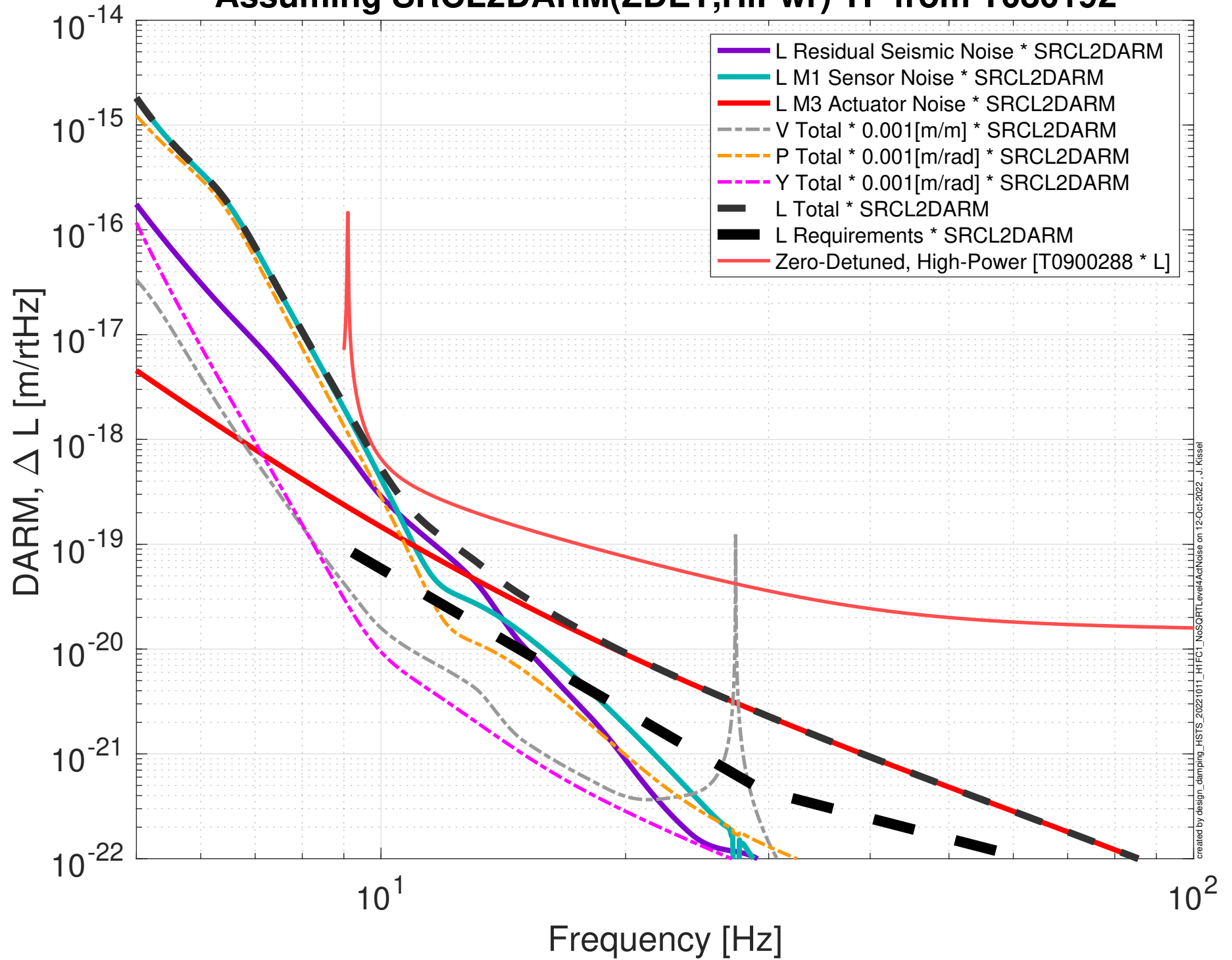
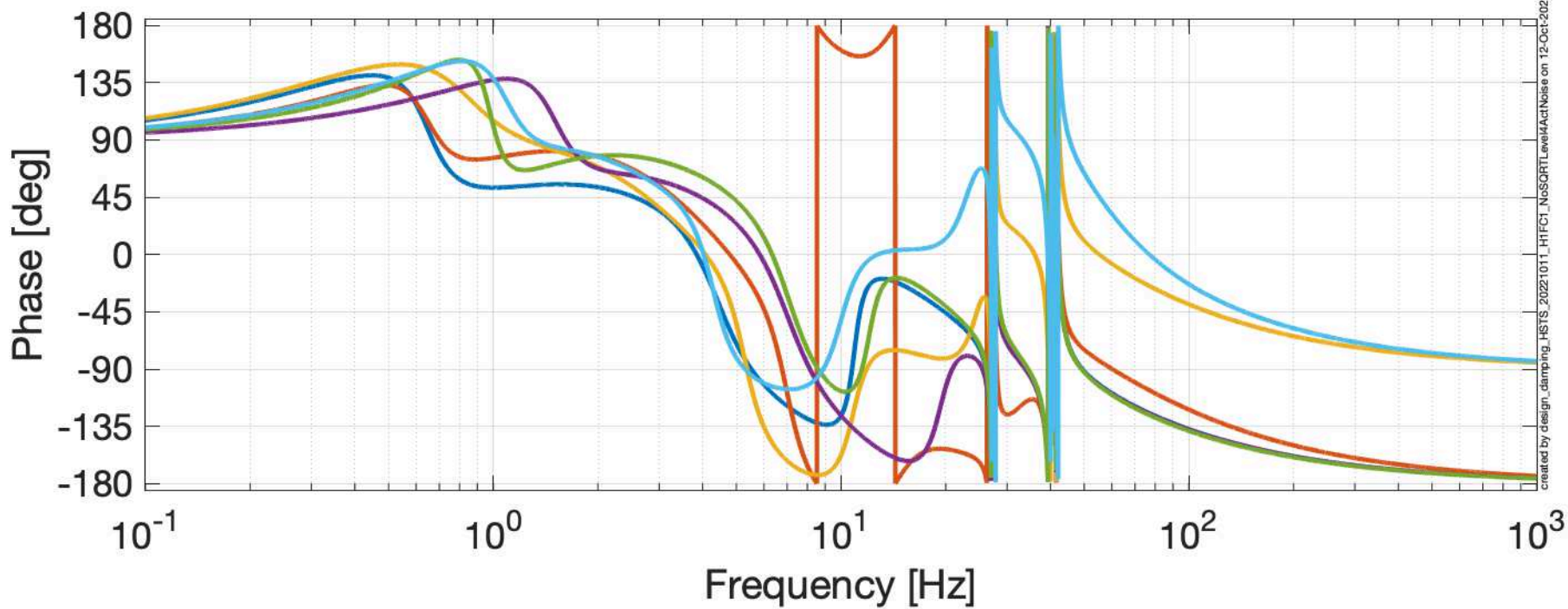
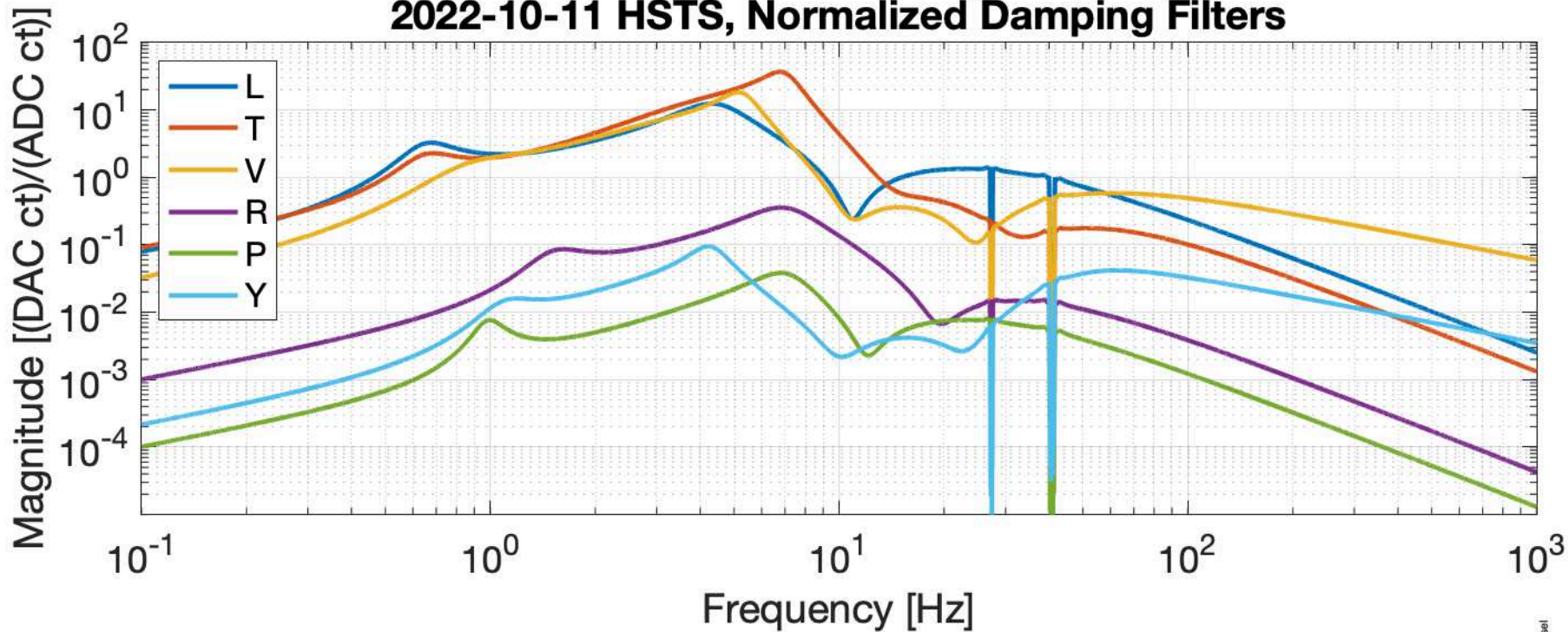


HSTS Damping Loop Performance; Differential Arm Displacement Assuming SRCL2DARM(ZDET,HiPwr) TF from T080192

