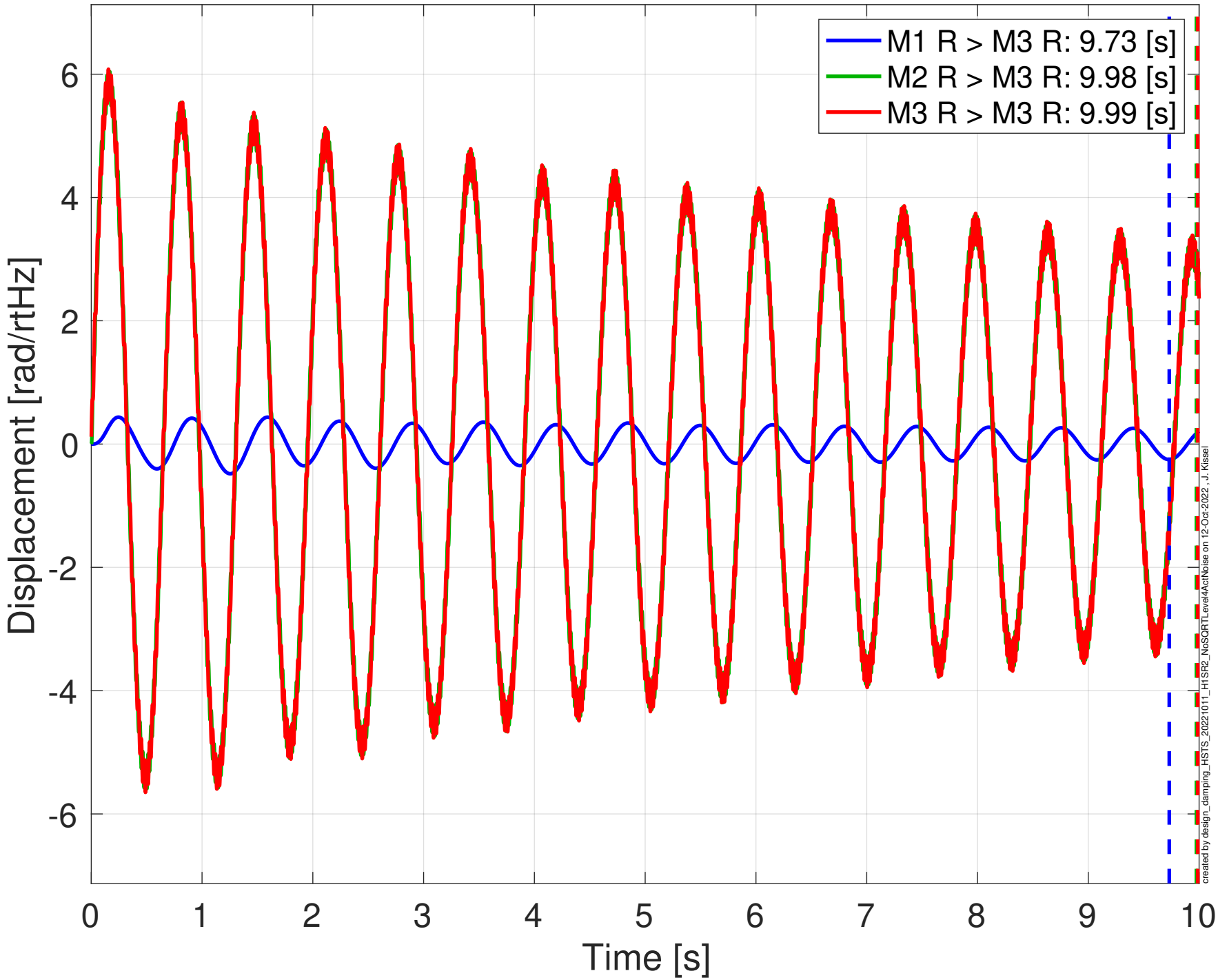

Projected M2 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, V Optic Displacement
M2 L to M3 V
M2 T to M3 V
M2 V to M3 V
M2 R to M3 V
M2 P to M3 V
M2 Y to M3 V
M2 Total V
Displacement [m/rtHz]
Frequency [Hz]
DAC Noise: 20bit, 200e-9*sqrt((50./f).^(3/2) + 1) V/rtHz
Driver Type: MOD TACQ, State: acqOfflpOn
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

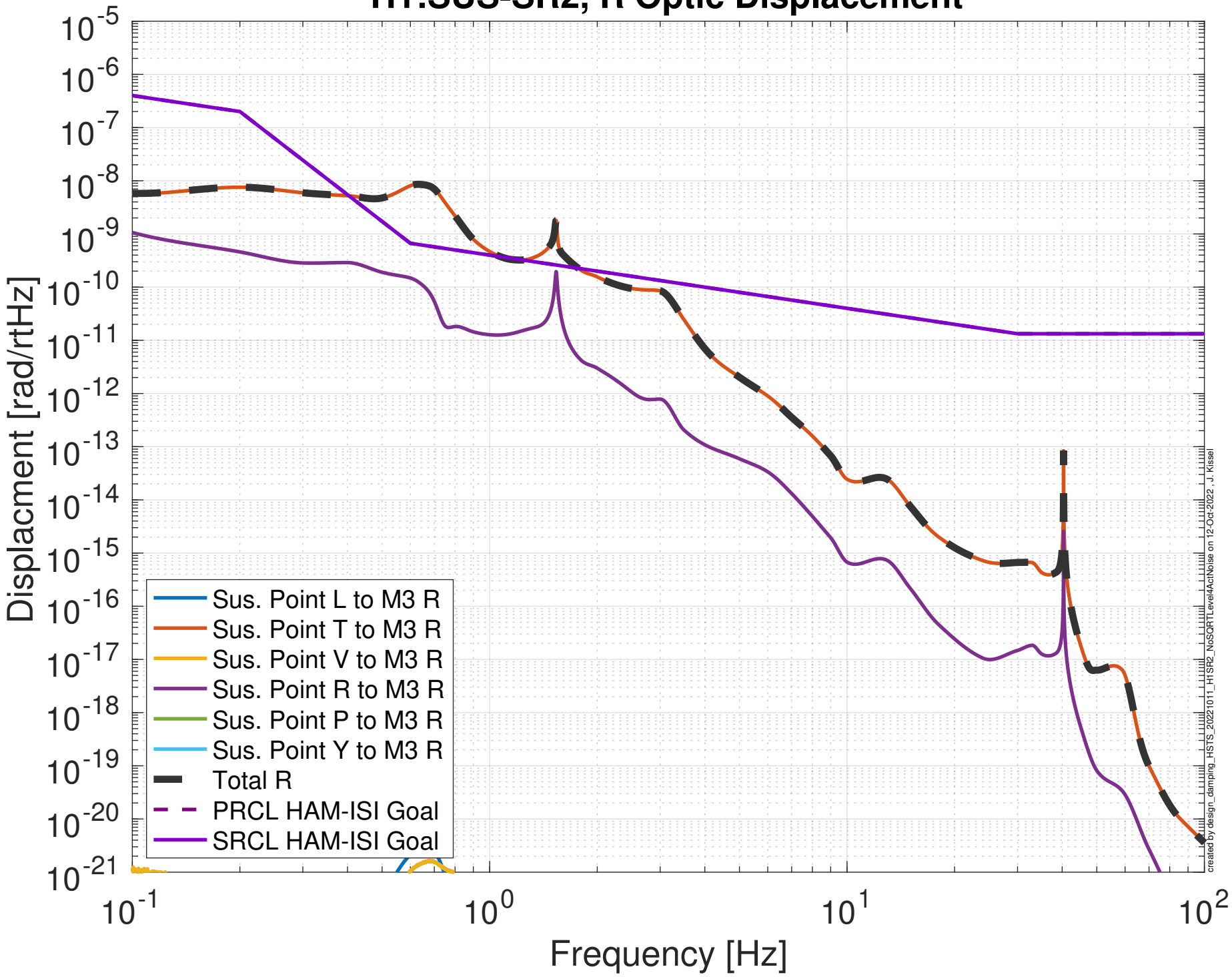
Projected M3 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, V Optic Displacement

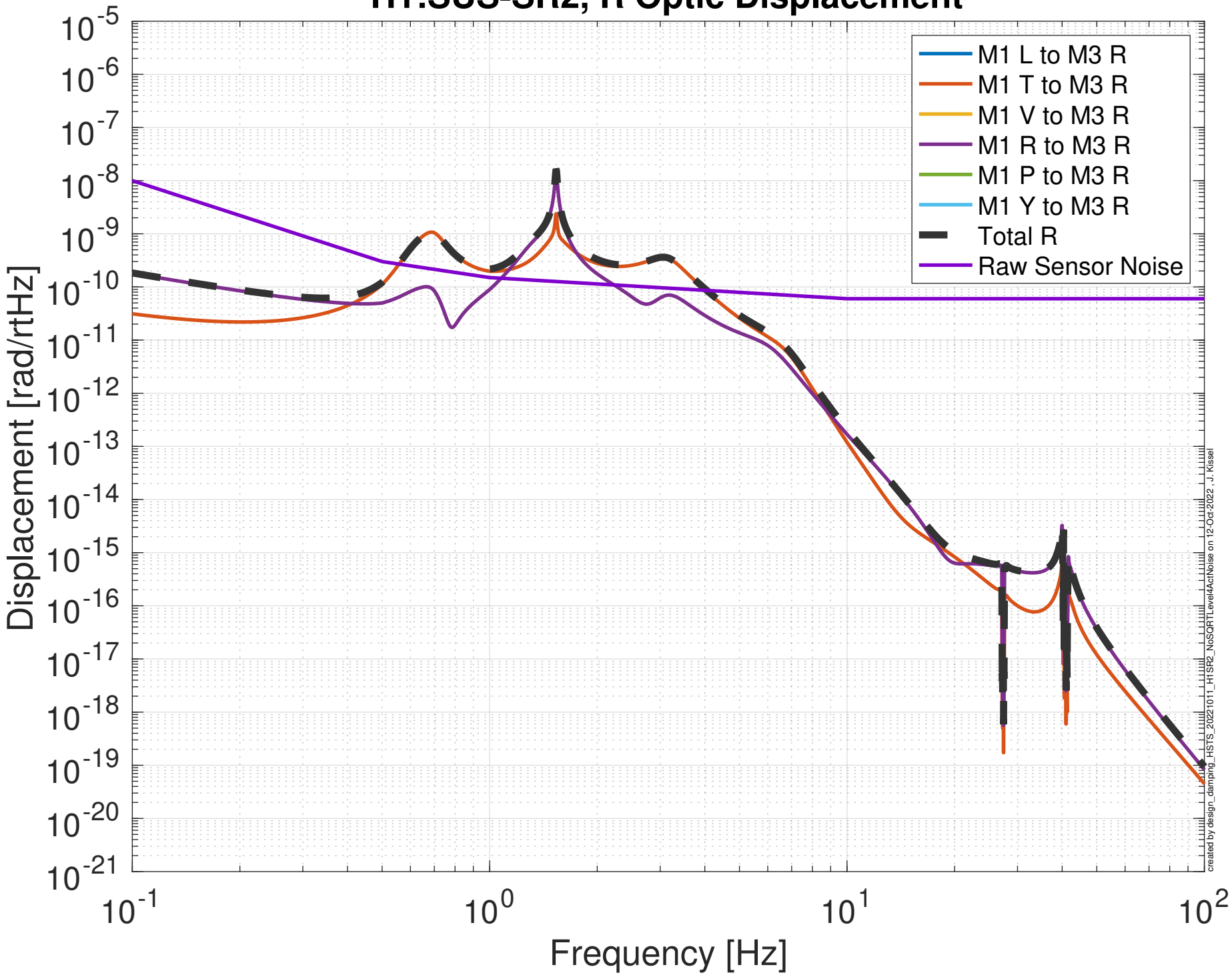


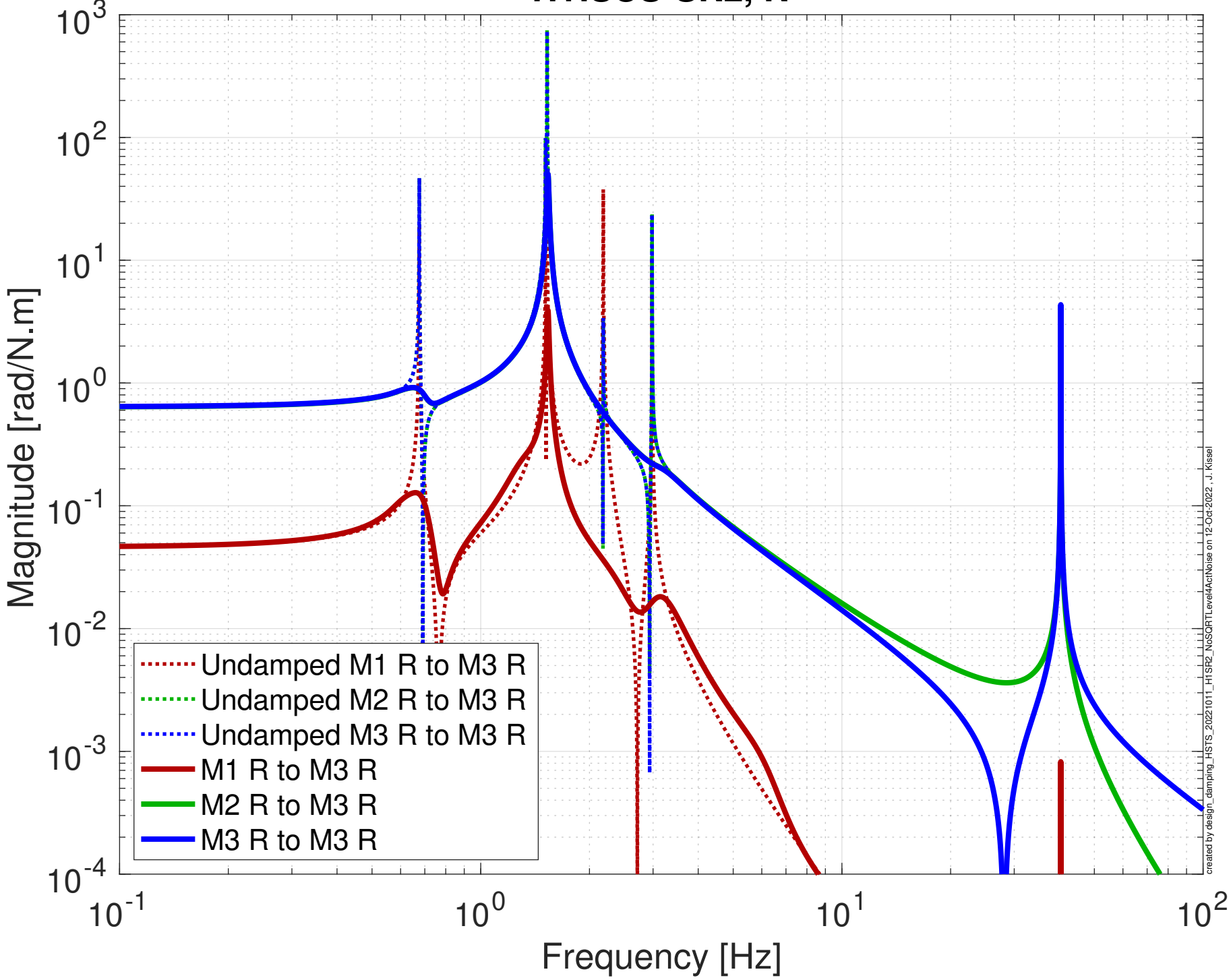

Damping Loop Performance
H1:SUS-SR2 V Optic Displacement
Displacement [m/rtHz]
Frequency [Hz]
Residual Seismic Noise
M1 Sensor Noise
M1 Mass Actuator Noise (18bit, TOP, lp)
M2 Mass Actuator Noise (20bit, MOD TACQ, acqOfflpOn)
M3 Mass Actuator Noise (20bit, MOD TACQ, acqOfflpOn)
Total
Requirements
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