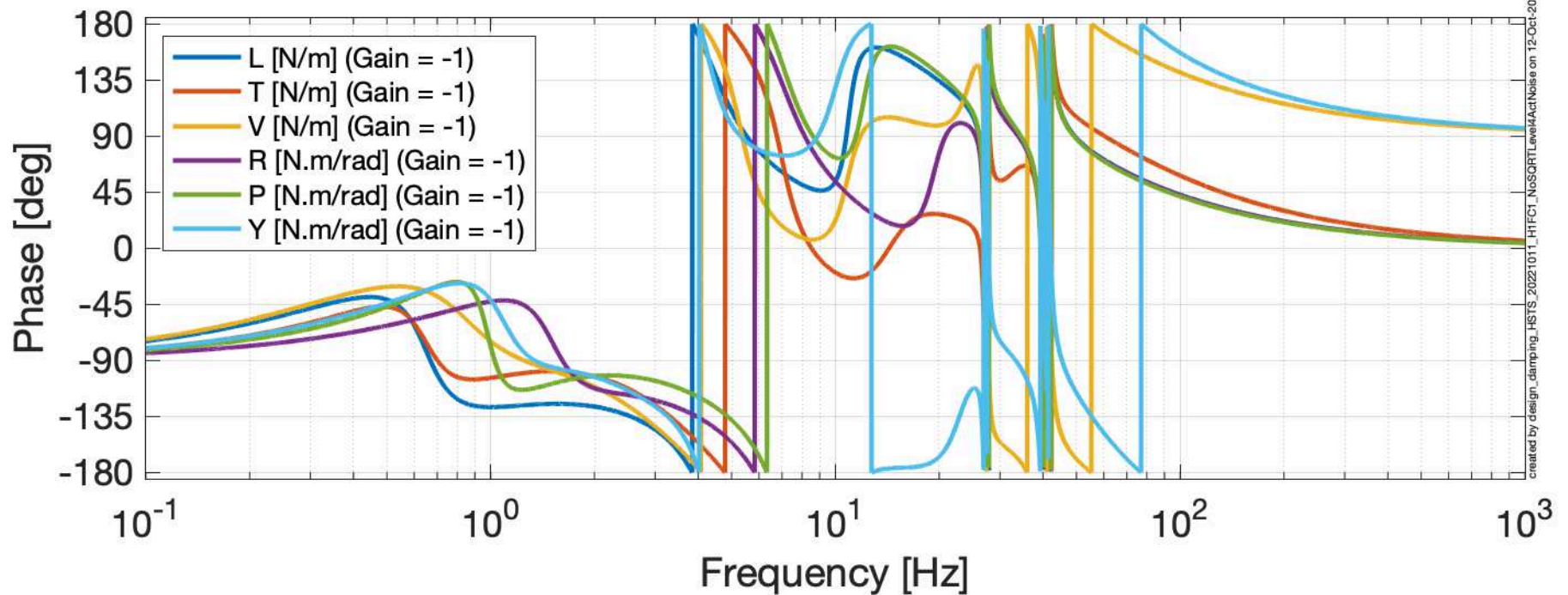
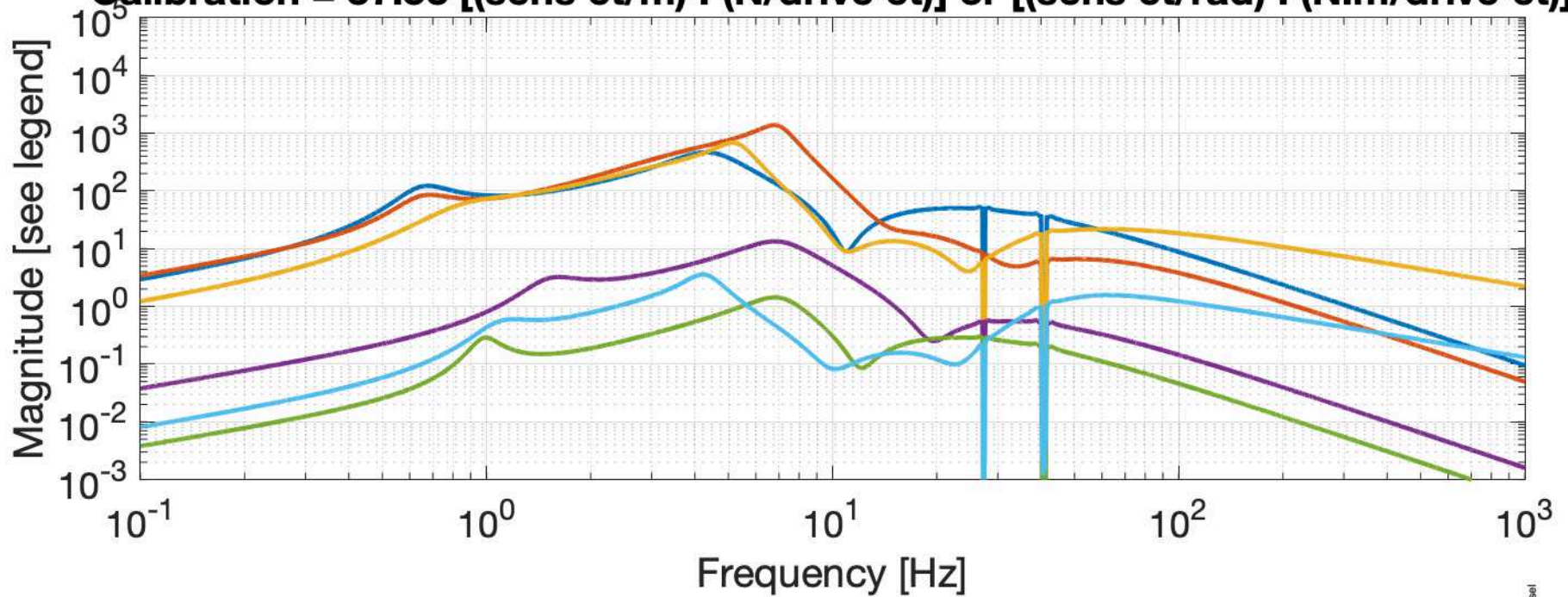


2022-10-11 HSTS, Normalized Damping Filters



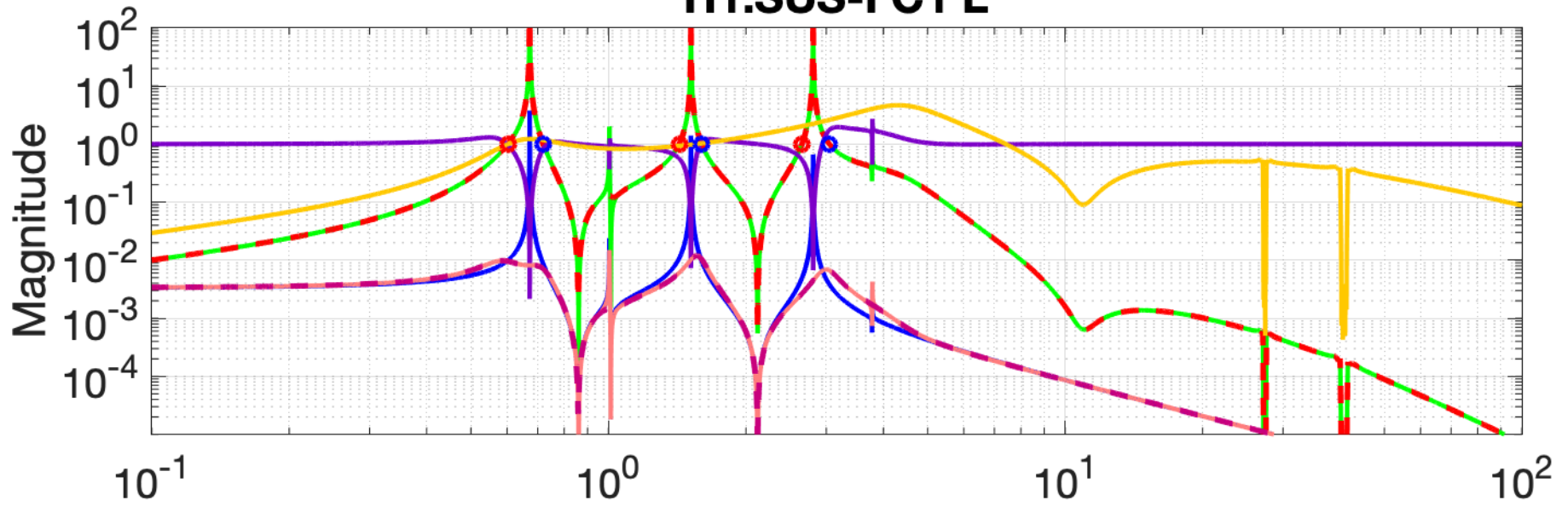
2022-10-11 HSTS, Calibrated Damping Filters

Calibration = 37.53 [(sens ct/m) . (N/drive ct)] or [(sens ct/rad) . (N.m/drive ct)]

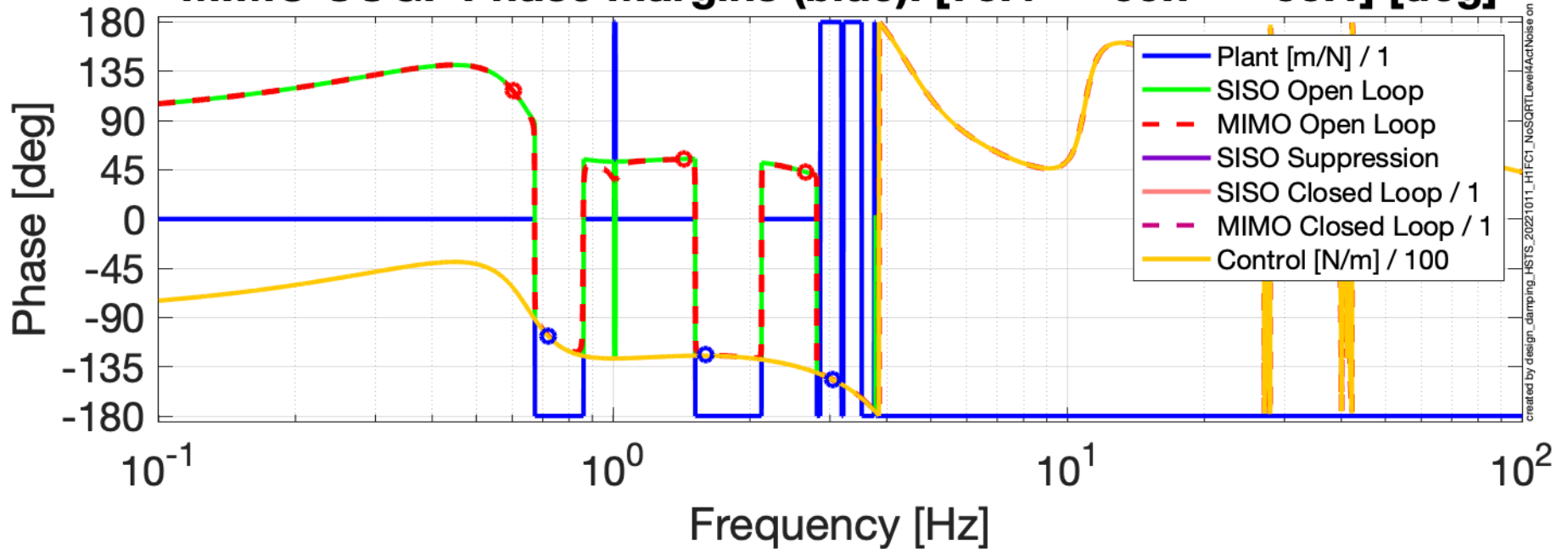


Damping Loop Design

H1:SUS-FC1 L

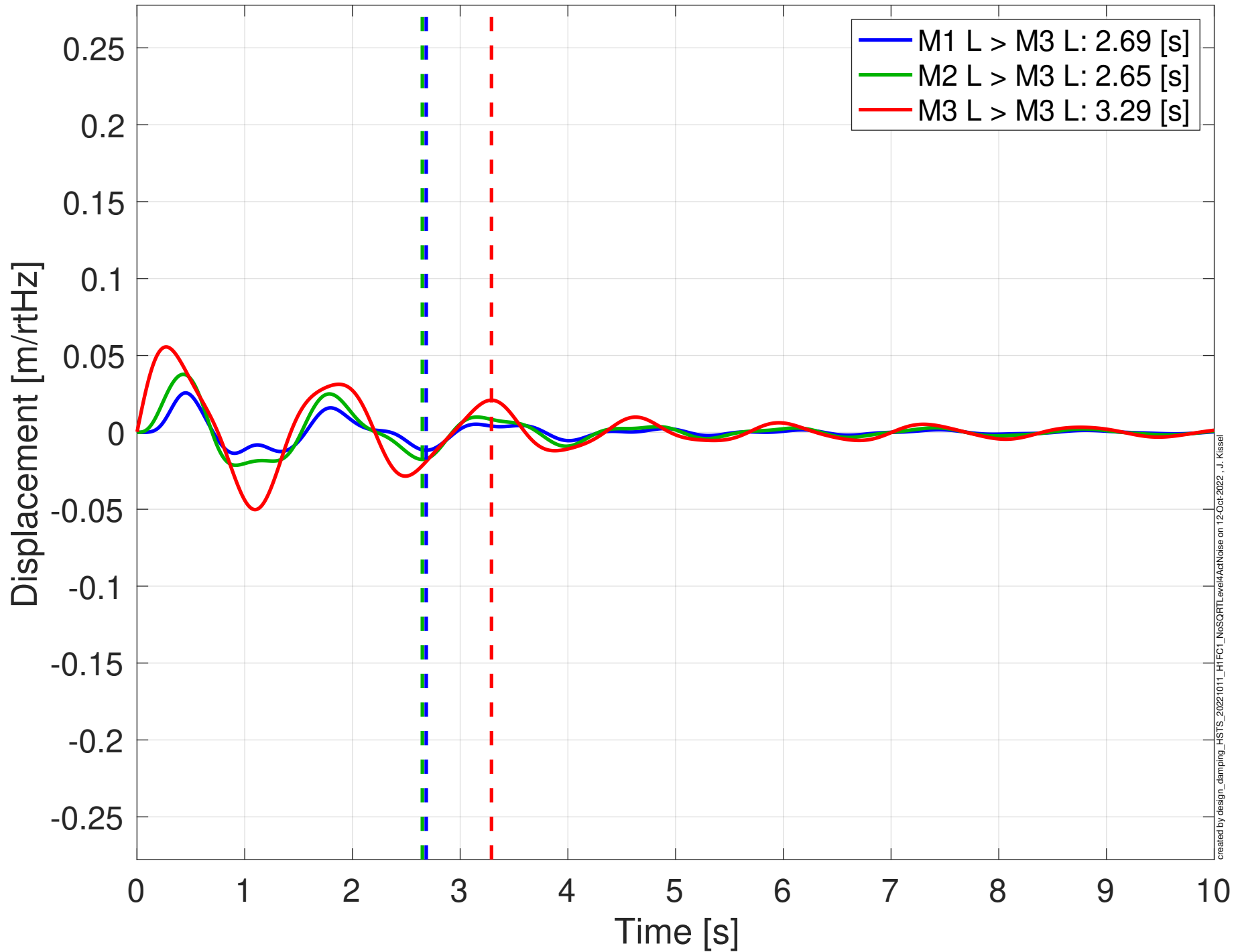


MIMO LUGF Phase Margins (red): [63 125 137] [deg]
MIMO UUGF Phase Margins (blue): [73.4 55.7 33.1] [deg]