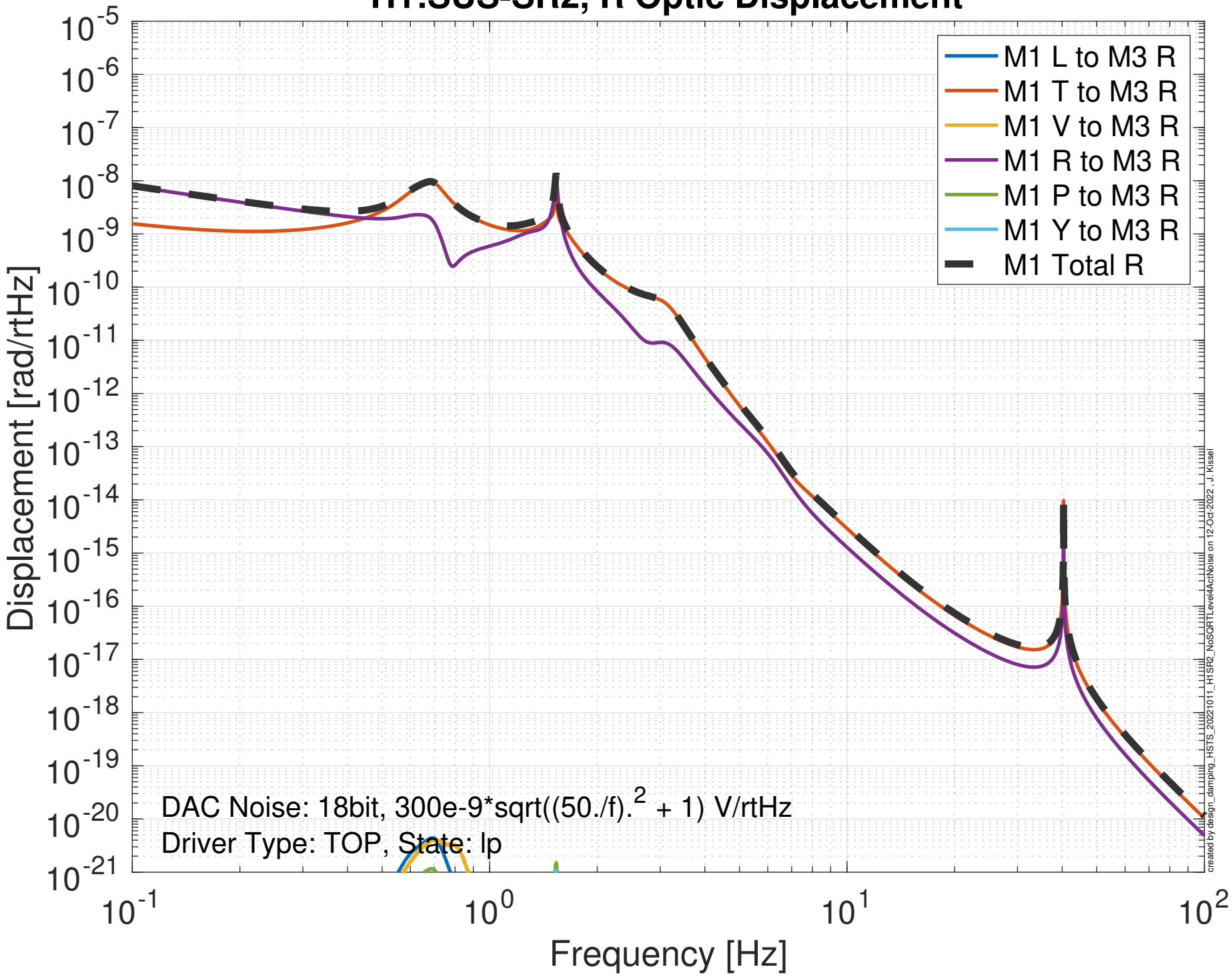

Damping Loop Design
H1:SUS-SR2 R
Magnitude
MIMO LUGF Phase Margins (red): [54.3 86.1] [deg]
MIMO UUGF Phase Margins (blue): [101 58.9] [deg]
Phase [deg]
Frequency [Hz]
Plant [rad/N.m] / 100
SISO Open Loop
MIMO Open Loop
SISO Suppression
SISO Closed Loop / 100
MIMO Closed Loop / 100
Control [N.m/rad] / 1
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel


Damped Impulse Response
H1:SUS-SR2 R
M1 R > M3 R: 9.73 [s]
M2 R > M3 R: 9.98 [s]
M3 R > M3 R: 9.99 [s]
Displacement [rad/rtHz]
Time [s]
6
4
2
0
-2
-4
-6
0
1
2
3
4
5
6
7
8
9
10
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

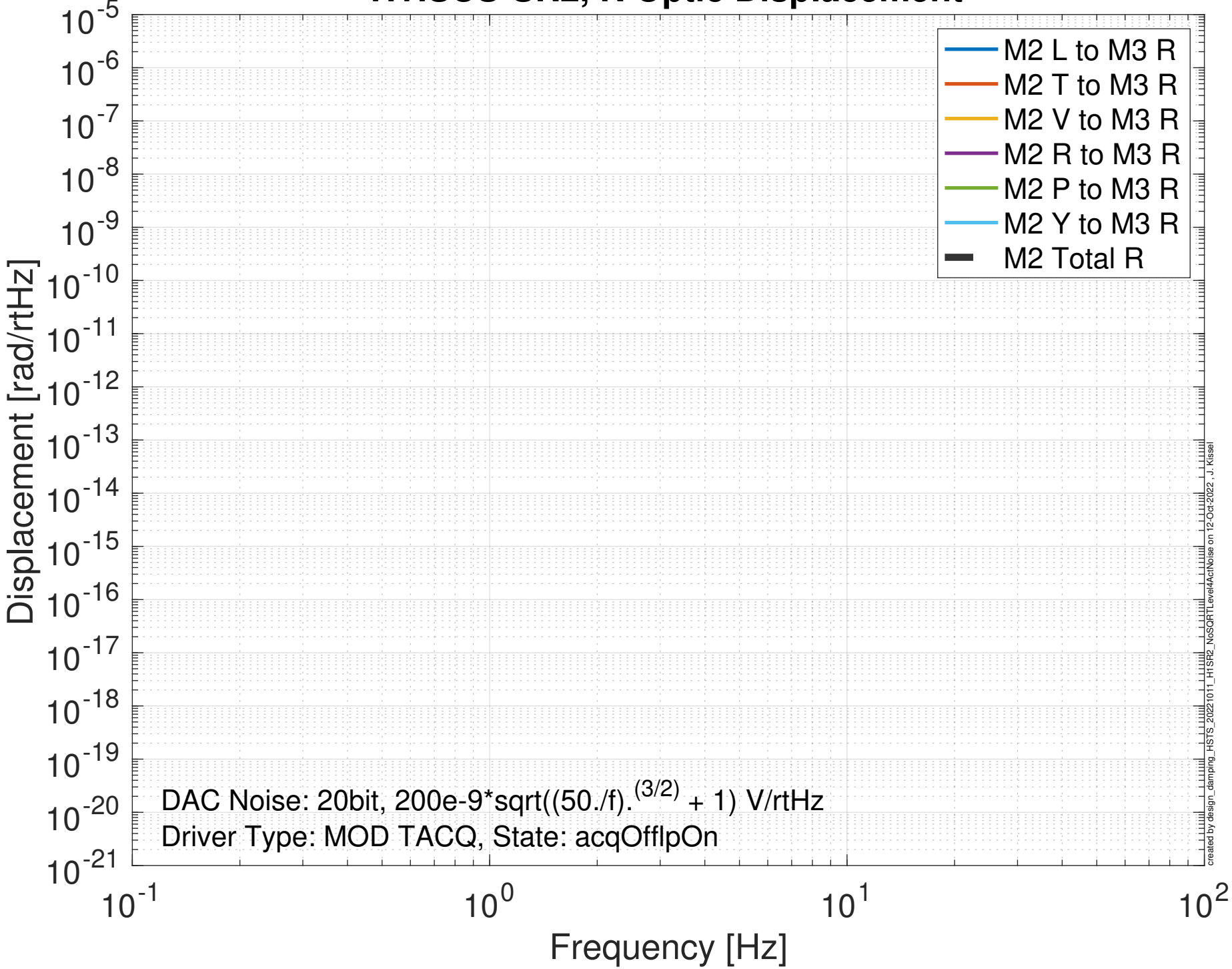

Projected Sus. Point > Optic Seismic Noise Budget
H1:SUS-SR2, R Optic Displacement
Displacment [rad/rtHz]
Frequency [Hz]
Sus. Point L to M3 R
Sus. Point T to M3 R
Sus. Point V to M3 R
Sus. Point R to M3 R
Sus. Point P to M3 R
Sus. Point Y to M3 R
Total R
PRCL HAM-ISI Goal
SRCL HAM-ISI Goal
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel


Projected Top Mass Sensor > Optic Noise Budget
H1:SUS-SR2, R Optic Displacement
Displacement [rad/rtHz]
Frequency [Hz]
M1 L to M3 R
M1 T to M3 R
M1 V to M3 R
M1 R to M3 R
M1 P to M3 R
M1 Y to M3 R
Total R
Raw Sensor Noise
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

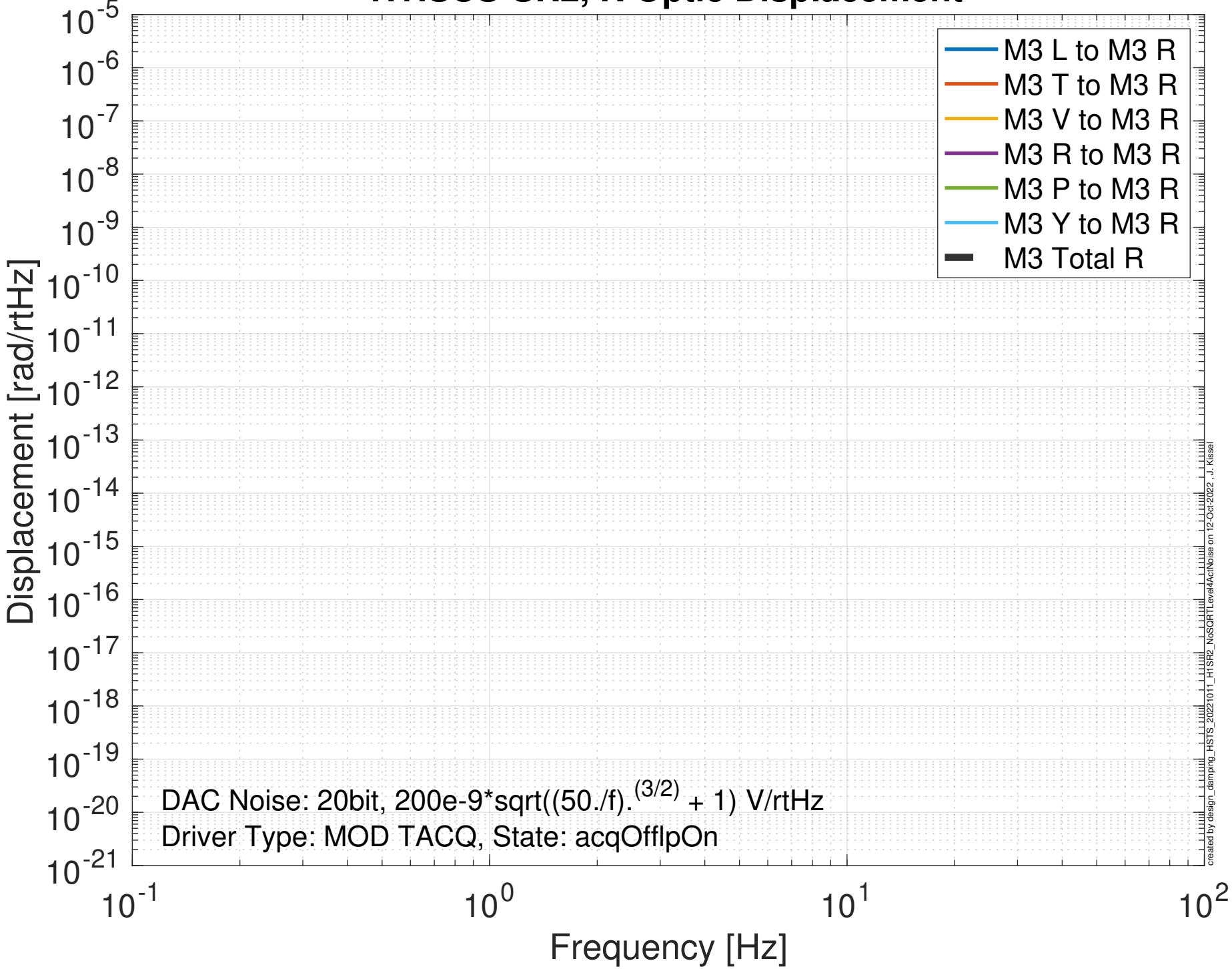

Global Control Transfer Functions to Optic
H1:SUS-SR2, R
Magnitude [rad/N.m]
Frequency [Hz]
Undamped M1 R to M3 R
Undamped M2 R to M3 R
Undamped M3 R to M3 R
M1 R to M3 R
M2 R to M3 R
M3 R to M3 R
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel


Projected M1 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, R Optic Displacement
Displacement [rad/rtHz]
Frequency [Hz]
M1 L to M3 R
M1 T to M3 R
M1 V to M3 R
M1 R to M3 R
M1 P to M3 R
M1 Y to M3 R
M1 Total R
DAC Noise: 18bit, 300e-9*sqrt((50./f).^2 + 1) V/rtHz
Driver Type: TOP, State: lp
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

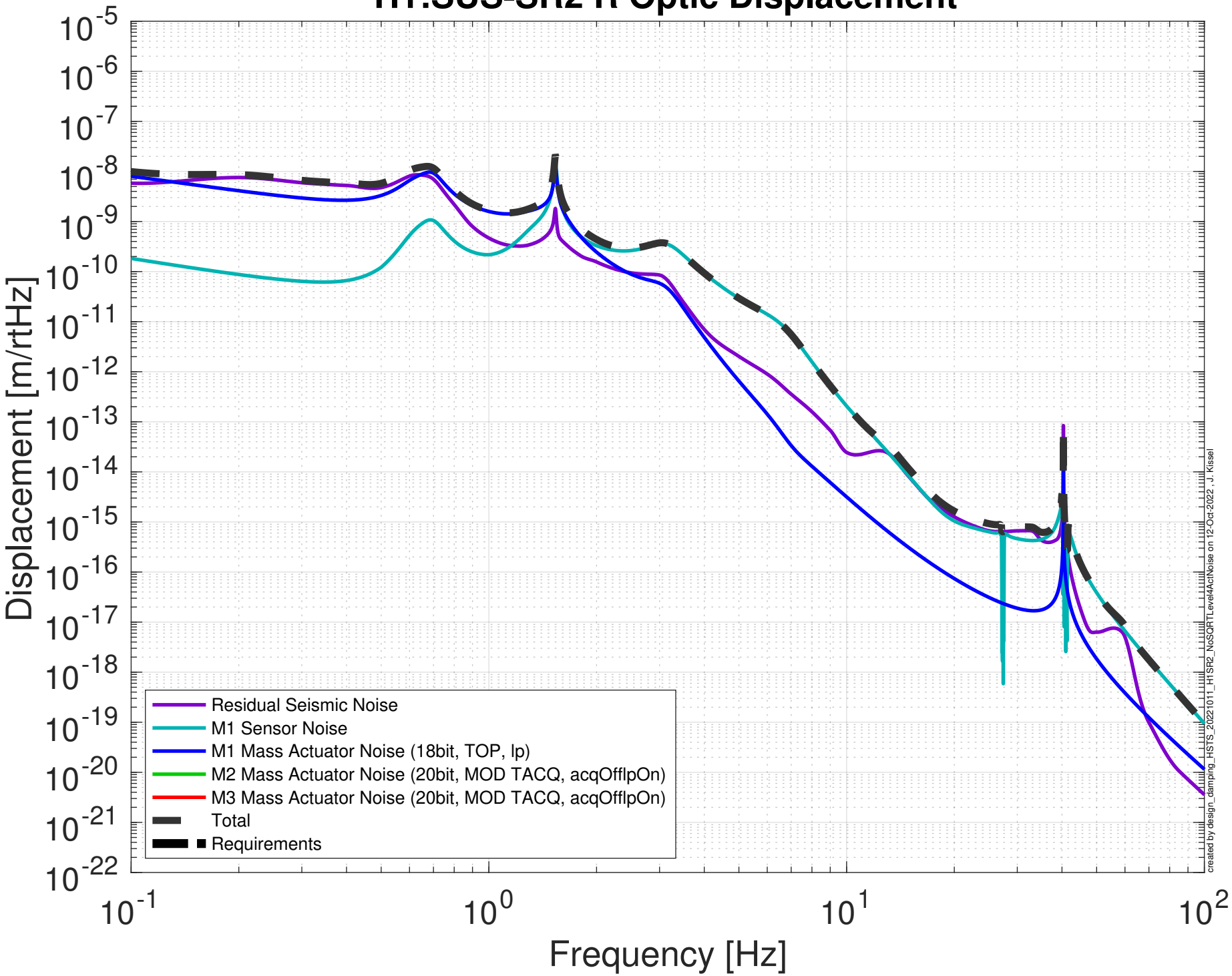
Projected M2 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, R Optic Displacement

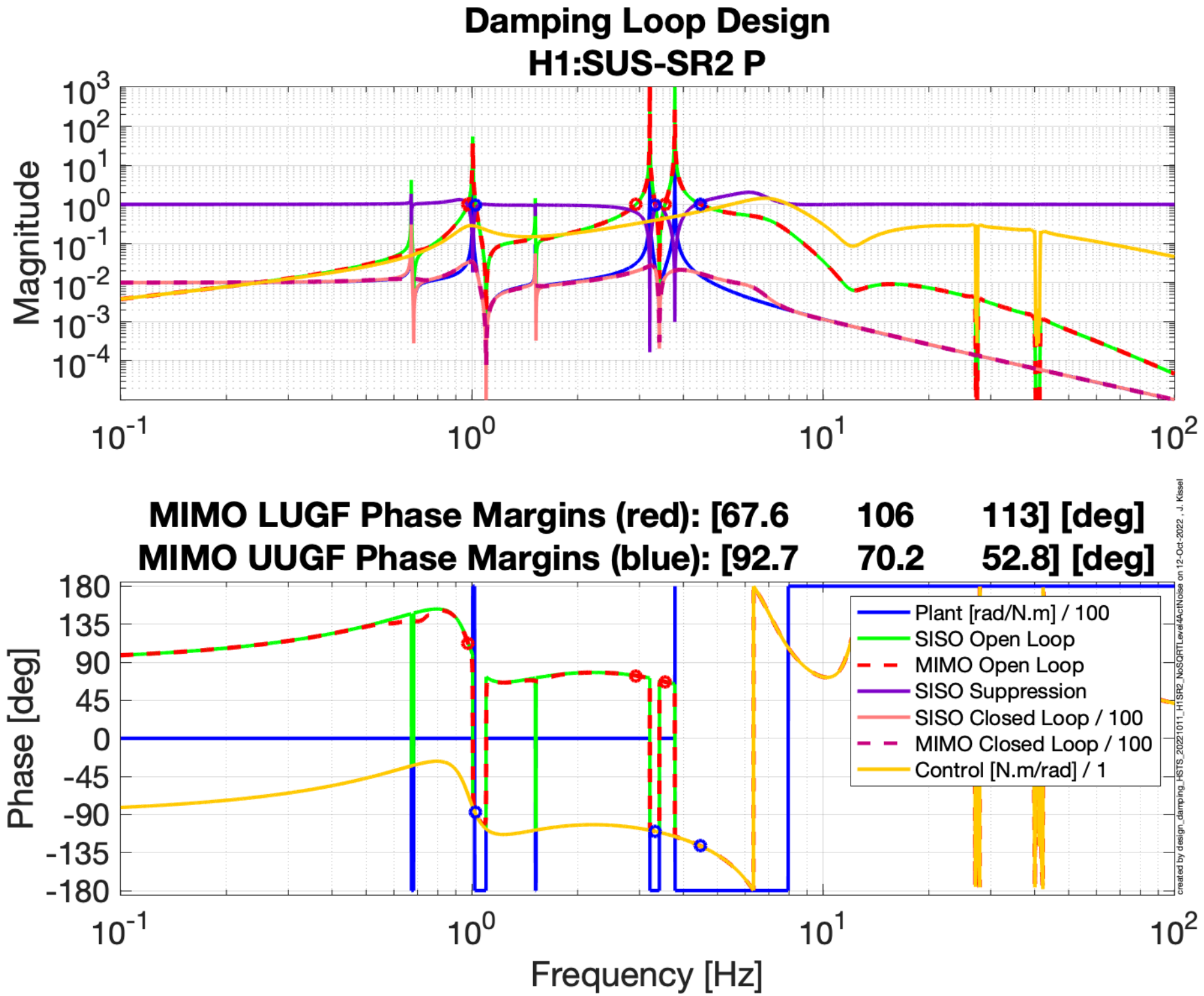


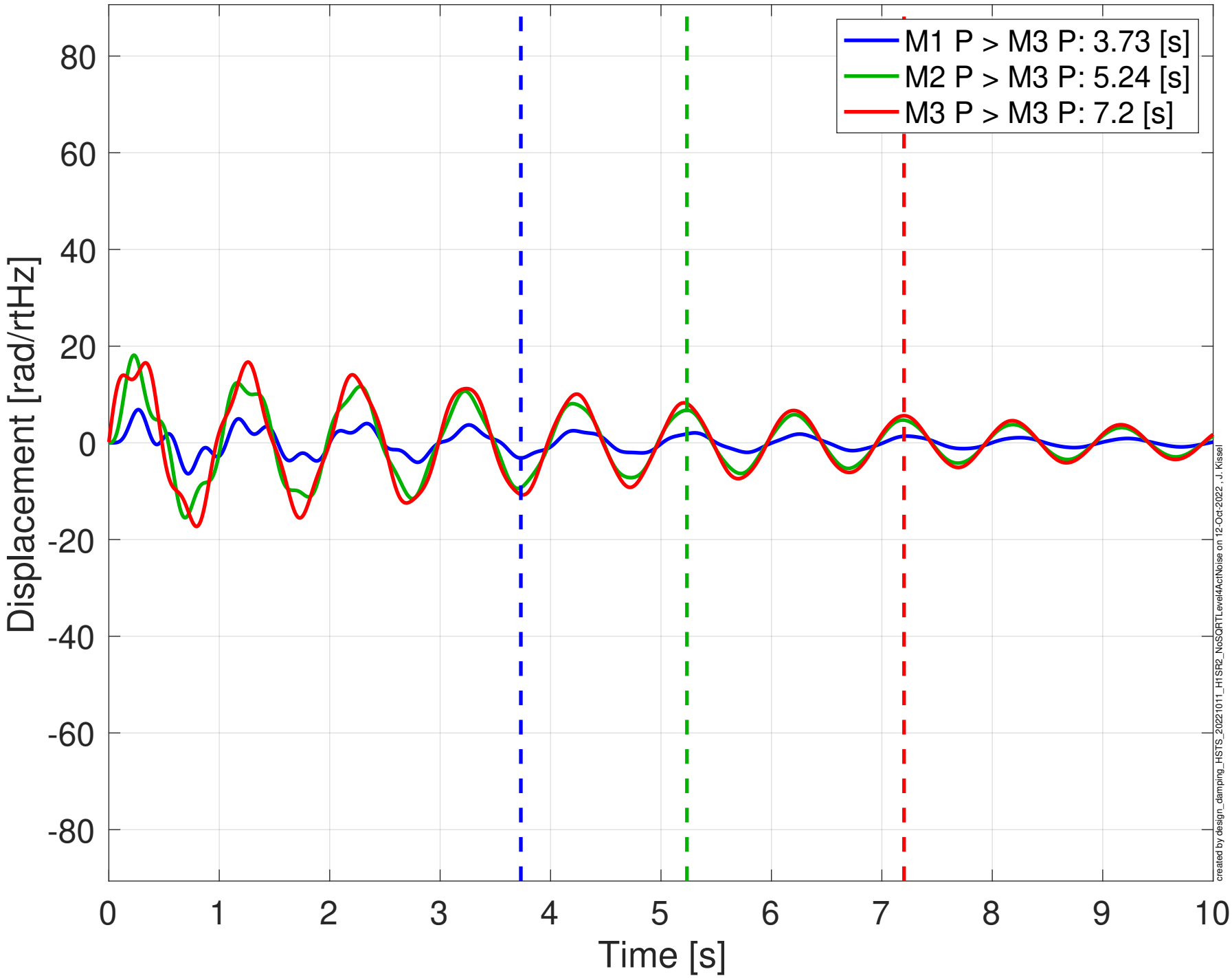
Projected M3 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, R Optic Displacement

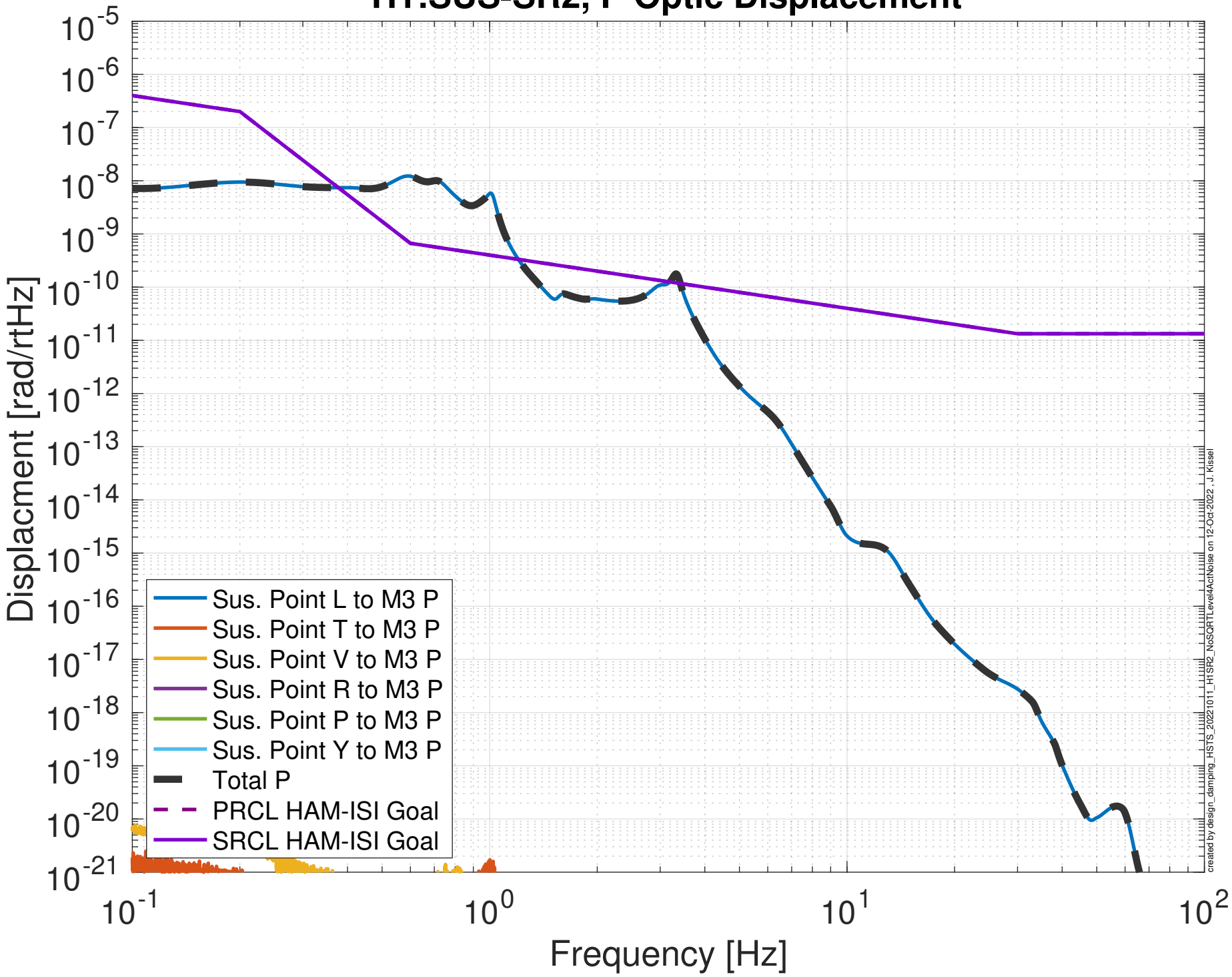


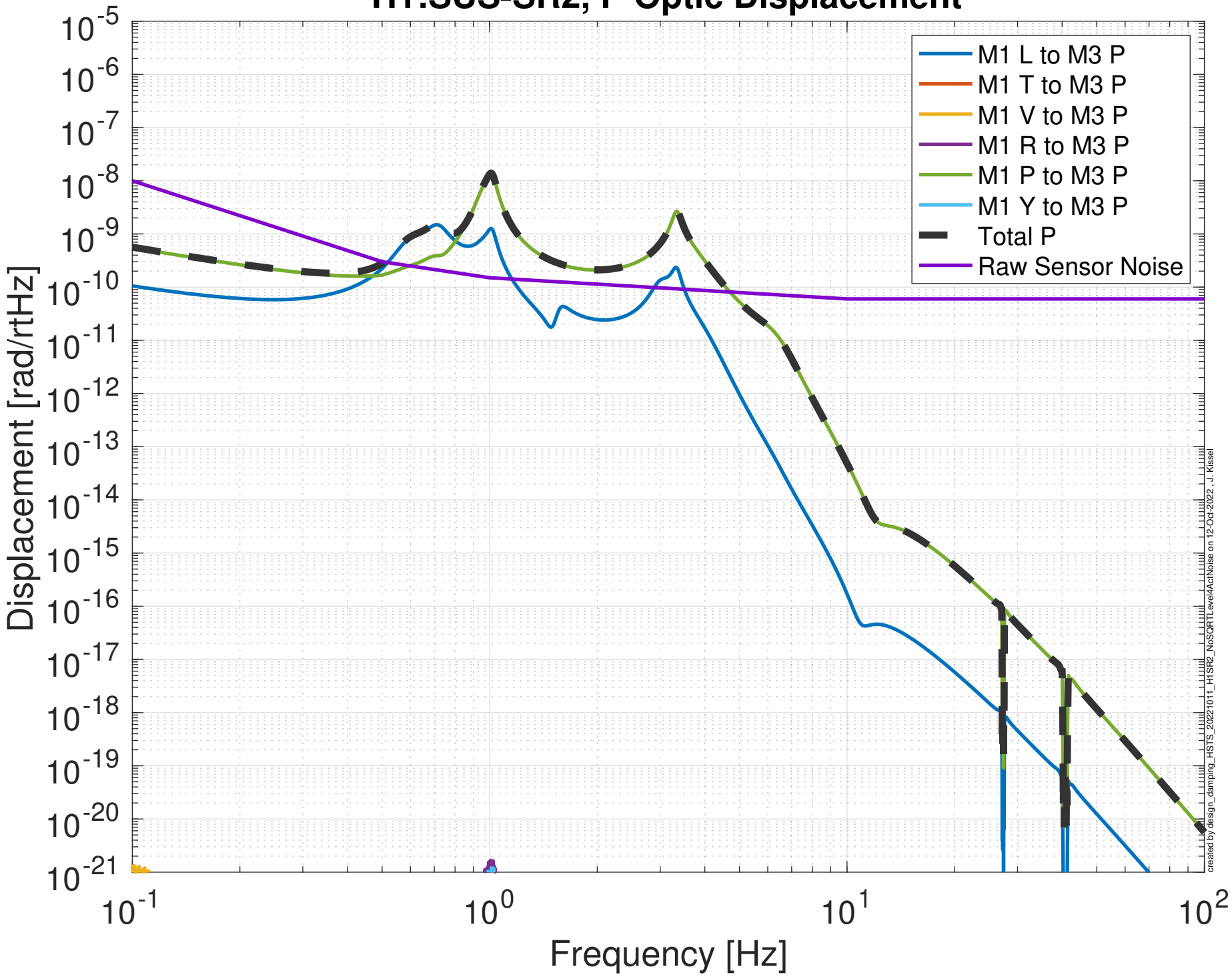
Damping Loop Performance
H1:SUS-SR2 R Optic Displacement