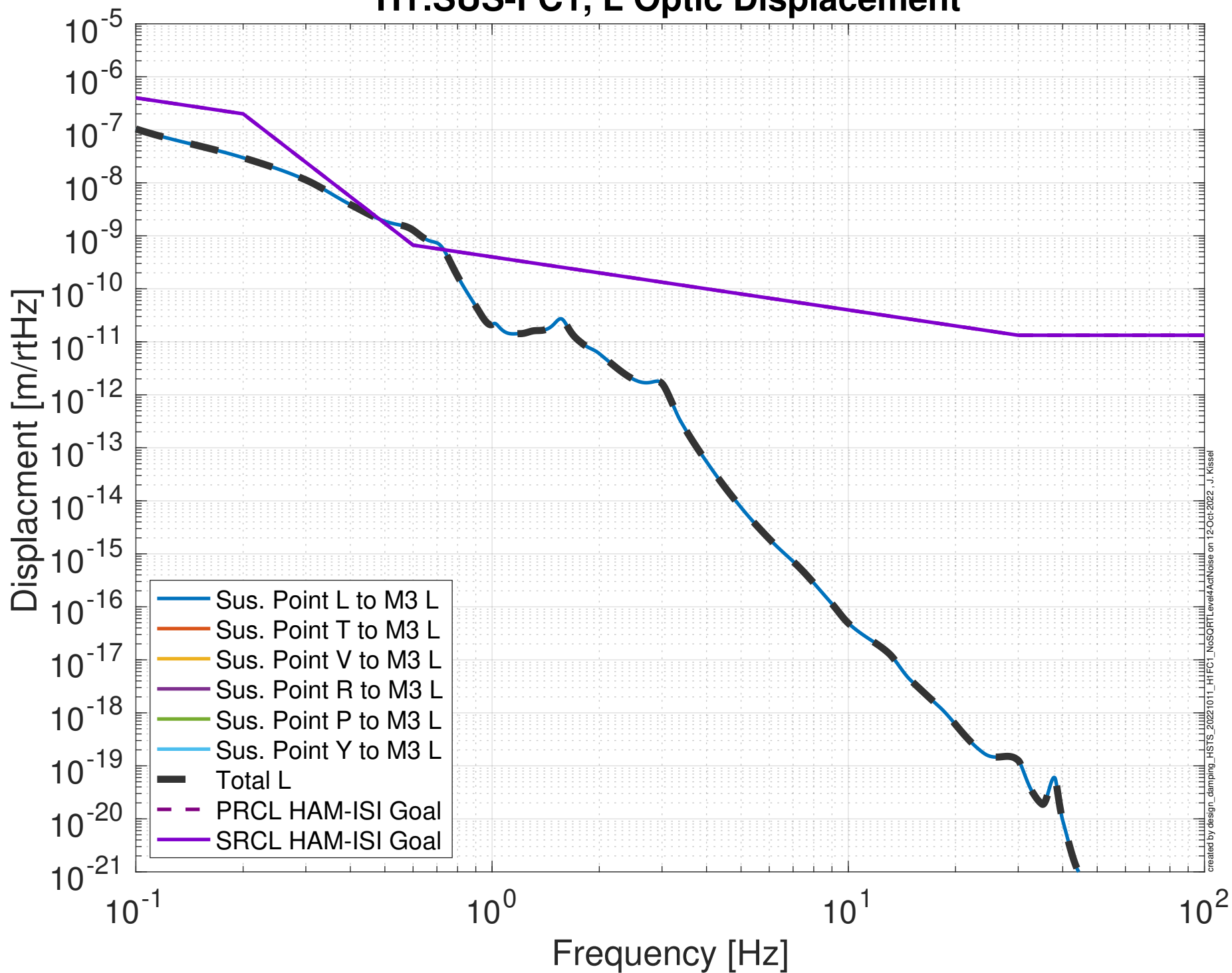


Damped Impulse Response

H1:SUS-FC1 L

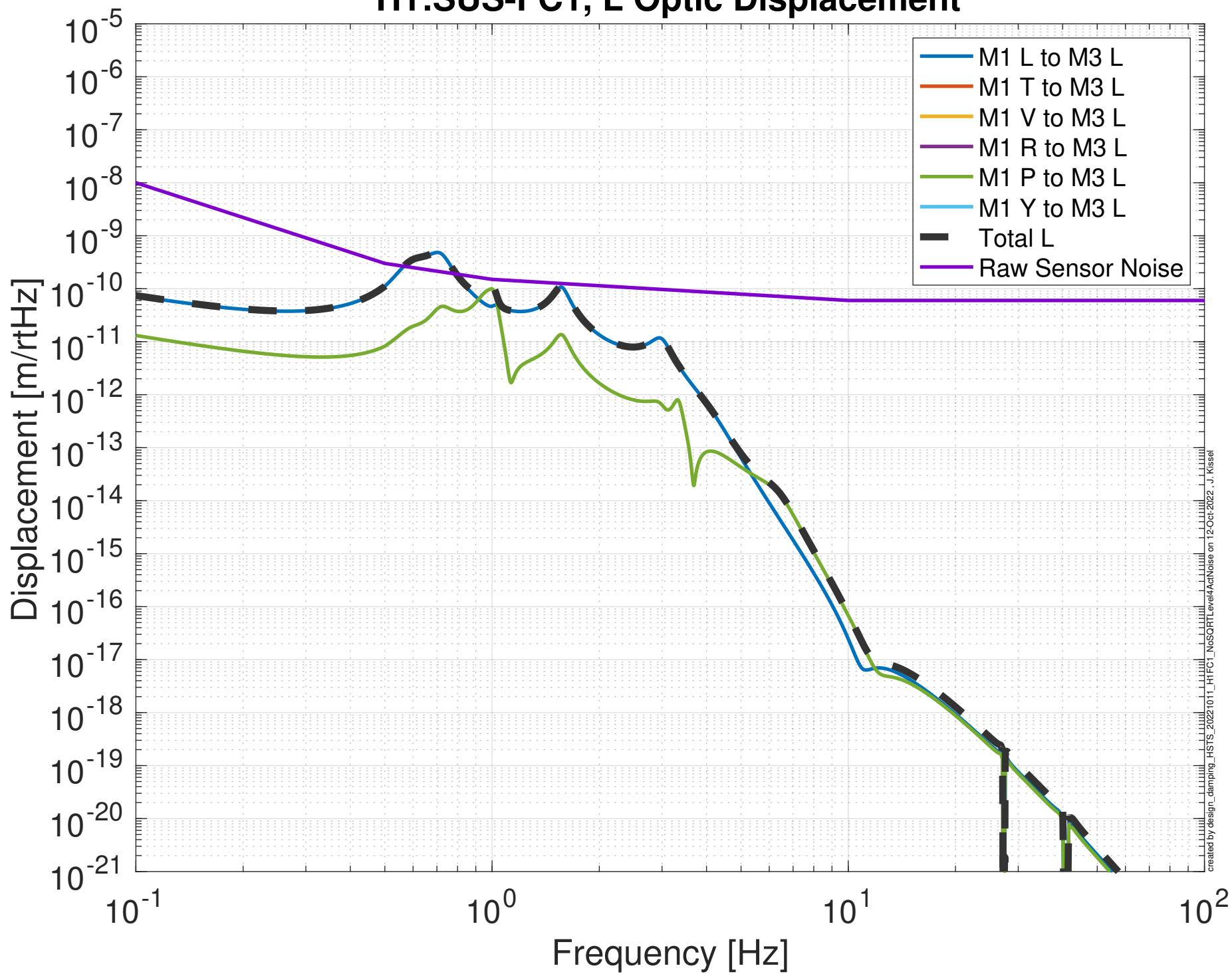


Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-FC1, L Optic Displacement



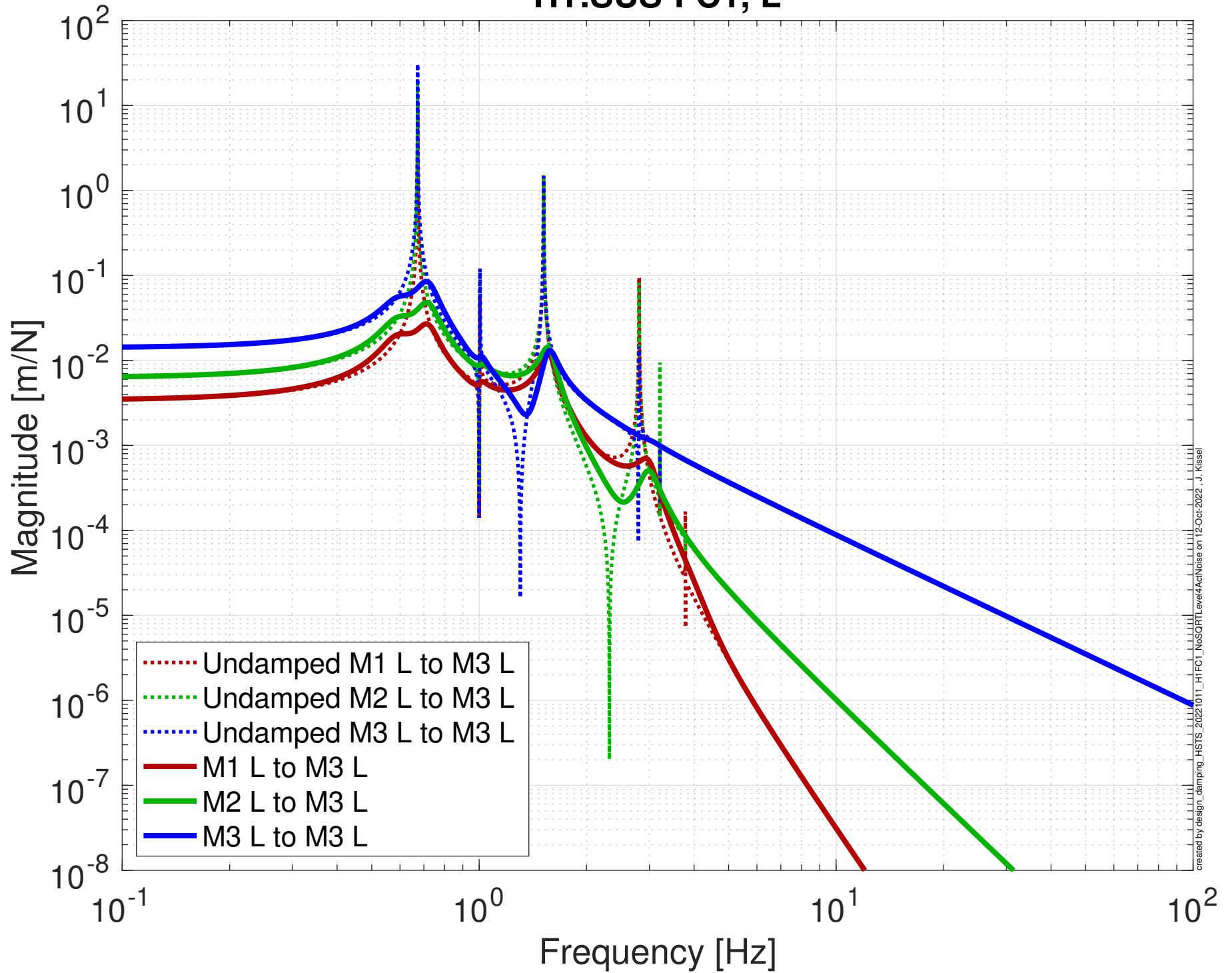
created by design_damping_H1STS_20221011_H1FC1_NUSORT_Level4ActNoise on 12 Oct 2022, J. Kissel