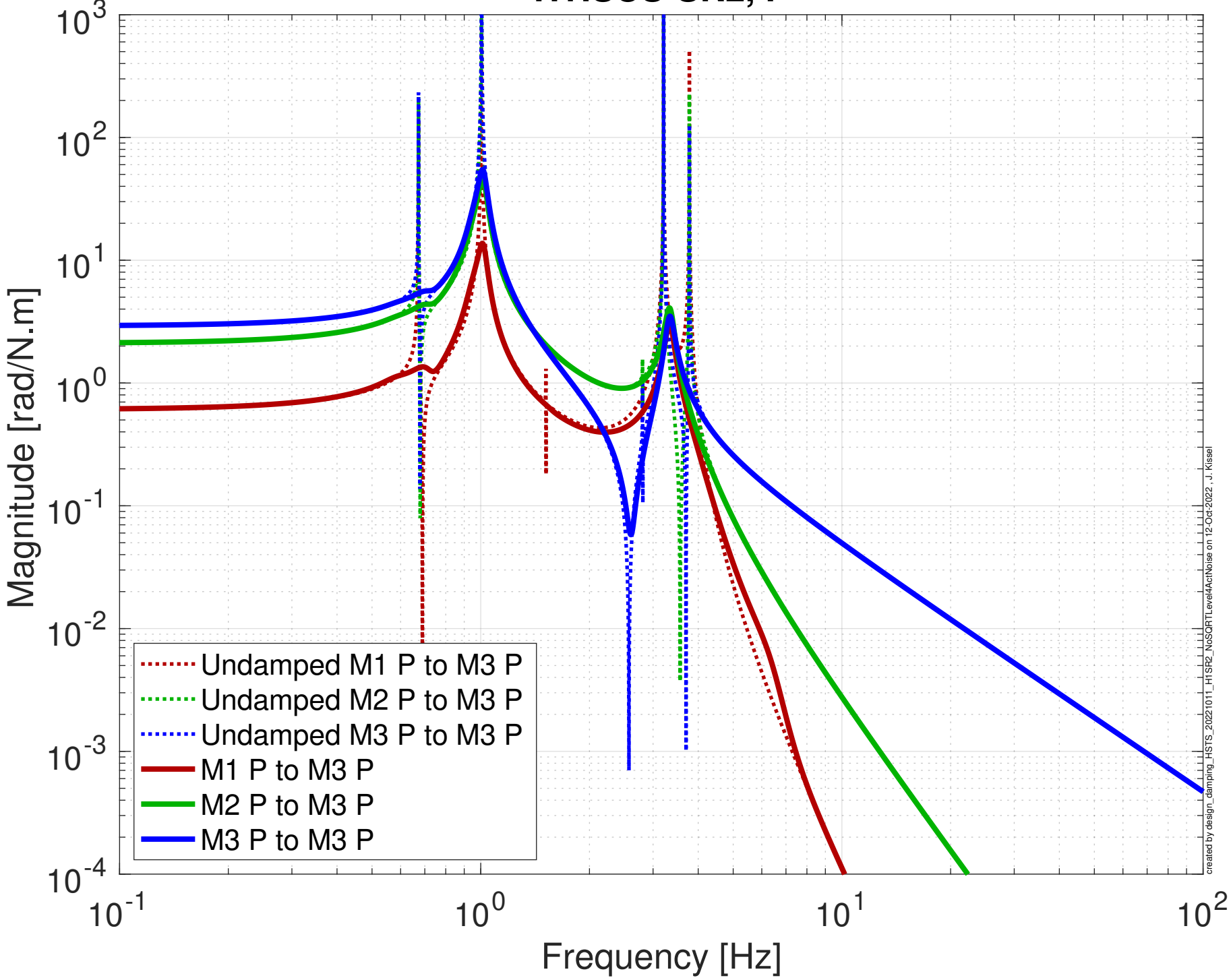


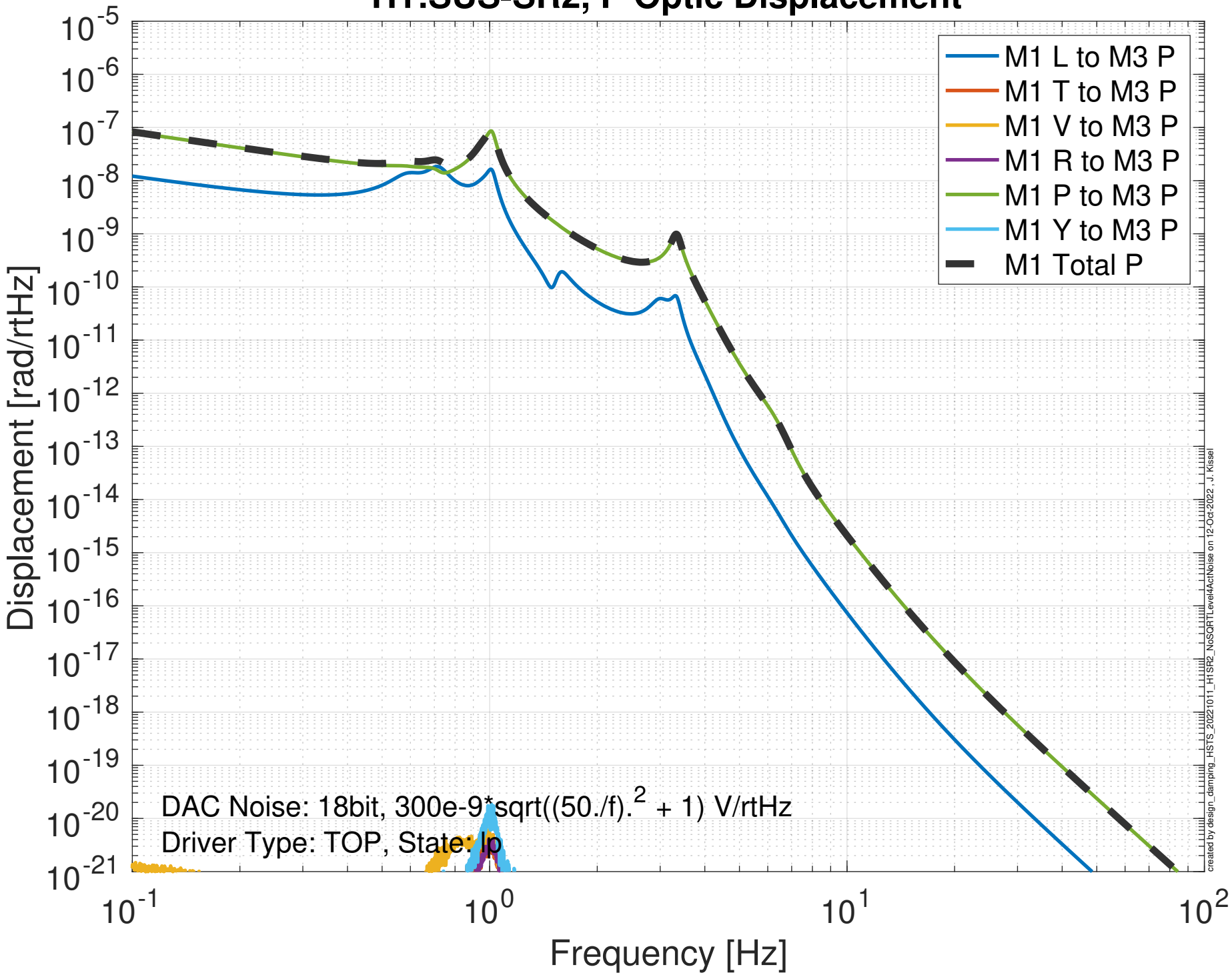

Damping Loop Design
H1:SUS-SR2 P
Magnitude
MIMO LUGF Phase Margins (red): [67.6 106 113] [deg]
MIMO UUGF Phase Margins (blue): [92.7 70.2 52.8] [deg]
Phase [deg]
Frequency [Hz]
Plant [rad/N.m] / 100
SISO Open Loop
MIMO Open Loop
SISO Suppression
SISO Closed Loop / 100
MIMO Closed Loop / 100
Control [N.m/rad] / 1
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

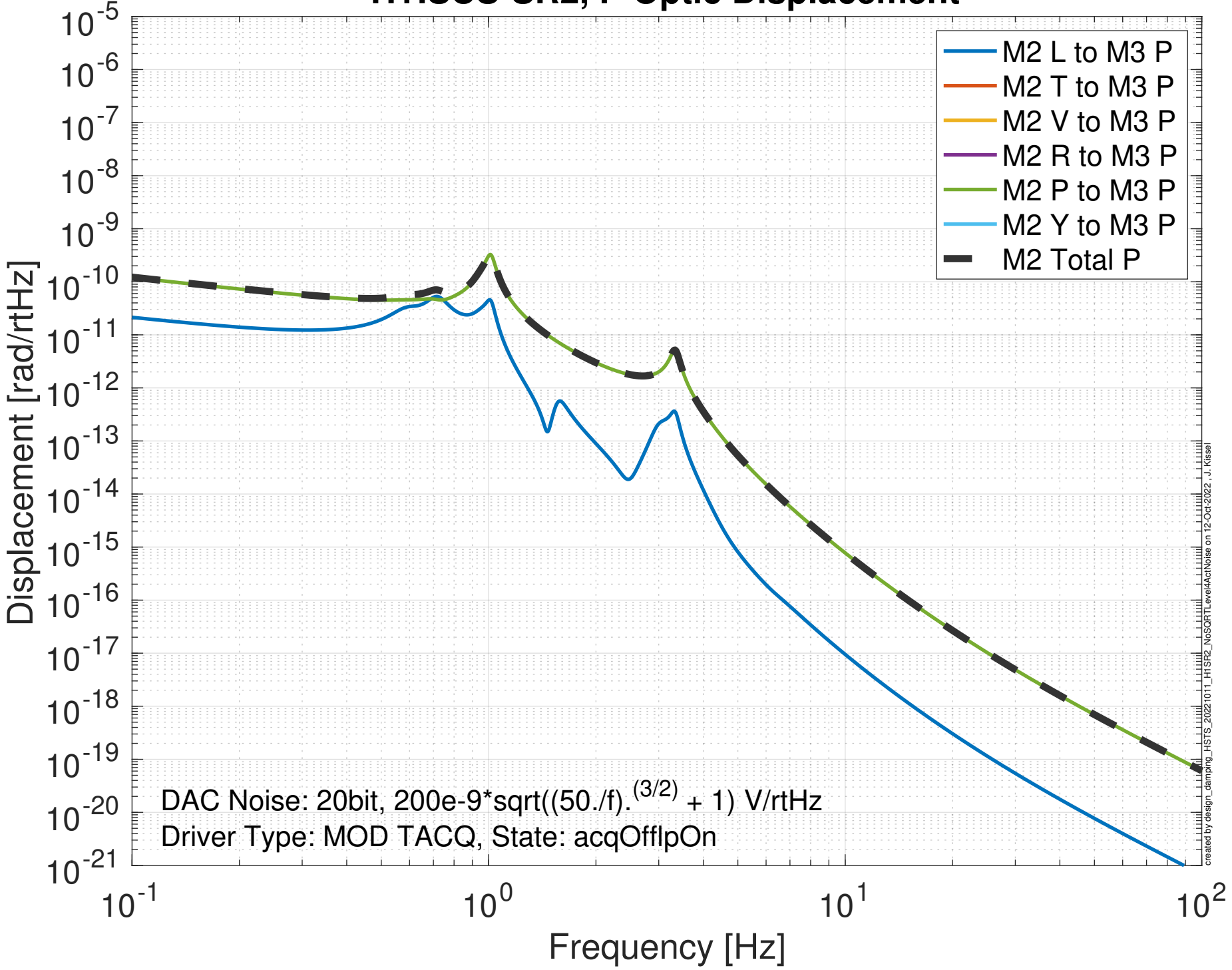

Damped Impulse Response
H1:SUS-SR2 P
M1 P > M3 P: 3.73 [s]
M2 P > M3 P: 5.24 [s]
M3 P > M3 P: 7.2 [s]
Displacement [rad/rtHz]
Time [s]
80
60
40
20
0
-20
-40
-60
-80
0
1
2
3
4
5
6
7
8
9
10
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

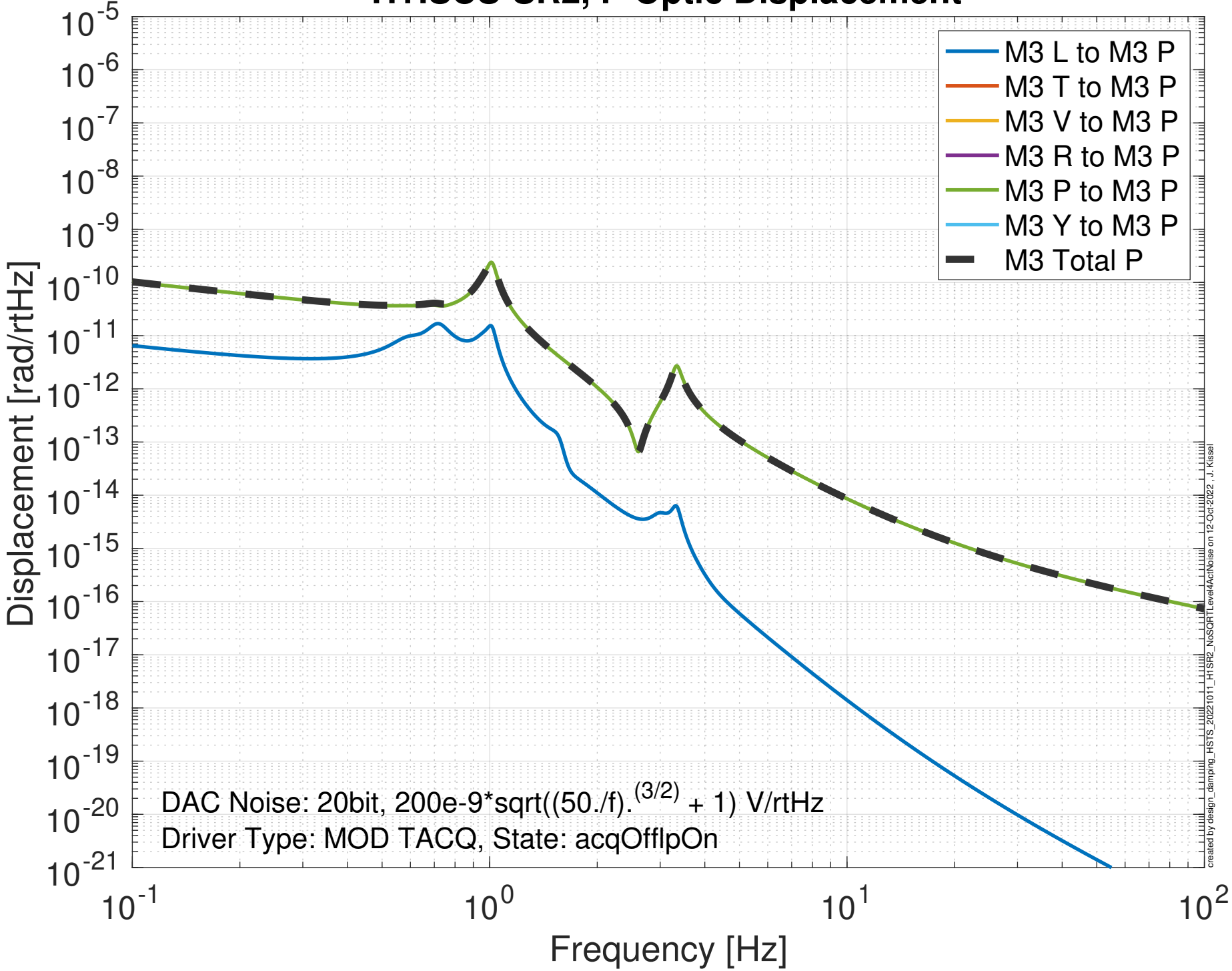

Projected Sus. Point > Optic Seismic Noise Budget
H1:SUS-SR2, P Optic Displacement
Displacment [rad/rtHz]
Frequency [Hz]
Sus. Point L to M3 P
Sus. Point T to M3 P
Sus. Point V to M3 P
Sus. Point R to M3 P
Sus. Point P to M3 P
Sus. Point Y to M3 P
Total P
PRCL HAM-ISI Goal
SRCL HAM-ISI Goal
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AclNoise on 12-Oct-2022 , J. Kissel


Projected Top Mass Sensor > Optic Noise Budget
H1:SUS-SR2, P Optic Displacement
Displacement [rad/rtHz]
Frequency [Hz]
M1 L to M3 P
M1 T to M3 P
M1 V to M3 P
M1 R to M3 P
M1 P to M3 P
M1 Y to M3 P
Total P
Raw Sensor Noise
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

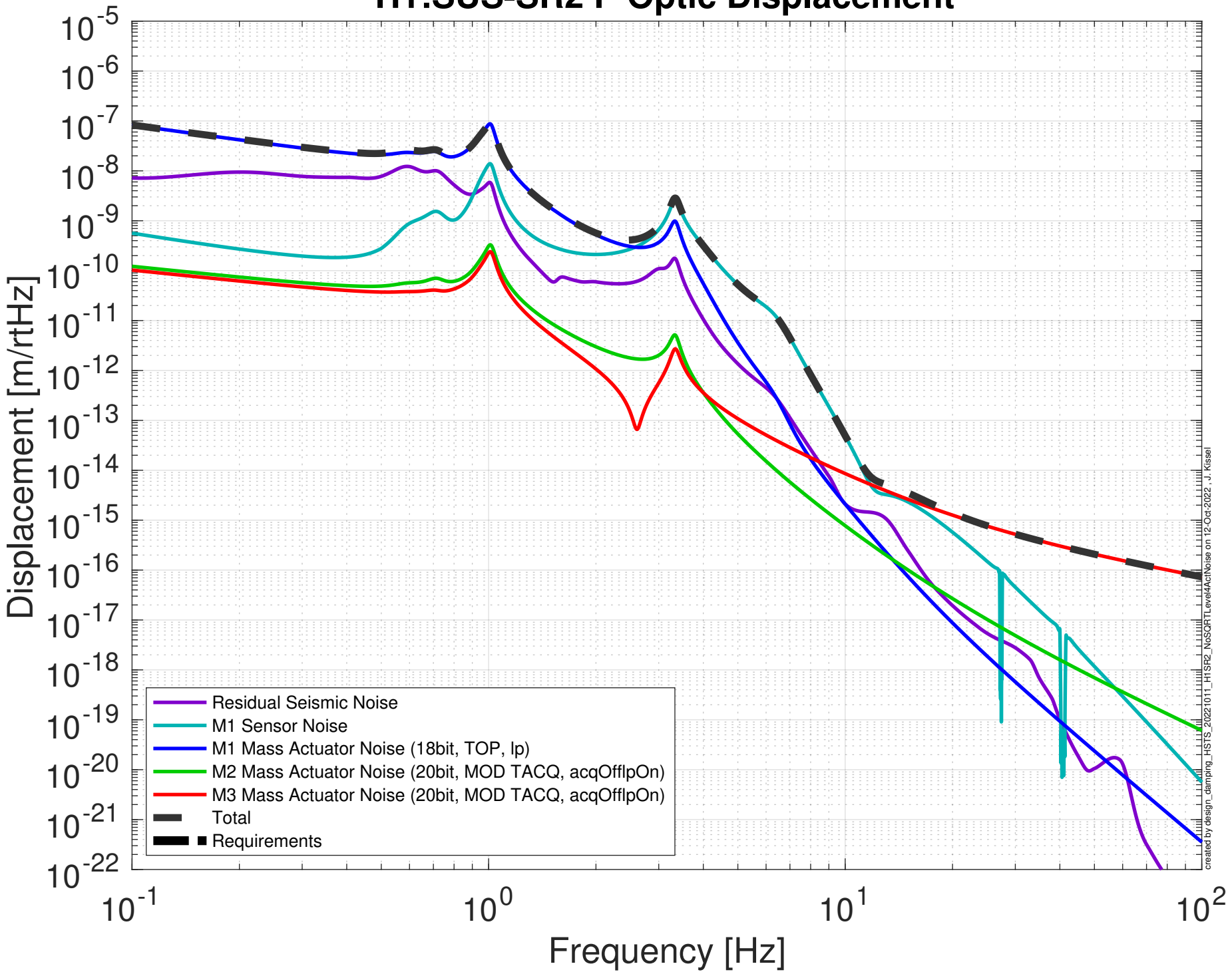

Global Control Transfer Functions to Optic
H1:SUS-SR2, P
Magnitude [rad/N.m]
Frequency [Hz]
Undamped M1 P to M3 P
Undamped M2 P to M3 P
Undamped M3 P to M3 P
M1 P to M3 P
M2 P to M3 P
M3 P to M3 P
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

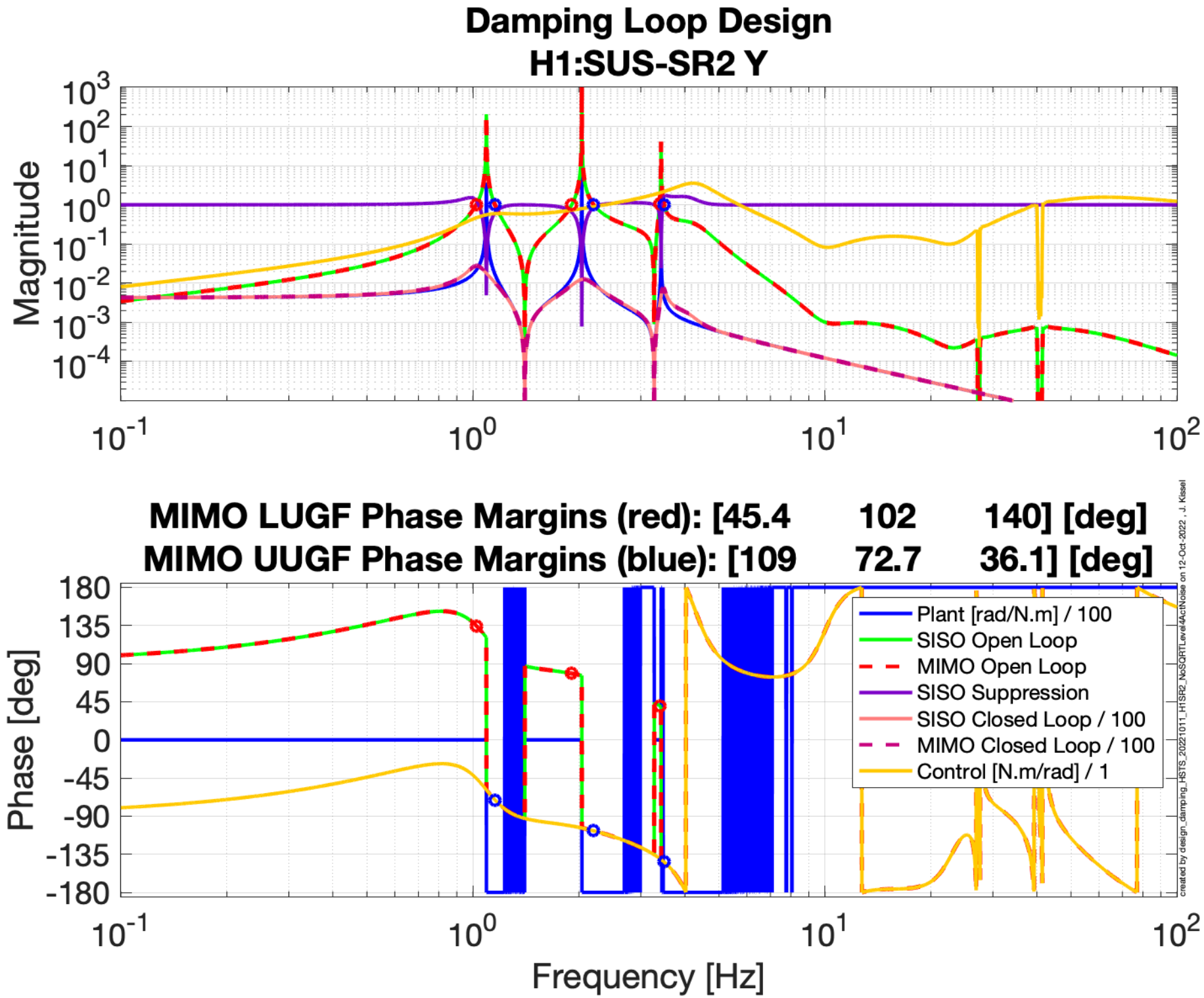

Projected M1 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, P Optic Displacement
Displacement [rad/rtHz]
Frequency [Hz]
M1 L to M3 P
M1 T to M3 P
M1 V to M3 P
M1 R to M3 P
M1 P to M3 P
M1 Y to M3 P
M1 Total P
DAC Noise: 18bit, 300e-9*sqrt((50./f).^2 + 1) V/rtHz
Driver Type: TOP, State: lp
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

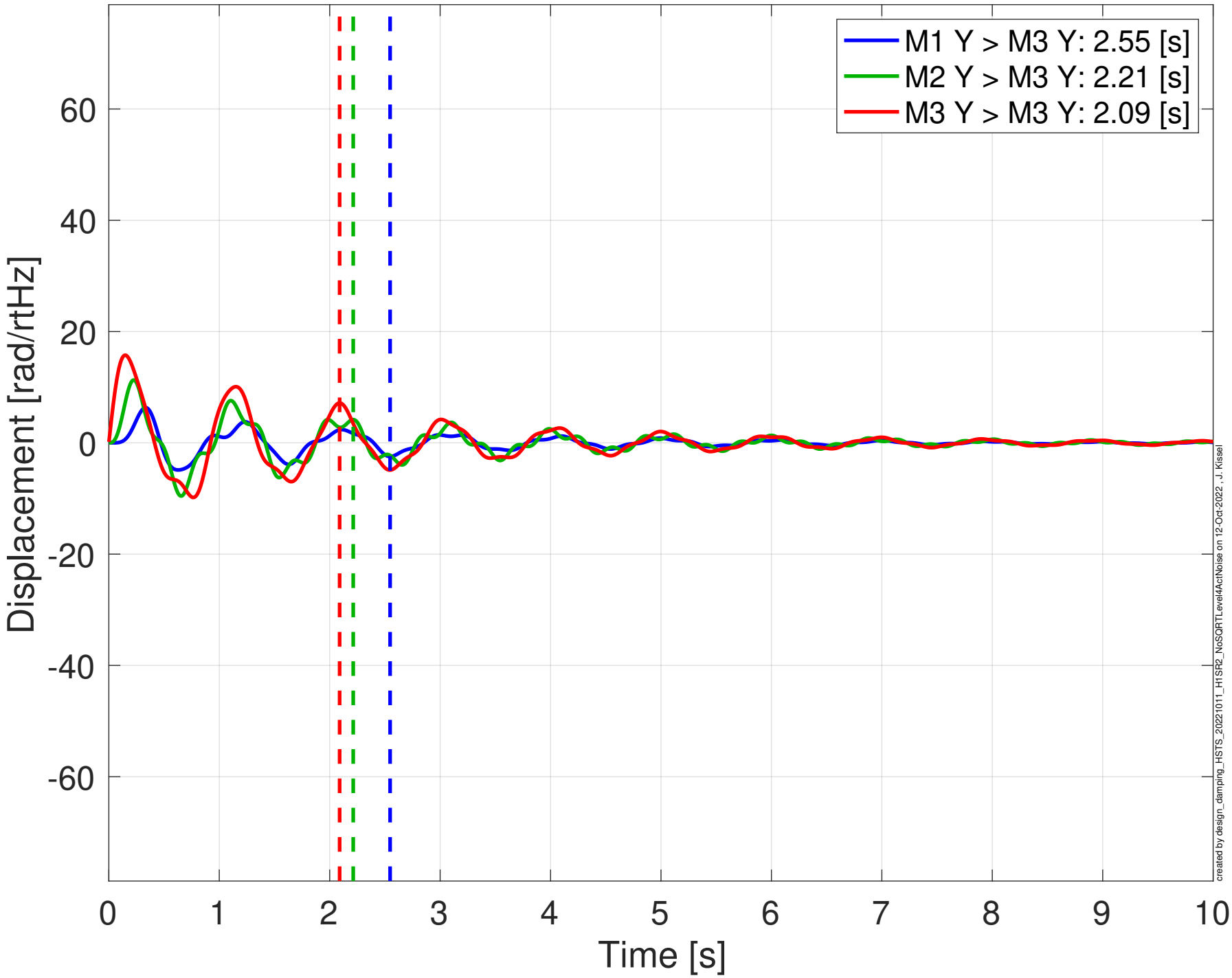

Projected M2 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, P Optic Displacement
M2 L to M3 P
M2 T to M3 P
M2 V to M3 P
M2 R to M3 P
M2 P to M3 P
M2 Y to M3 P
M2 Total P
DAC Noise: 20bit, 200e-9*sqrt((50./f).^(3/2) + 1) V/rtHz
Driver Type: MOD TACQ, State: acqOfflpOn
Displacement [rad/rtHz]
Frequency [Hz]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

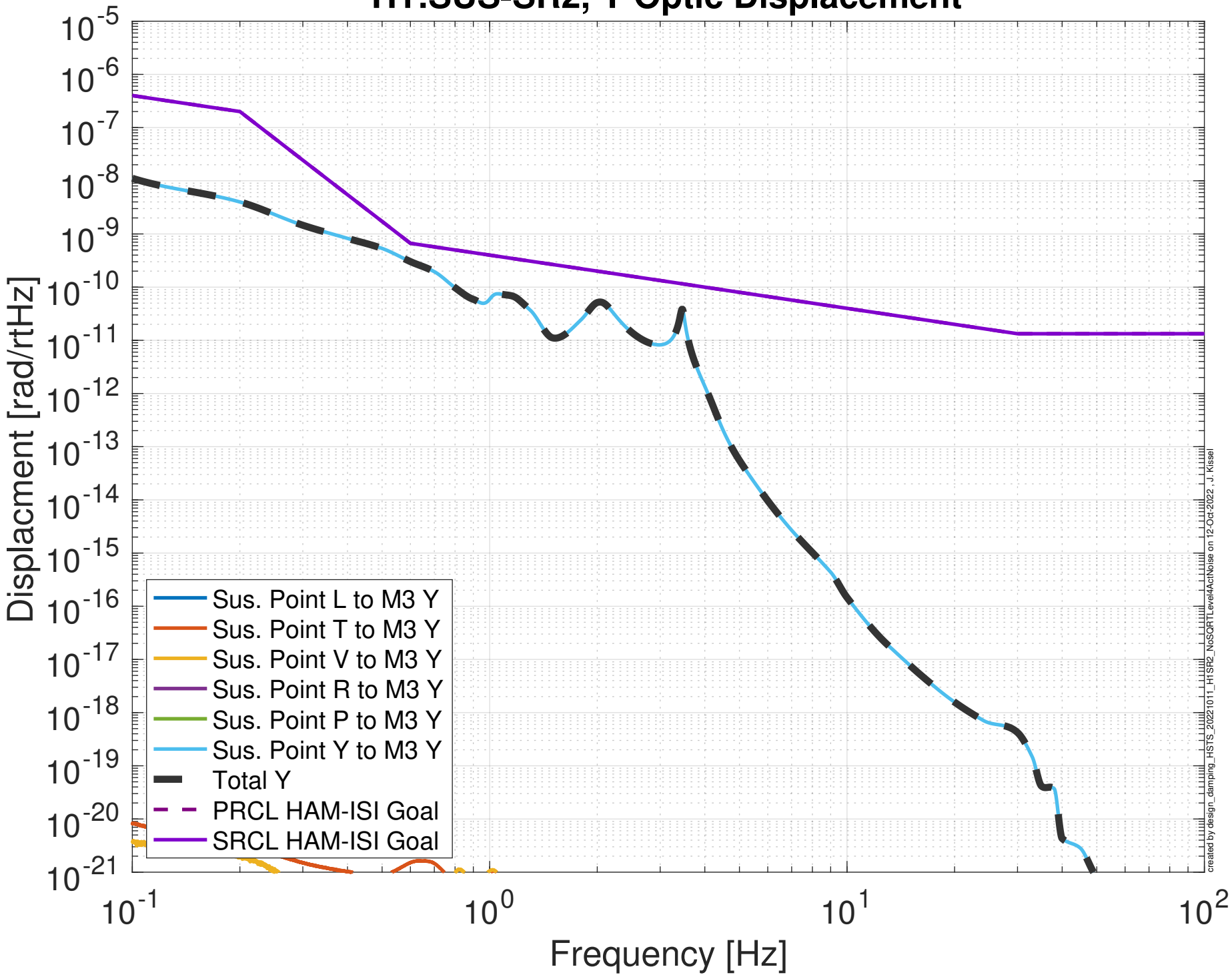

Projected M3 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, P Optic Displacement
M3 L to M3 P
M3 T to M3 P
M3 V to M3 P
M3 R to M3 P
M3 P to M3 P
M3 Y to M3 P
M3 Total P
DAC Noise: 20bit, 200e-9*sqrt((50./f).^(3/2) + 1) V/rtHz
Driver Type: MOD TACQ, State: acqOfflpOn
Displacement [rad/rtHz]
Frequency [Hz]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

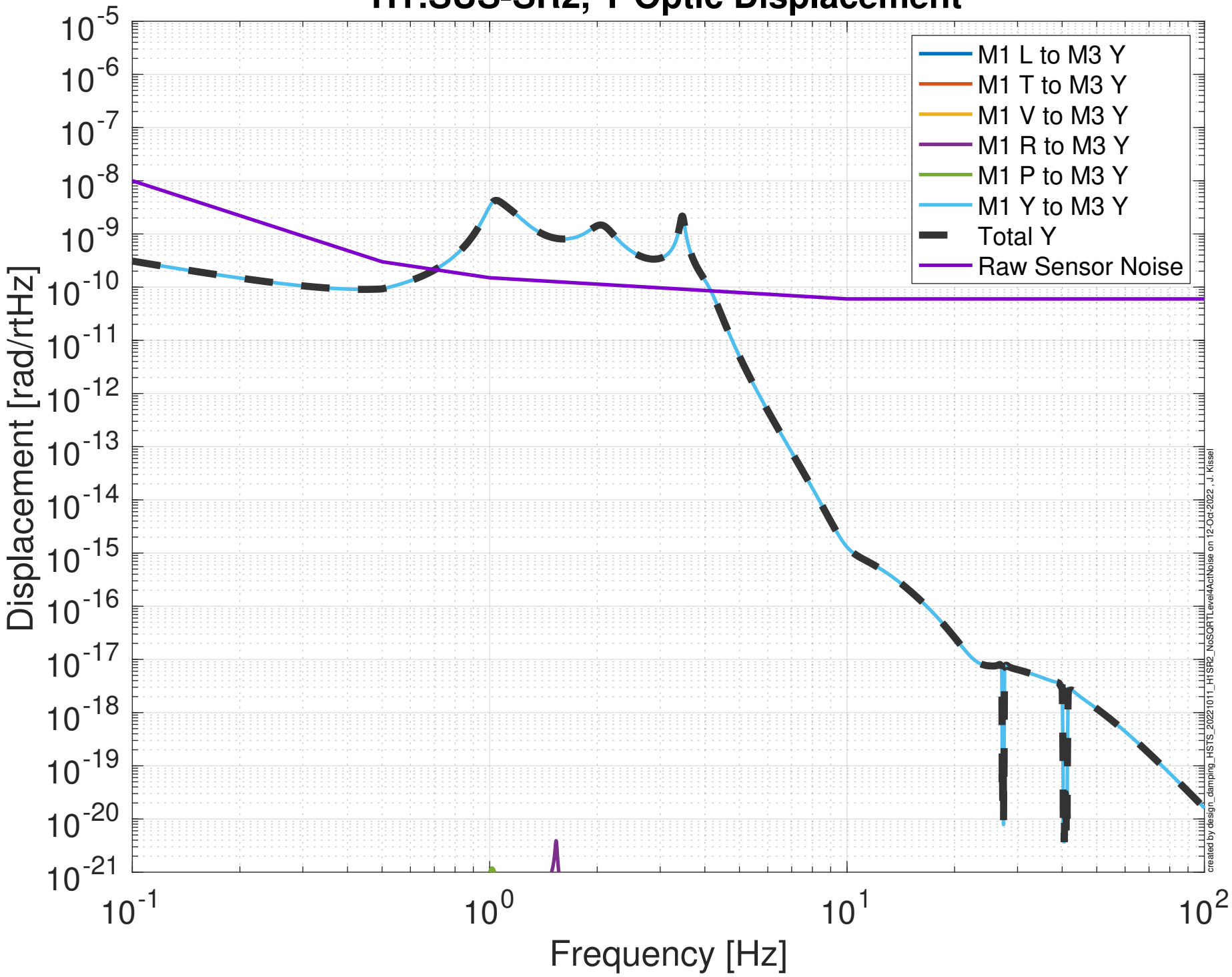
Damping Loop Performance
H1:SUS-SR2 P Optic Displacement