Projected Top Mass Sensor > Optic Noise Budget H1:SUS-FC1, L Optic Displacement

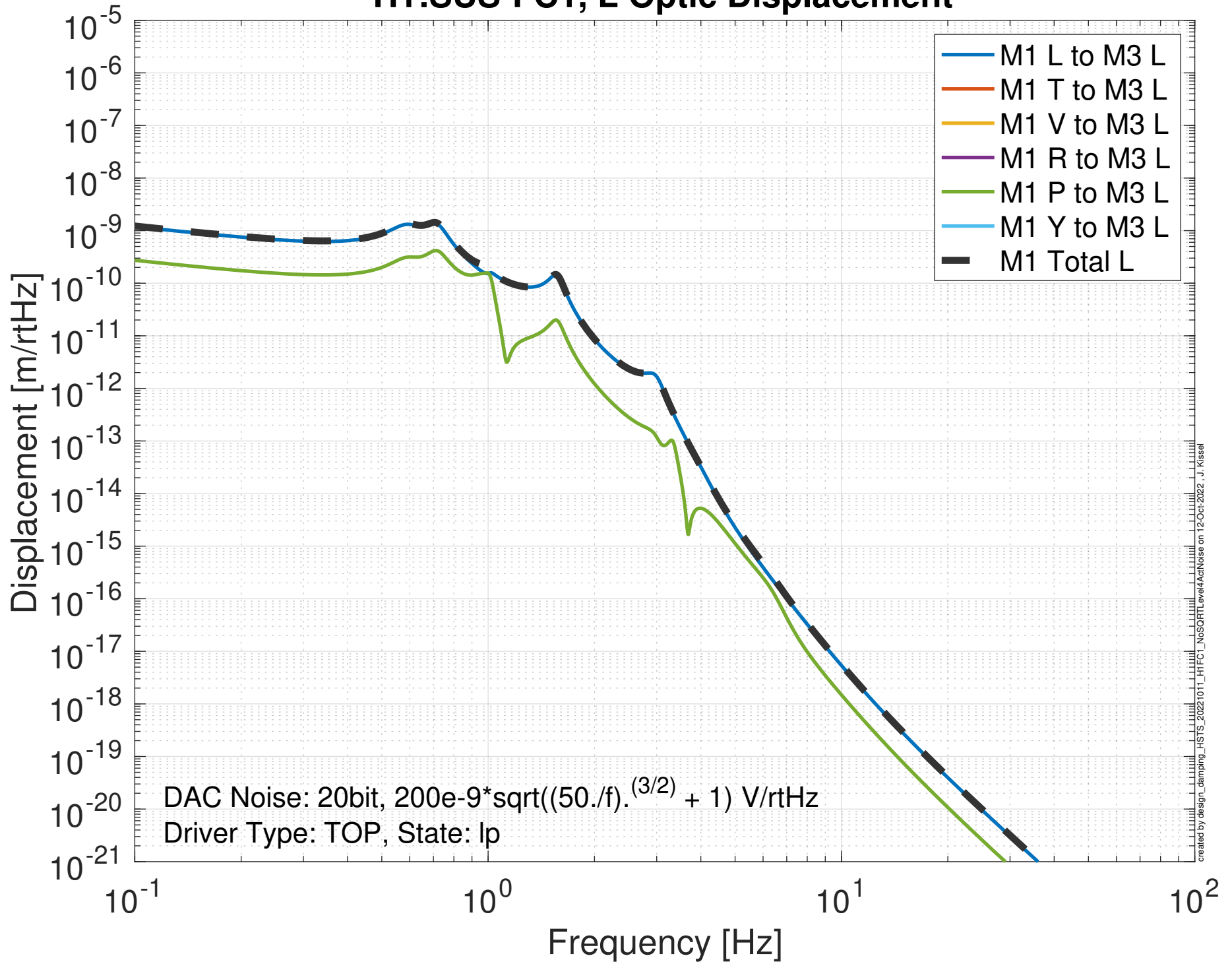


Global Control Transfer Functions to Optic

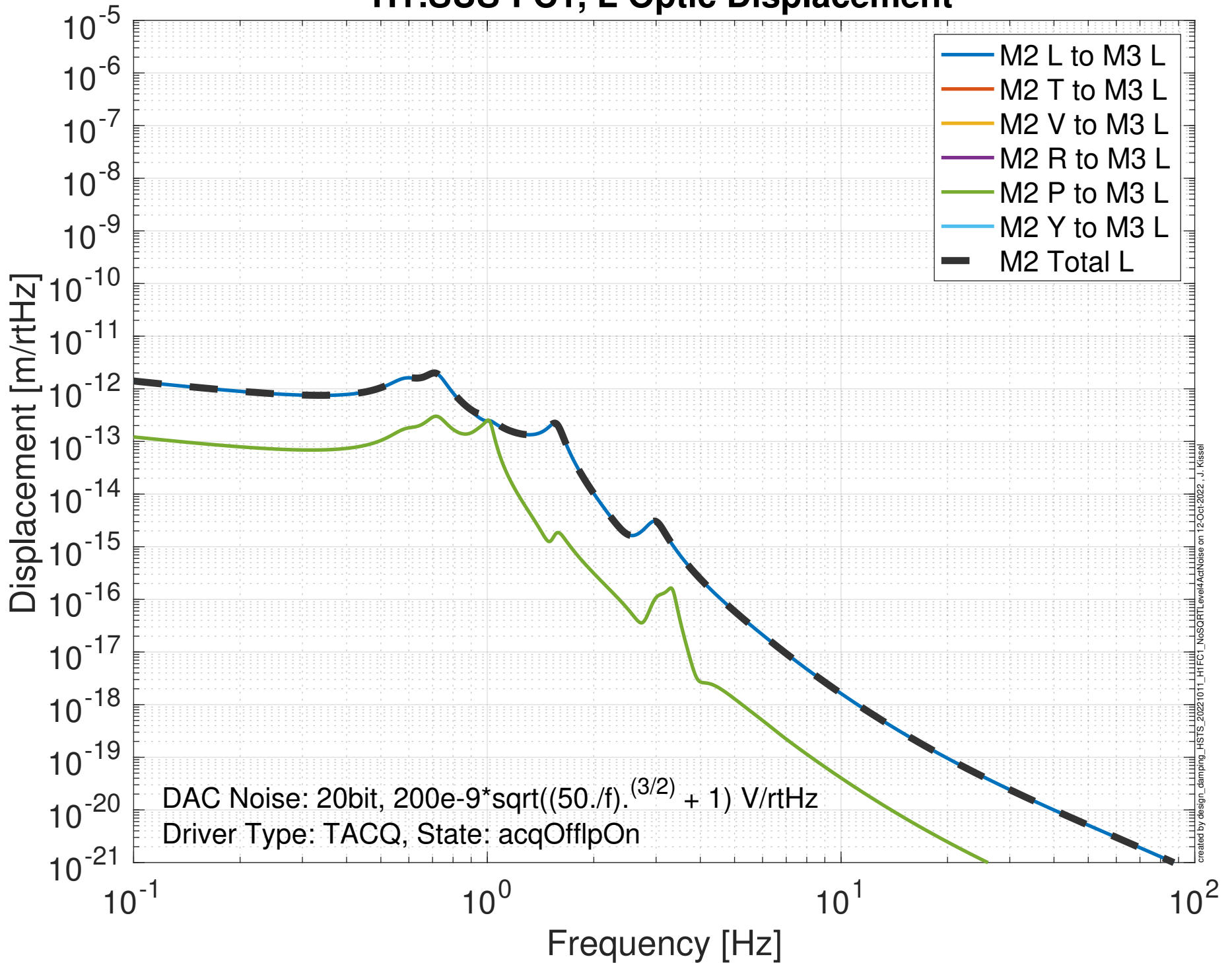
H1:SUS-FC1, L



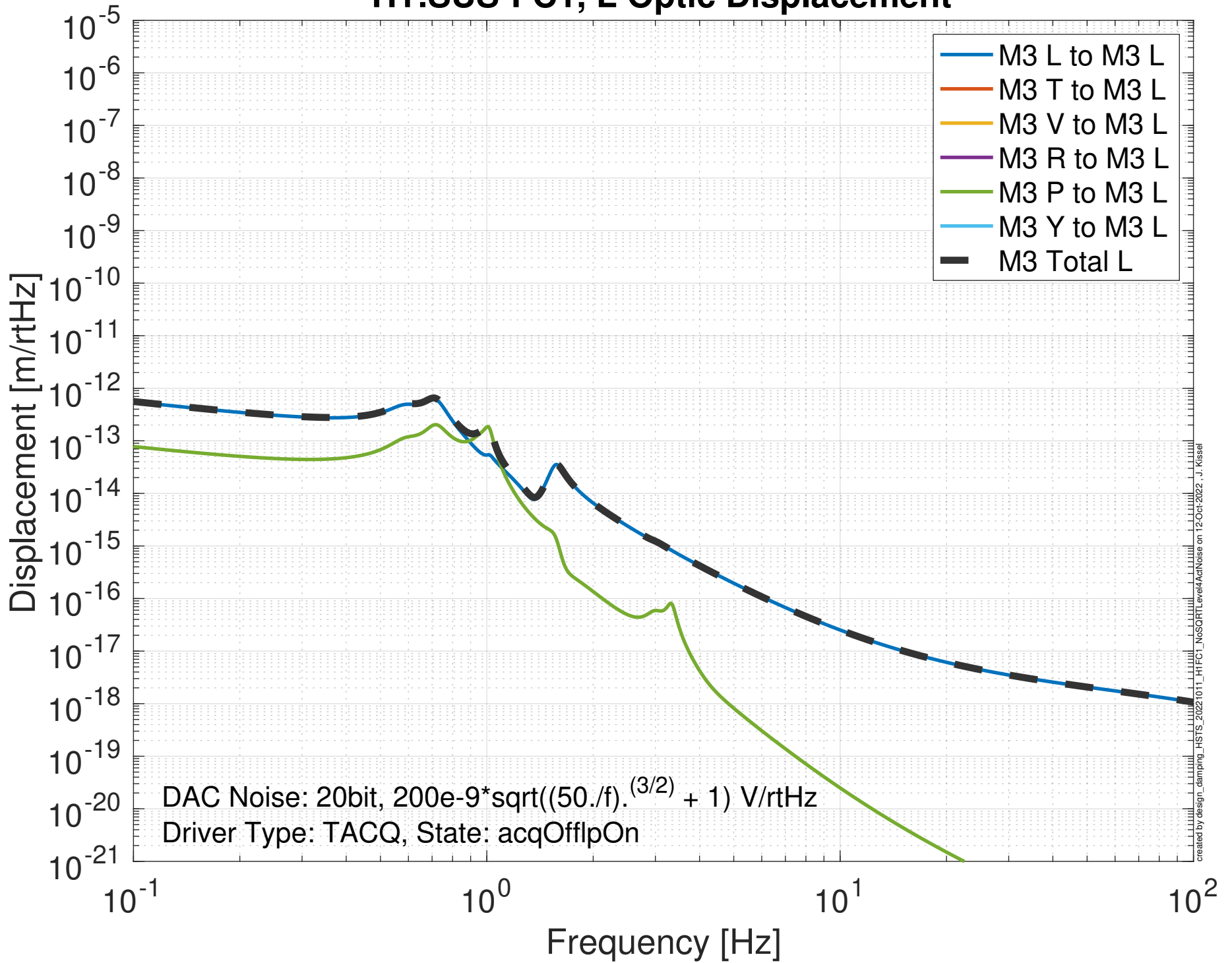
Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-FC1, L Optic Displacement



Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-FC1, L Optic Displacement



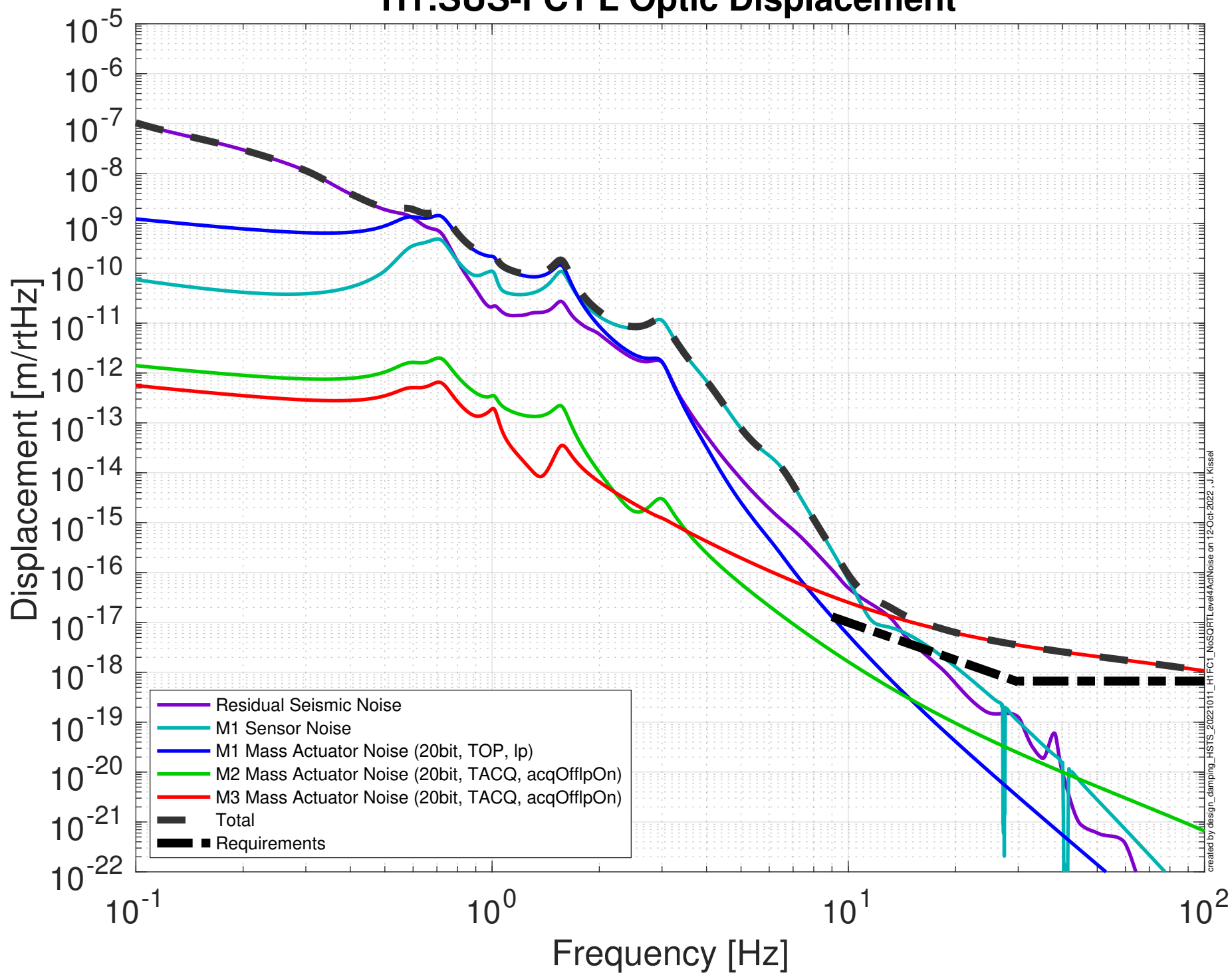
Projected M3 Mass Actuator > Optic Noise Budget H1:SUS-FC1, L Optic Displacement



created by design_campng_HSTS_20221011_HFC1_NUSORT_Level4ActNoise on 12 Oct 2022, J. Kissel