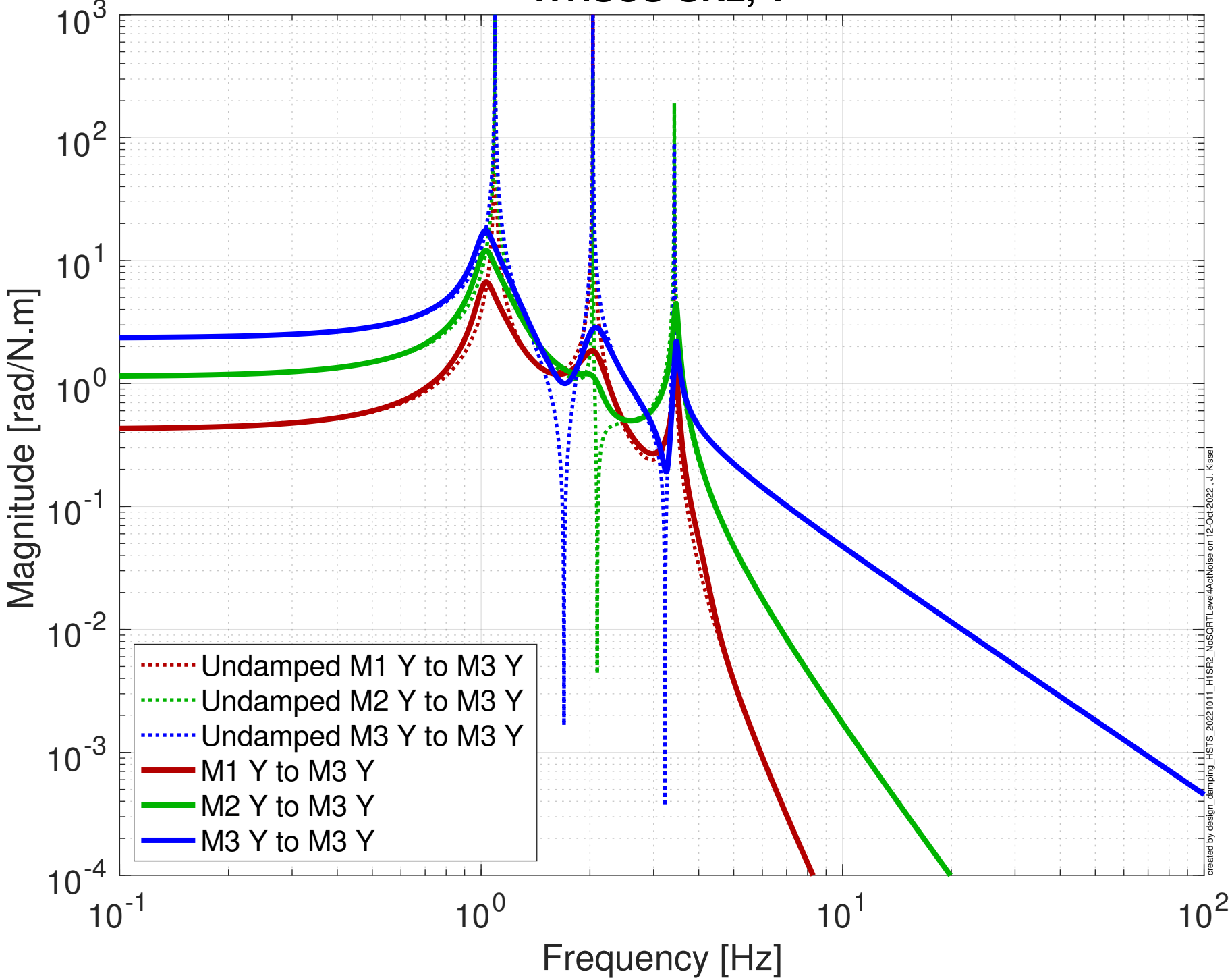


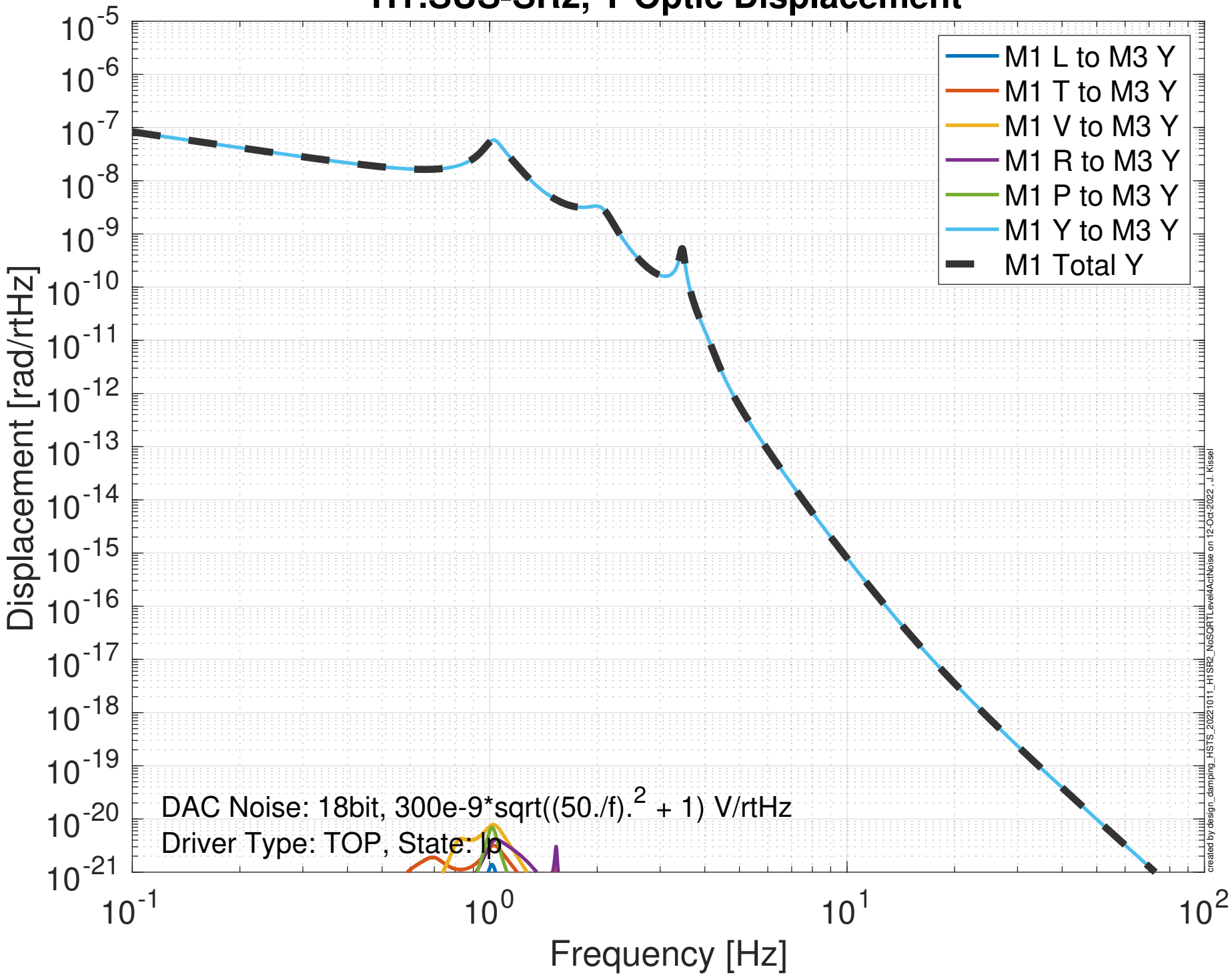

Damping Loop Design
H1:SUS-SR2 Y
Magnitude
MIMO LUGF Phase Margins (red): [45.4 102 140] [deg]
MIMO UUGF Phase Margins (blue): [109 72.7 36.1] [deg]
Phase [deg]
Frequency [Hz]
Plant [rad/N.m] / 100
SISO Open Loop
MIMO Open Loop
SISO Suppression
SISO Closed Loop / 100
MIMO Closed Loop / 100
Control [N.m/rad] / 1
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

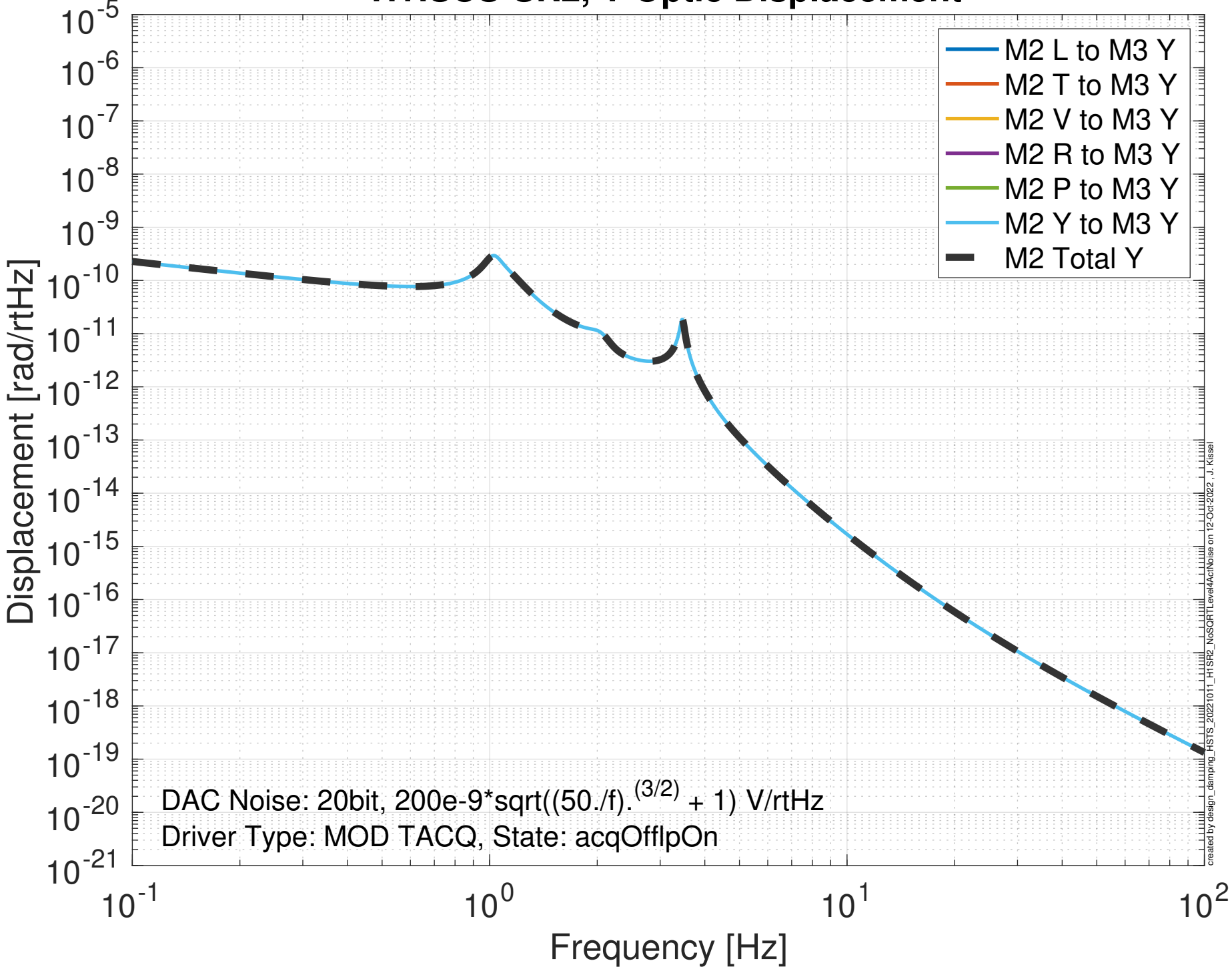

Damped Impulse Response
H1:SUS-SR2 Y
M1 Y > M3 Y: 2.55 [s]
M2 Y > M3 Y: 2.21 [s]
M3 Y > M3 Y: 2.09 [s]
Displacement [rad/rtHz]
60
40
20
0
-20
-40
-60
0
1
2
3
4
5
6
7
8
9
10
Time [s]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

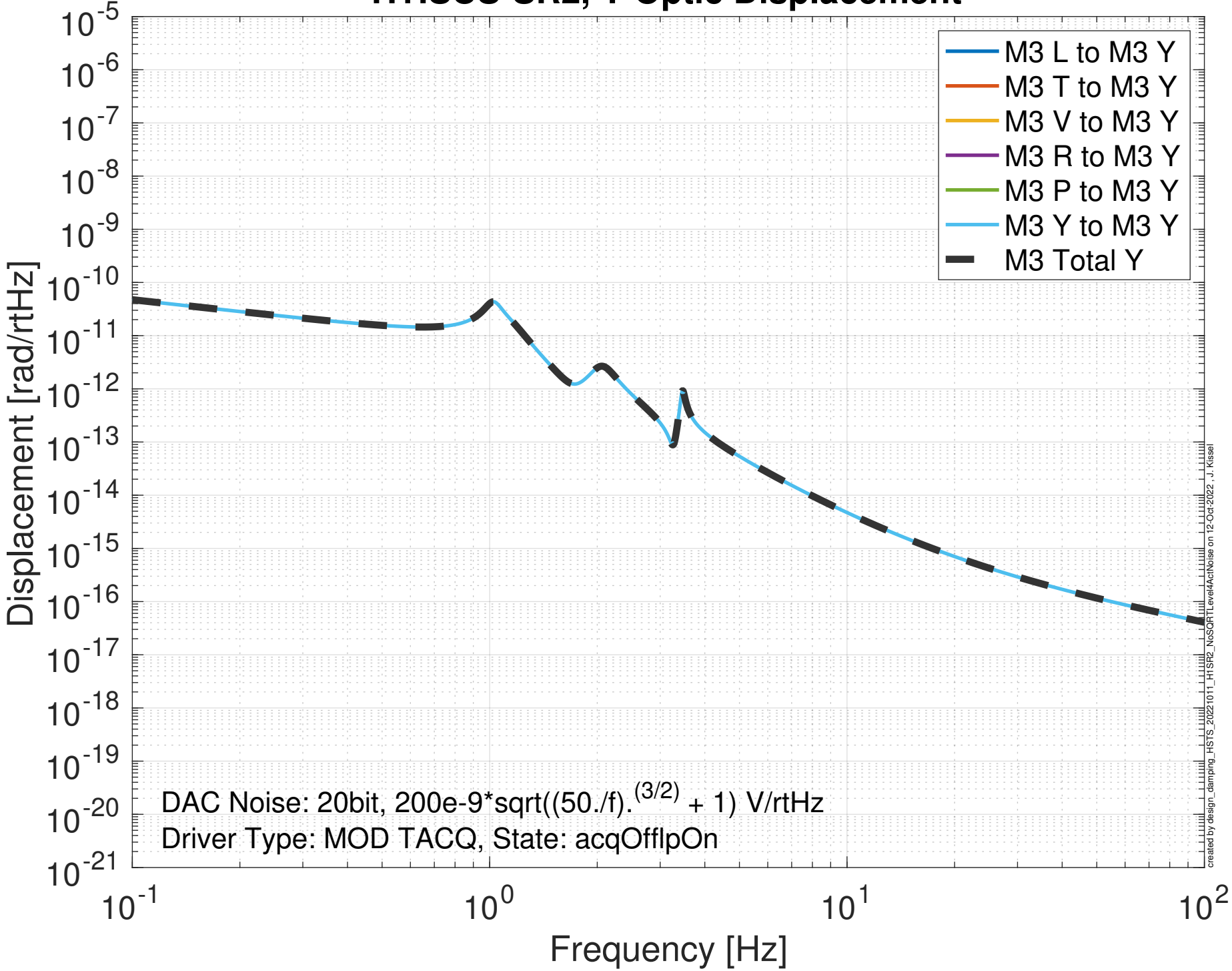

Projected Sus. Point > Optic Seismic Noise Budget
H1:SUS-SR2, Y Optic Displacement
Displacment [rad/rtHz]
Frequency [Hz]
Sus. Point L to M3 Y
Sus. Point T to M3 Y
Sus. Point V to M3 Y
Sus. Point R to M3 Y
Sus. Point P to M3 Y
Sus. Point Y to M3 Y
Total Y
PRCL HAM-ISI Goal
SRCL HAM-ISI Goal
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AclNoise on 12-Oct-2022 , J. Kissel


Projected Top Mass Sensor > Optic Noise Budget
H1:SUS-SR2, Y Optic Displacement
Displacement [rad/rtHz]
Frequency [Hz]
M1 L to M3 Y
M1 T to M3 Y
M1 V to M3 Y
M1 R to M3 Y
M1 P to M3 Y
M1 Y to M3 Y
Total Y
Raw Sensor Noise
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

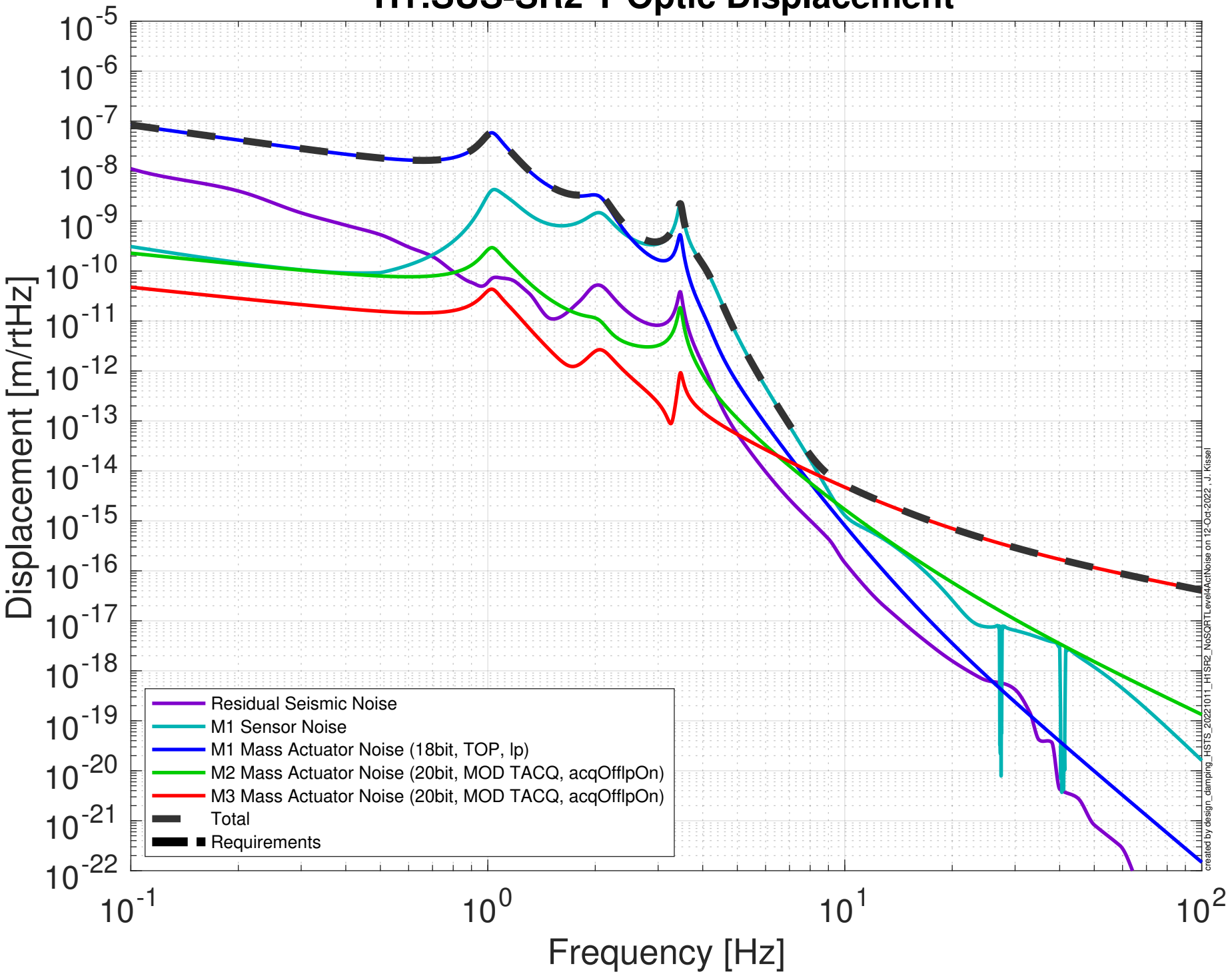

Global Control Transfer Functions to Optic
H1:SUS-SR2, Y
Magnitude [rad/N.m]
Frequency [Hz]
Undamped M1 Y to M3 Y
Undamped M2 Y to M3 Y
Undamped M3 Y to M3 Y
M1 Y to M3 Y
M2 Y to M3 Y
M3 Y to M3 Y
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel

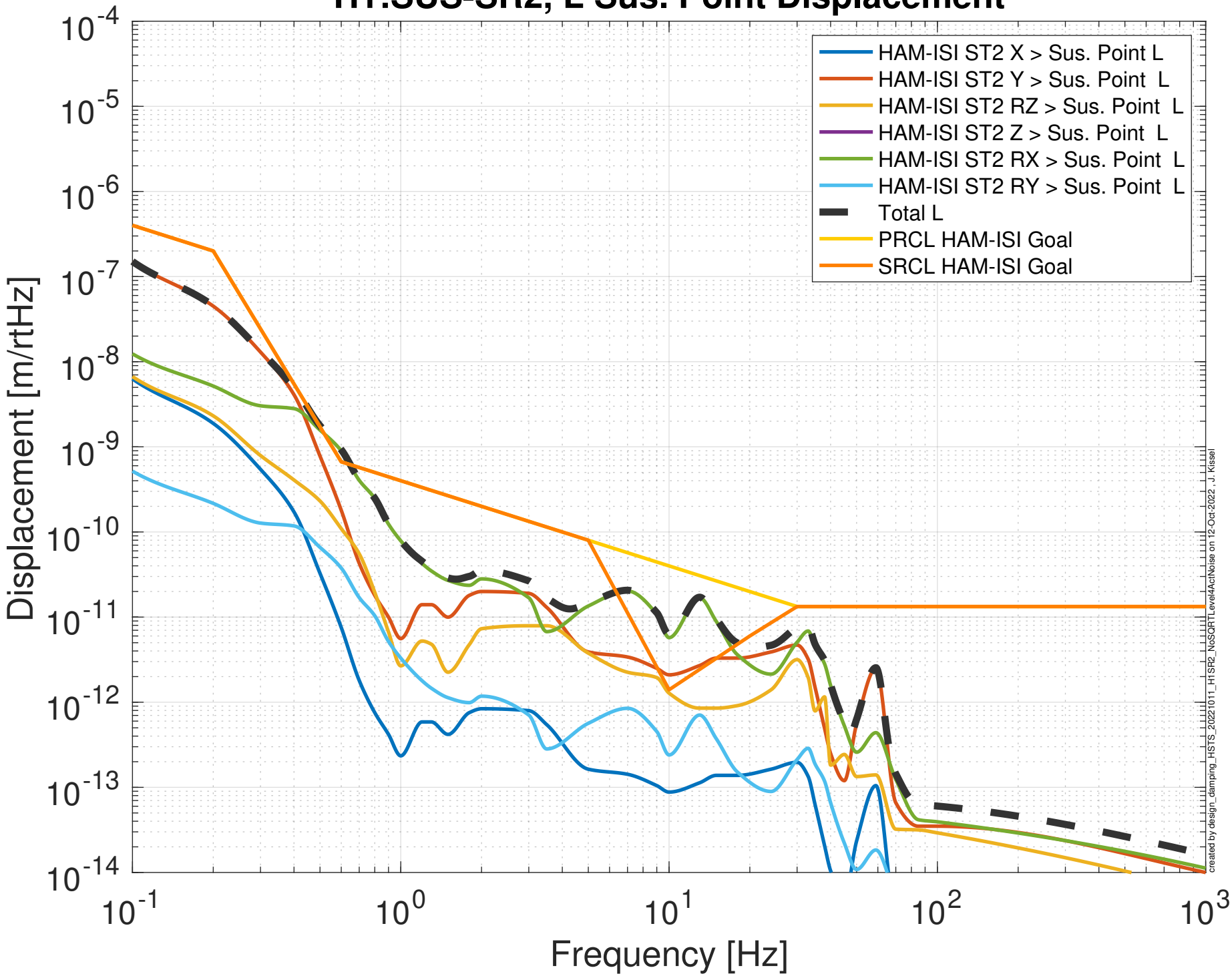

Projected M1 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, Y Optic Displacement
Displacement [rad/rtHz]
Frequency [Hz]
M1 L to M3 Y
M1 T to M3 Y
M1 V to M3 Y
M1 R to M3 Y
M1 P to M3 Y
M1 Y to M3 Y
M1 Total Y
DAC Noise: 18bit, 300e-9*sqrt((50./f).^2 + 1) V/rtHz
Driver Type: TOP, State: lp
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4ActNoise on 12-Oct-2022 , J. Kissel


Projected M2 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, Y Optic Displacement
Displacement [rad/rtHz]
Frequency [Hz]
M2 L to M3 Y
M2 T to M3 Y
M2 V to M3 Y
M2 R to M3 Y
M2 P to M3 Y
M2 Y to M3 Y
M2 Total Y
DAC Noise: 20bit, 200e-9*sqrt((50./f).^(3/2) + 1) V/rtHz
Driver Type: MOD TACQ, State: acqOfflpOn
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

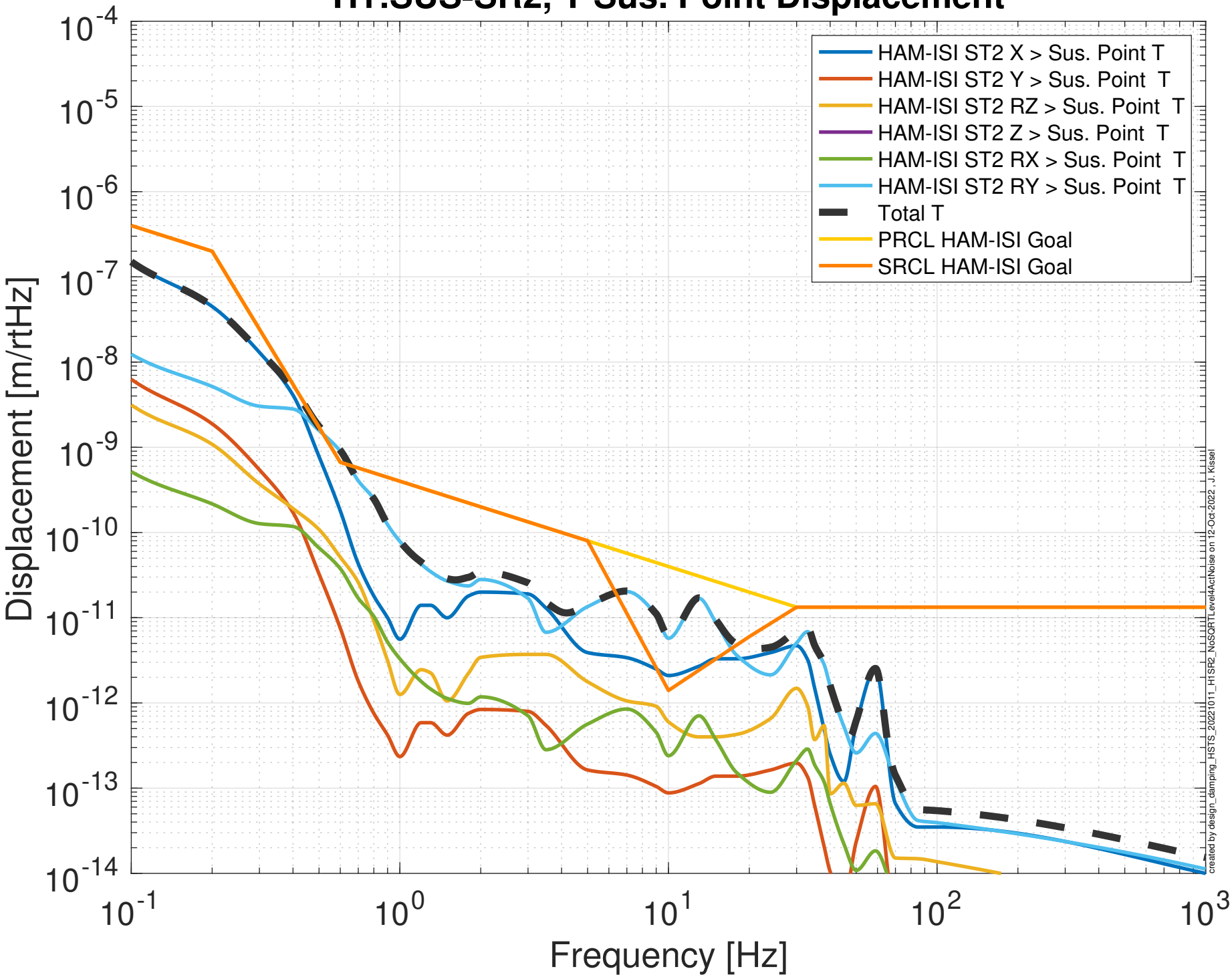

Projected M3 Mass Actuator > Optic Noise Budget
H1:SUS-SR2, Y Optic Displacement
M3 L to M3 Y
M3 T to M3 Y
M3 V to M3 Y
M3 R to M3 Y
M3 P to M3 Y
M3 Y to M3 Y
M3 Total Y
Displacement [rad/rtHz]
Frequency [Hz]
DAC Noise: 20bit, 200e-9*sqrt((50./f).^(3/2) + 1) V/rtHz
Driver Type: MOD TACQ, State: acqOfflpOn
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel

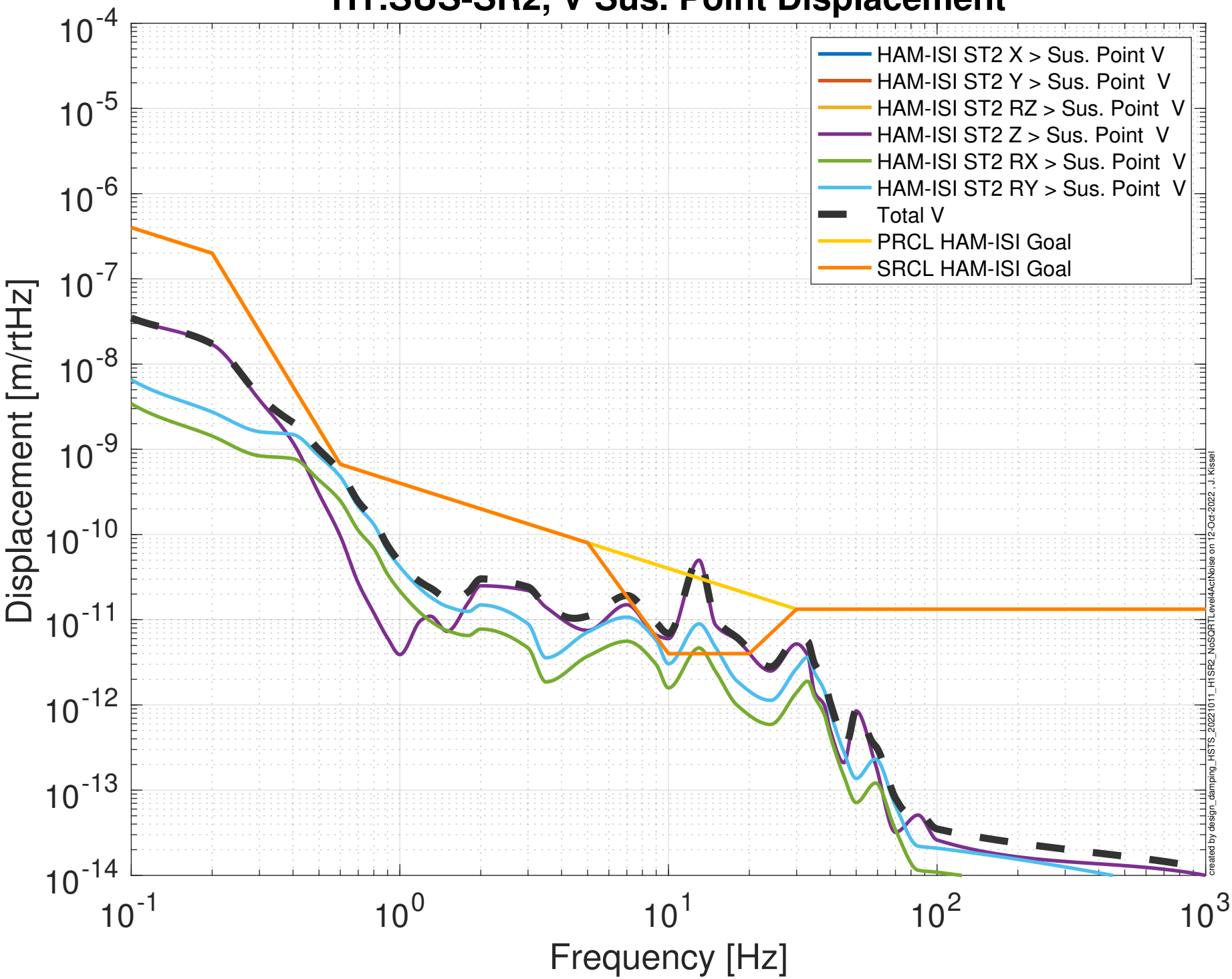
Damping Loop Performance
H1:SUS-SR2 Y Optic Displacement