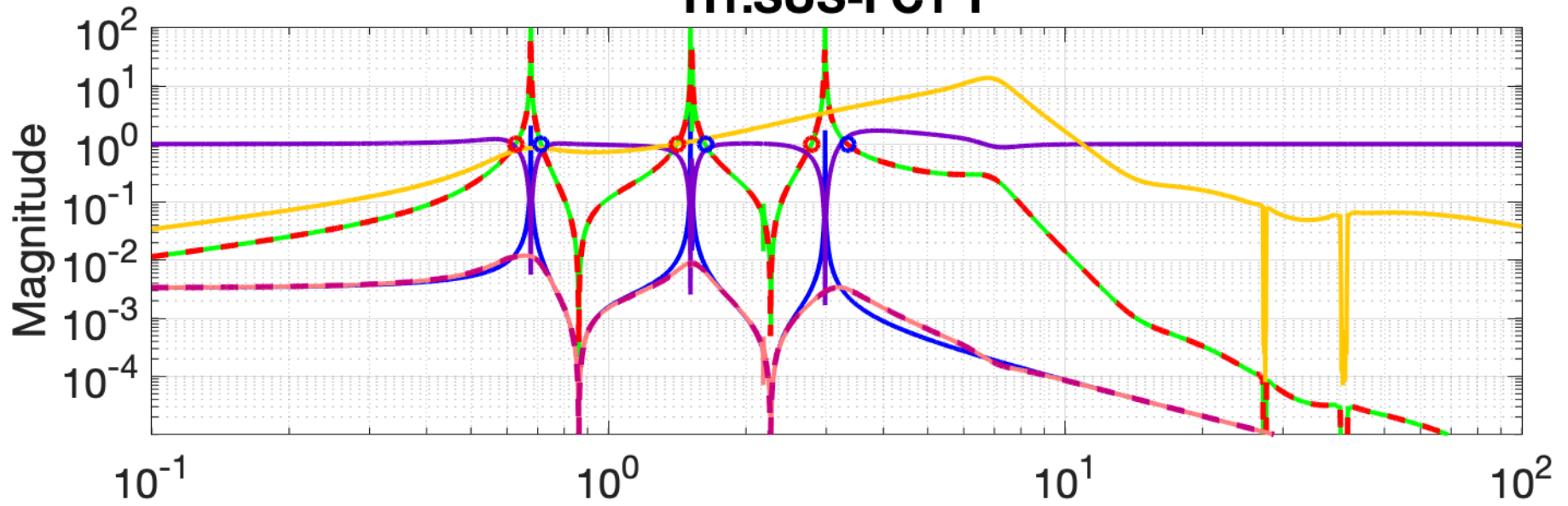
Damping Loop Performance

H1:SUS-FC1 L Optic Displacement

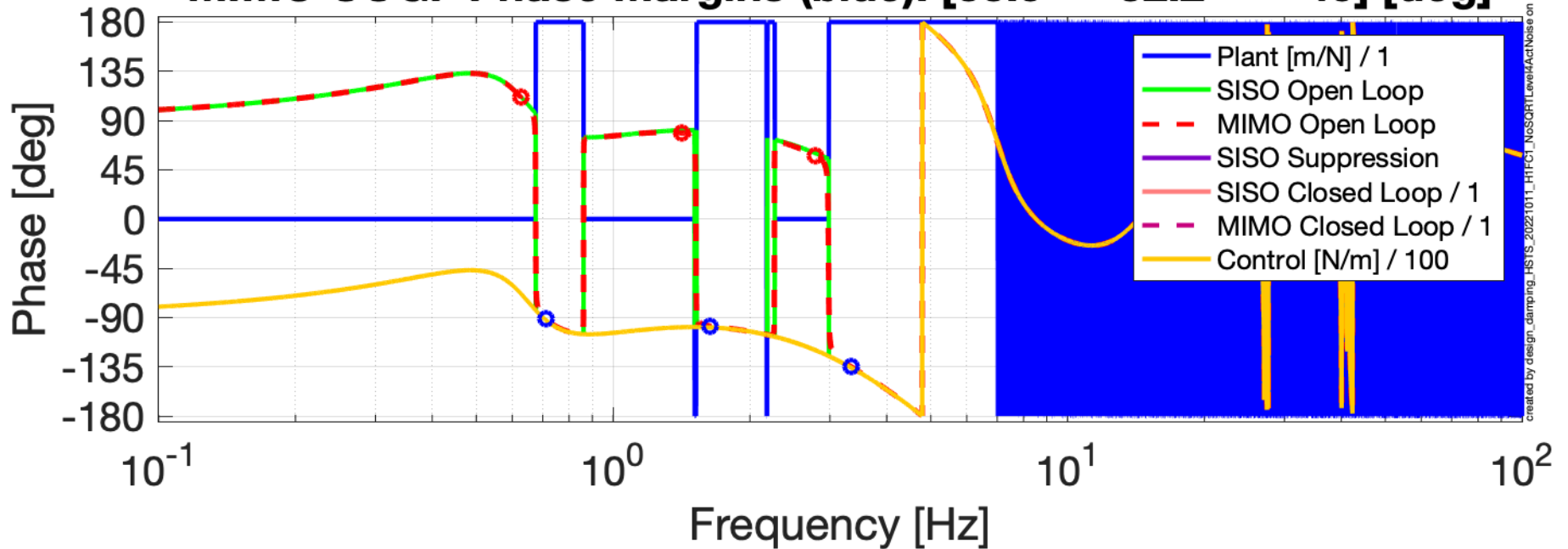


Damping Loop Design

H1:SUS-FC1 T

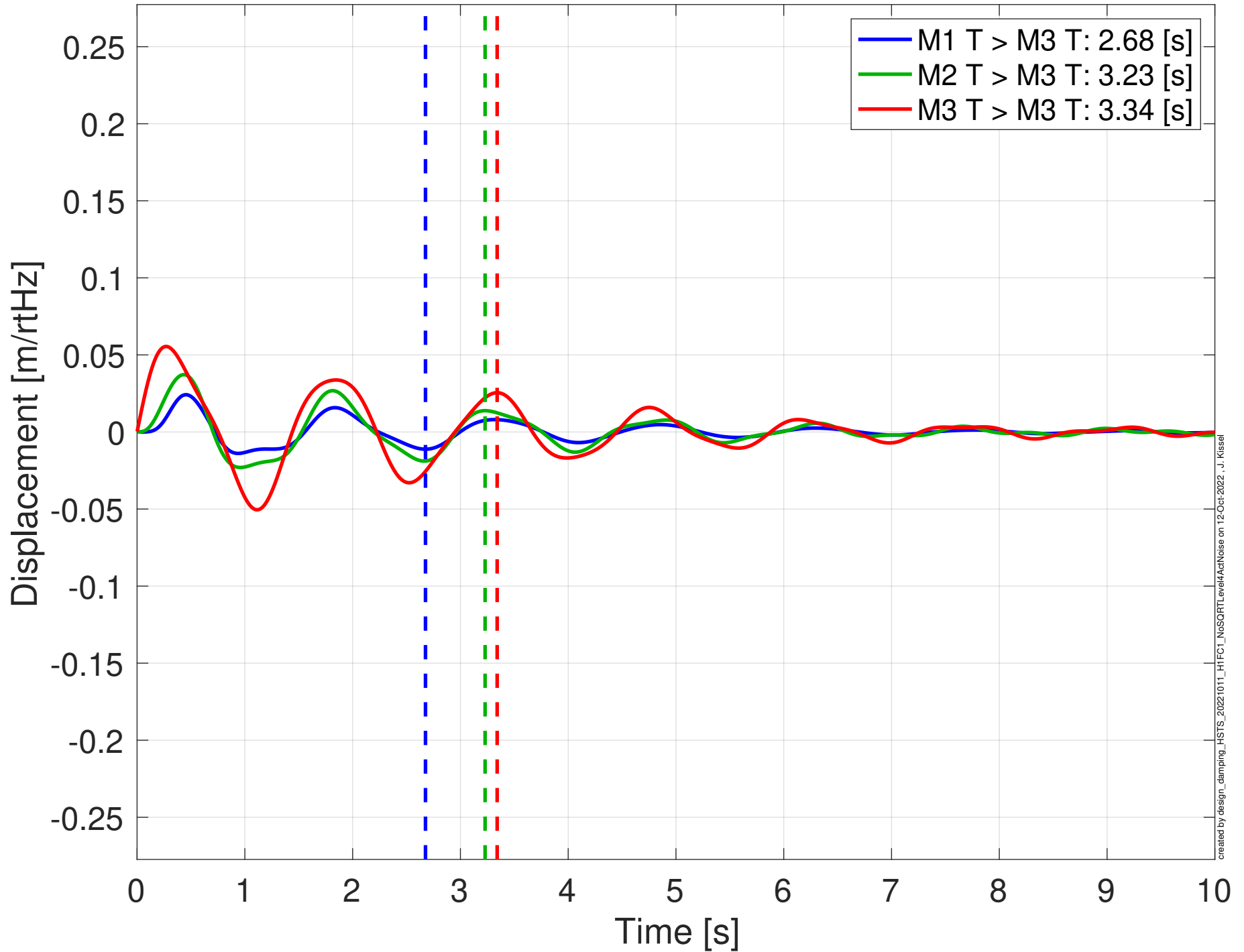


MIMO LUGF Phase Margins (red): [68.7 101 122] [deg]
MIMO UUGF Phase Margins (blue): [88.5 82.2 45] [deg]

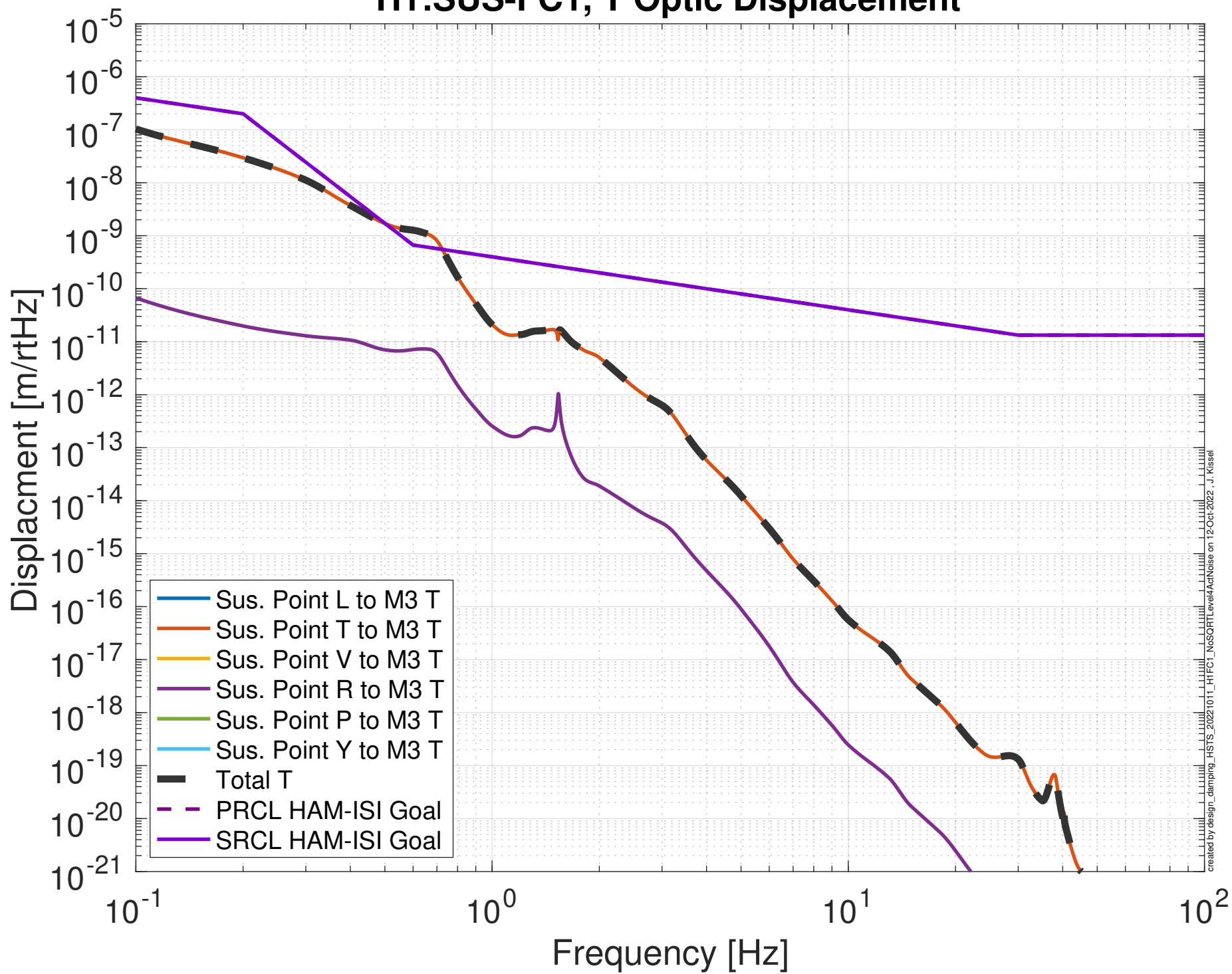


Damped Impulse Response

H1:SUS-FC1 T

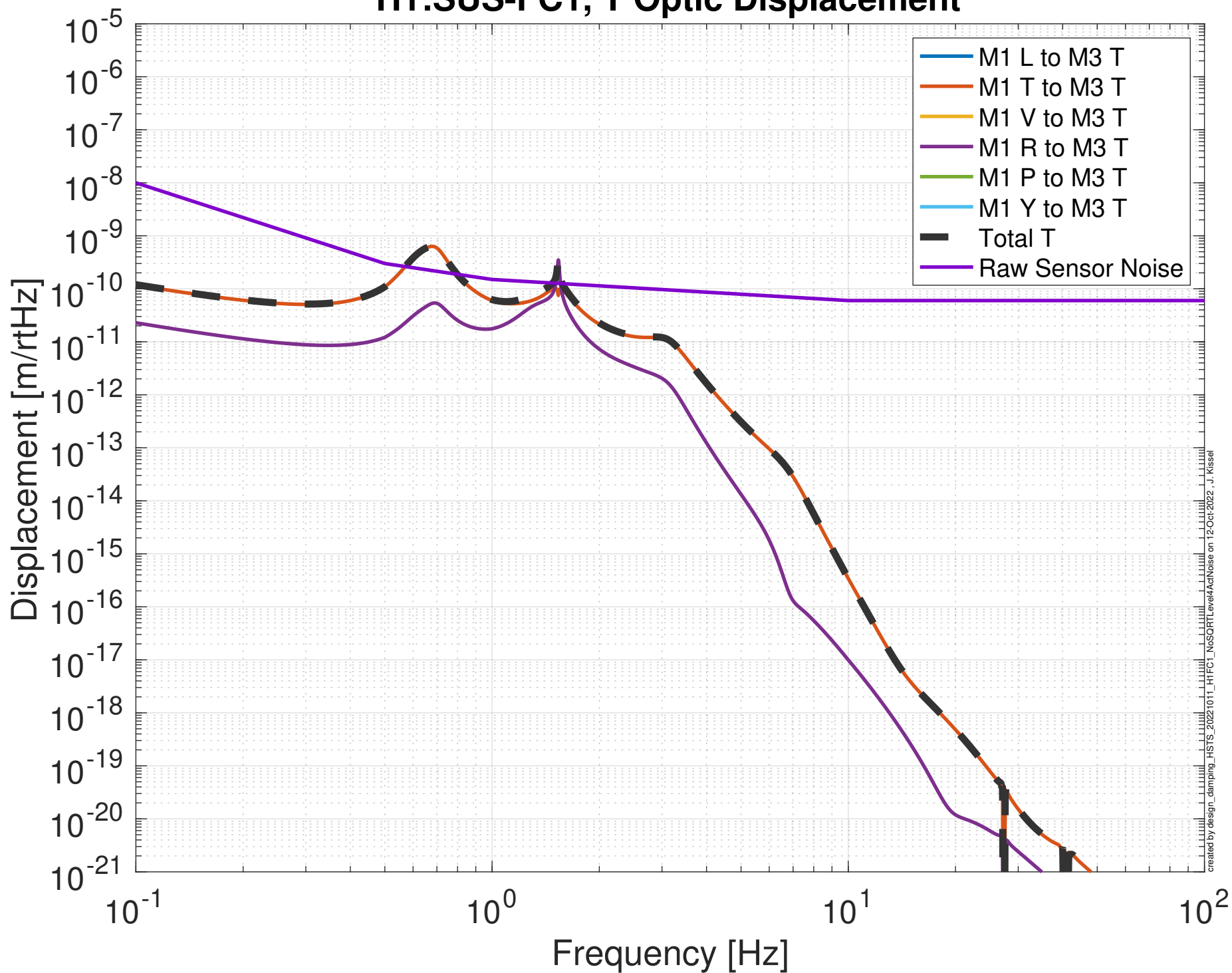


Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-FC1, T Optic Displacement

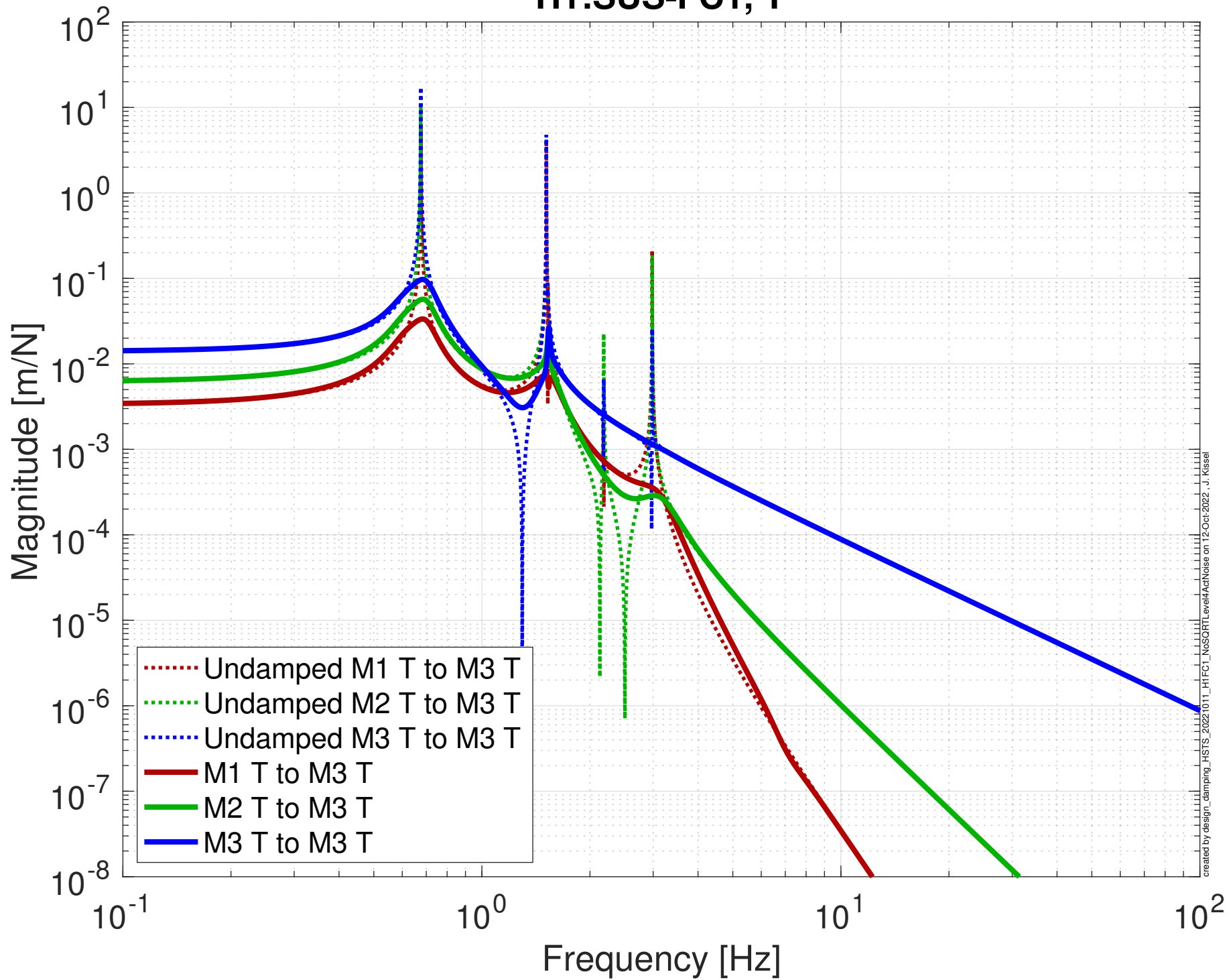


created by design_damping_H1STS_20221011_H1FC1_NUSORT_Level4ActNoise on 12 Oct 2022, J. Kissel