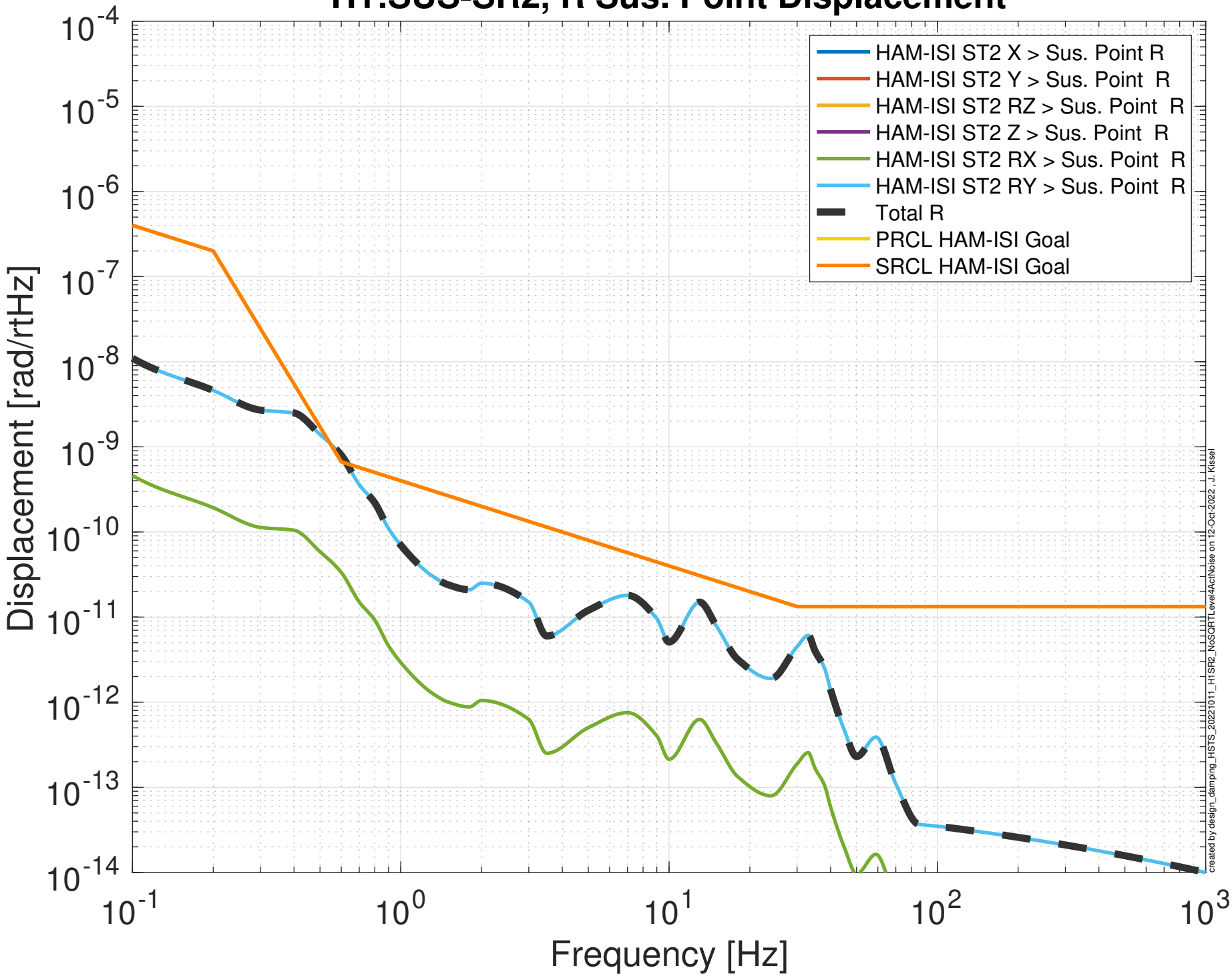

Projected ISI Seismic Noise Budget
H1:SUS-SR2, L Sus. Point Displacement
HAM-ISI ST2 X > Sus. Point L
HAM-ISI ST2 Y > Sus. Point L
HAM-ISI ST2 RZ > Sus. Point L
HAM-ISI ST2 Z > Sus. Point L
HAM-ISI ST2 RX > Sus. Point L
HAM-ISI ST2 RY > Sus. Point L
Total L
PRCL HAM-ISI Goal
SRCL HAM-ISI Goal
Displacement [m/rtHz]
Frequency [Hz]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AclNoise on 12-Oct-2022 , J. Kissel

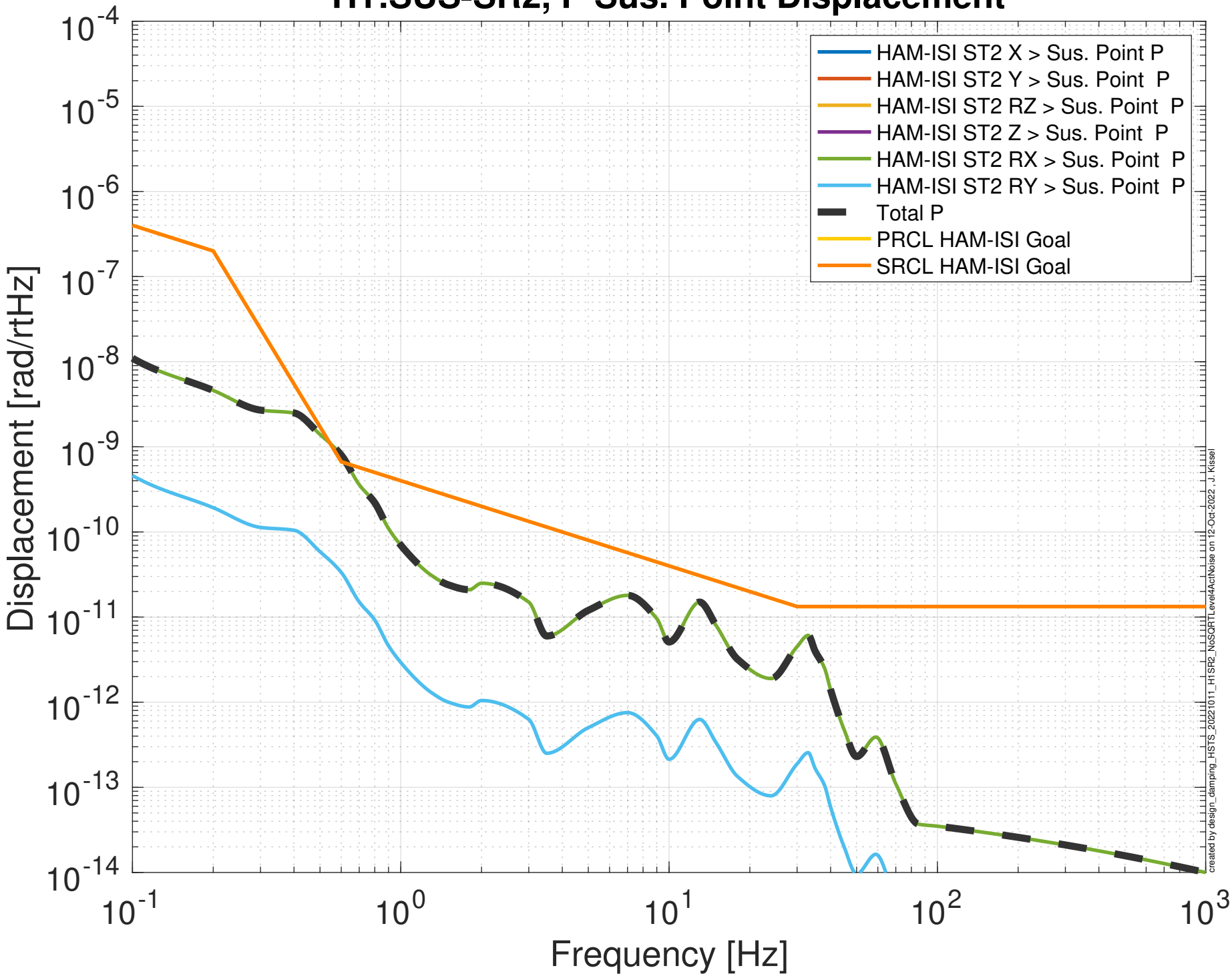
Projected ISI Seismic Noise Budget
H1:SUS-SR2, T Sus. Point Displacement

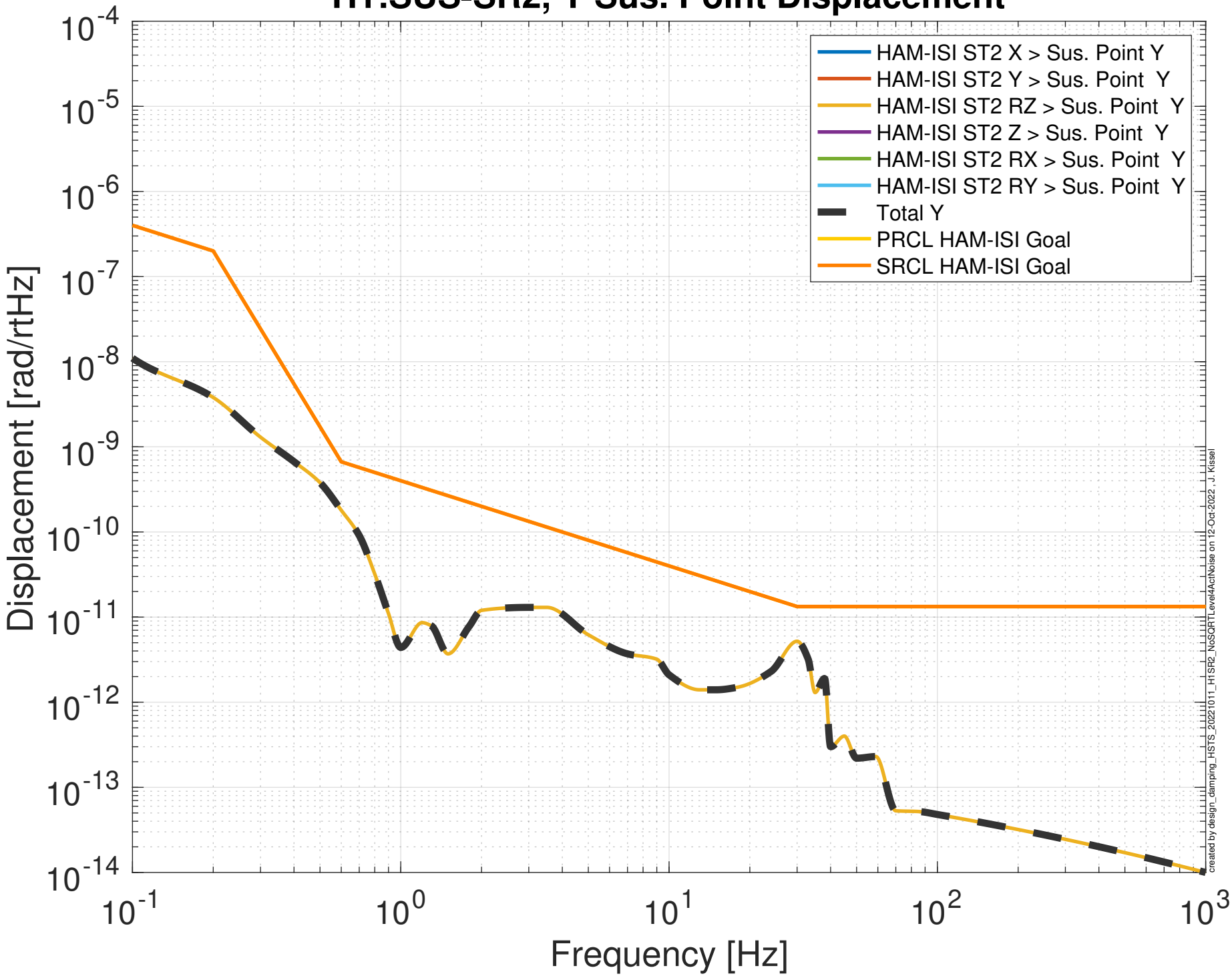


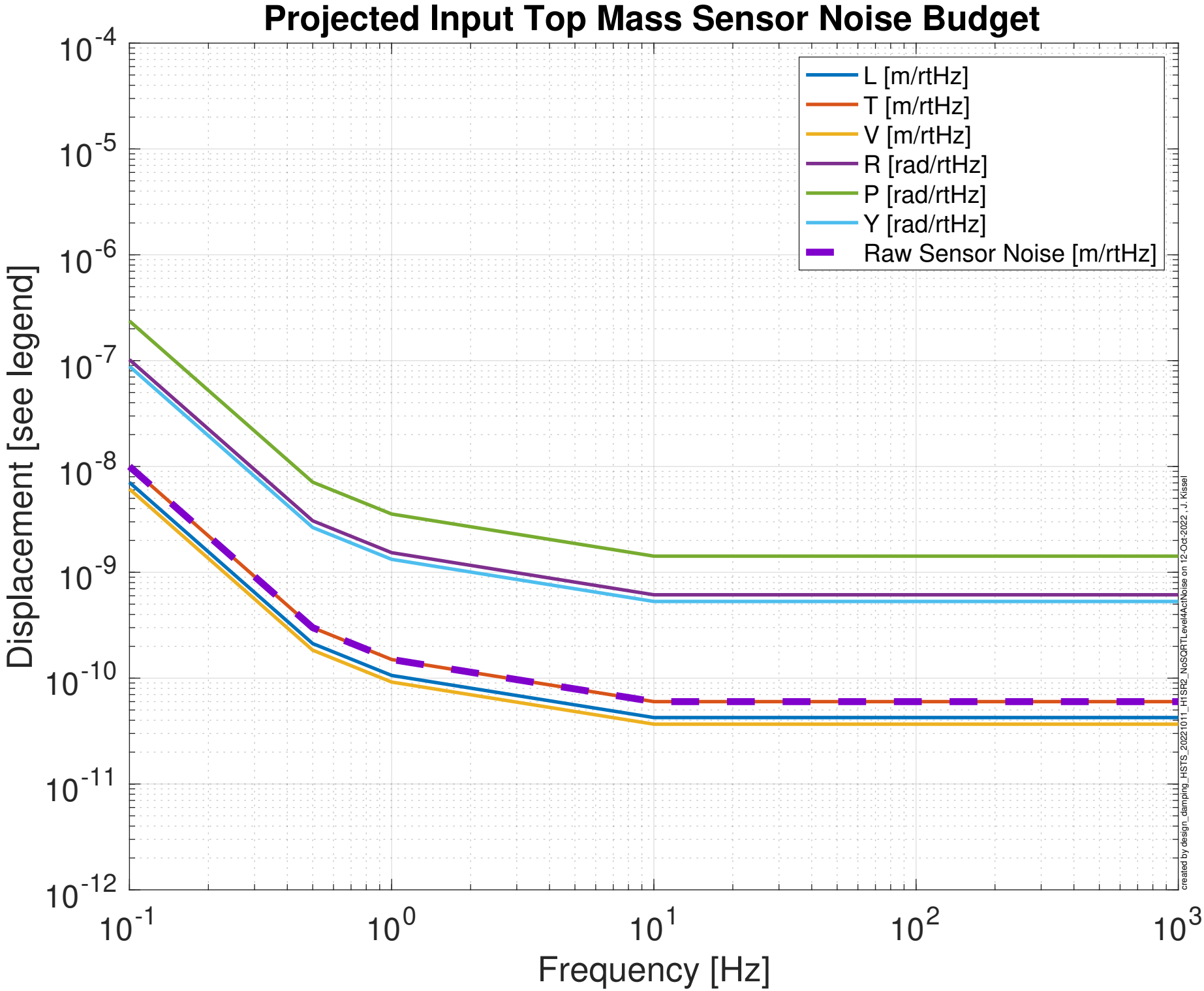

Projected ISI Seismic Noise Budget
H1:SUS-SR2, V Sus. Point Displacement
HAM-ISI ST2 X > Sus. Point V
HAM-ISI ST2 Y > Sus. Point V
HAM-ISI ST2 RZ > Sus. Point V
HAM-ISI ST2 Z > Sus. Point V
HAM-ISI ST2 RX > Sus. Point V
HAM-ISI ST2 RY > Sus. Point V
Total V
PRCL HAM-ISI Goal
SRCL HAM-ISI Goal
Displacement [m/rtHz]
Frequency [Hz]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AclNoise on 12-Oct-2022 , J. Kissel

Projected ISI Seismic Noise Budget
H1:SUS-SR2, R Sus. Point Displacement




Projected ISI Seismic Noise Budget
H1:SUS-SR2, P Sus. Point Displacement
HAM-ISI ST2 X > Sus. Point P
HAM-ISI ST2 Y > Sus. Point P
HAM-ISI ST2 RZ > Sus. Point P
HAM-ISI ST2 Z > Sus. Point P
HAM-ISI ST2 RX > Sus. Point P
HAM-ISI ST2 RY > Sus. Point P
Total P
PRCL HAM-ISI Goal
SRCL HAM-ISI Goal
Displacement [rad/rtHz]
Frequency [Hz]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AclNoise on 12-Oct-2022 , J. Kissel


Projected ISI Seismic Noise Budget
H1:SUS-SR2, Y Sus. Point Displacement
HAM-ISI ST2 X > Sus. Point Y
HAM-ISI ST2 Y > Sus. Point Y
HAM-ISI ST2 RZ > Sus. Point Y
HAM-ISI ST2 Z > Sus. Point Y
HAM-ISI ST2 RX > Sus. Point Y
HAM-ISI ST2 RY > Sus. Point Y
Total Y
PRCL HAM-ISI Goal
SRCL HAM-ISI Goal
Displacement [rad/rtHz]
Frequency [Hz]
created by design_damping_HSTS_20221011_H1SR2_NoSQRTLevel4AclNoise on 12-Oct-2022 , J. Kissel


Projected Input Top Mass Sensor Noise Budget
L [m/rtHz]
T [m/rtHz]
V [m/rtHz]
R [rad/rtHz]
P [rad/rtHz]
Y [rad/rtHz]
Raw Sensor Noise [m/rtHz]
Displacement [see legend]
Frequency [Hz]
10^-4
10^-5
10^-6
10^-7
10^-8
10^-9
10^-10
10^-11
10^-12
10^-1
10^0
10^1
10^2
10^3
created by design_damping_HSTS_20221011_HTSR2_NoSQRTLevel4AccNoise on 12-Oct-2022 , J. Kissel