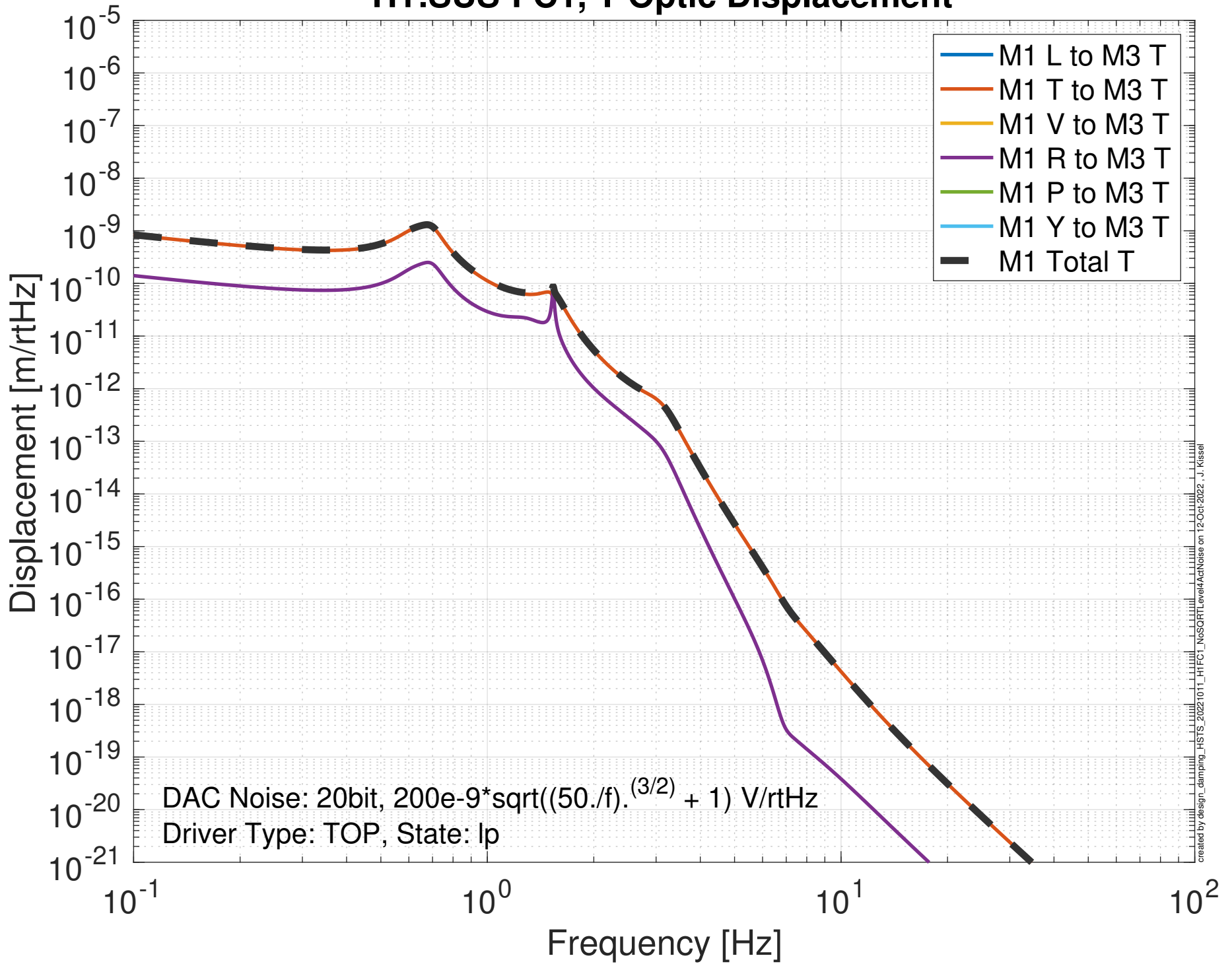
Projected Top Mass Sensor > Optic Noise Budget H1:SUS-FC1, T Optic Displacement



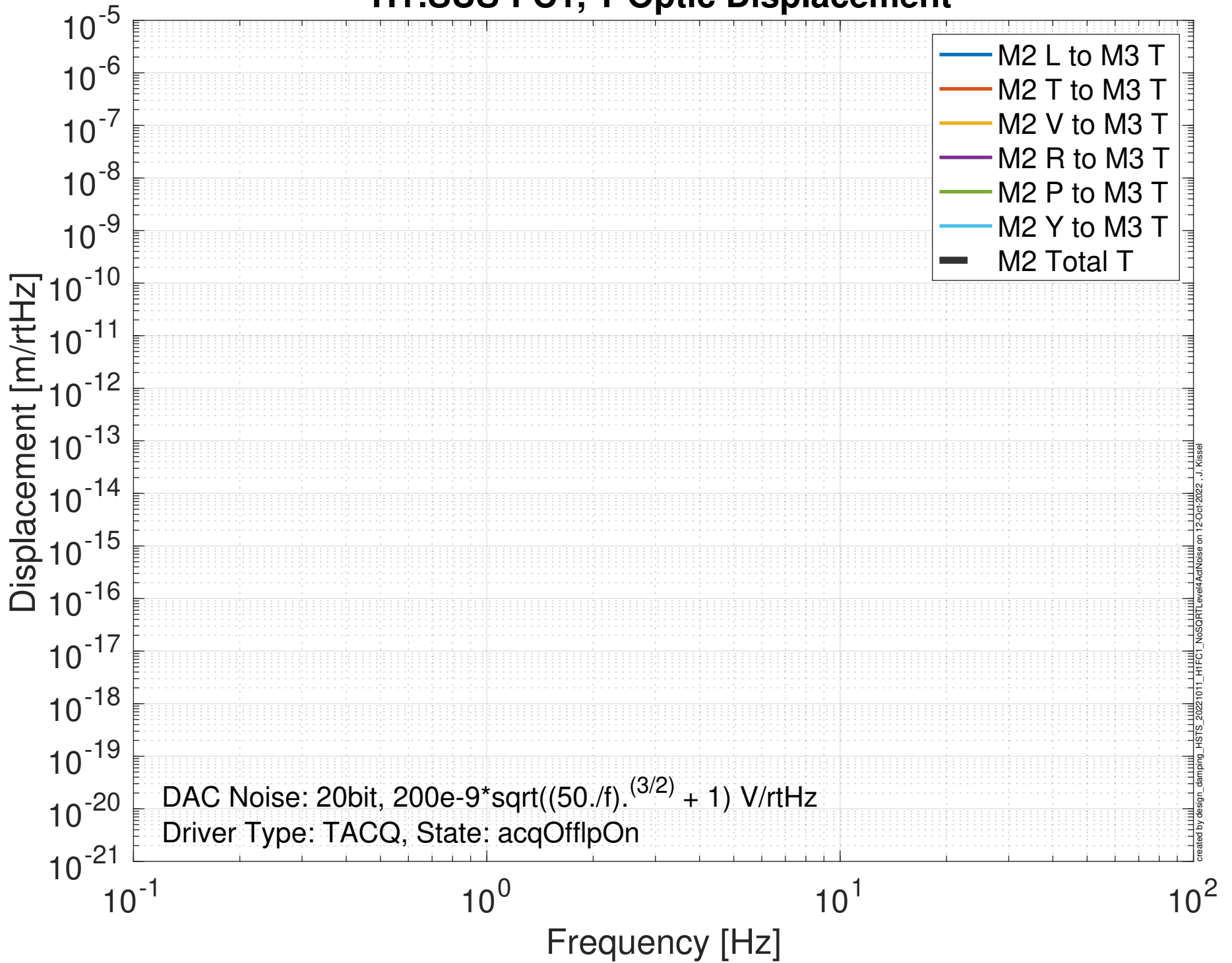
Global Control Transfer Functions to Optic H1:SUS-FC1, T



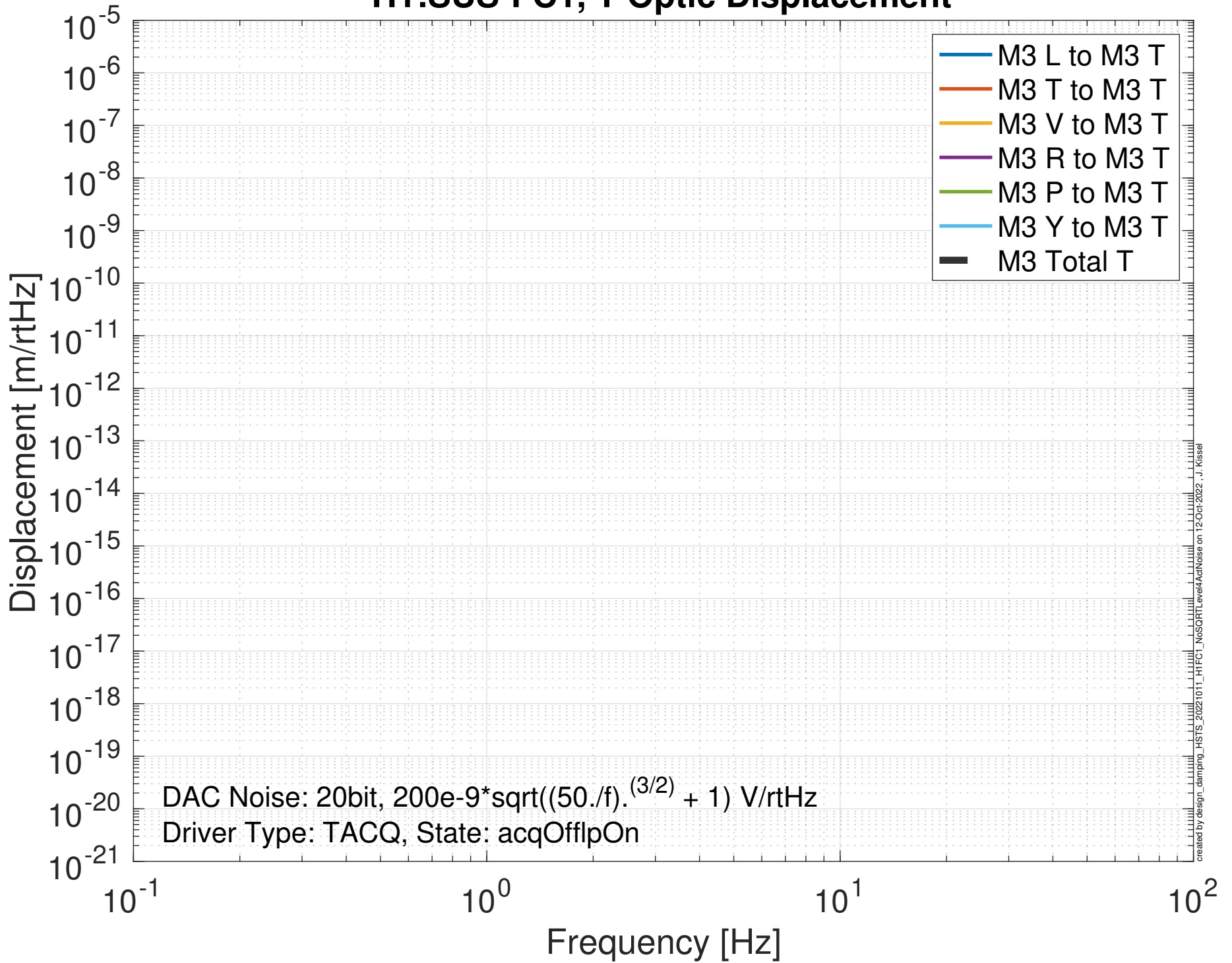
Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-FC1, T Optic Displacement



Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-FC1, T Optic Displacement

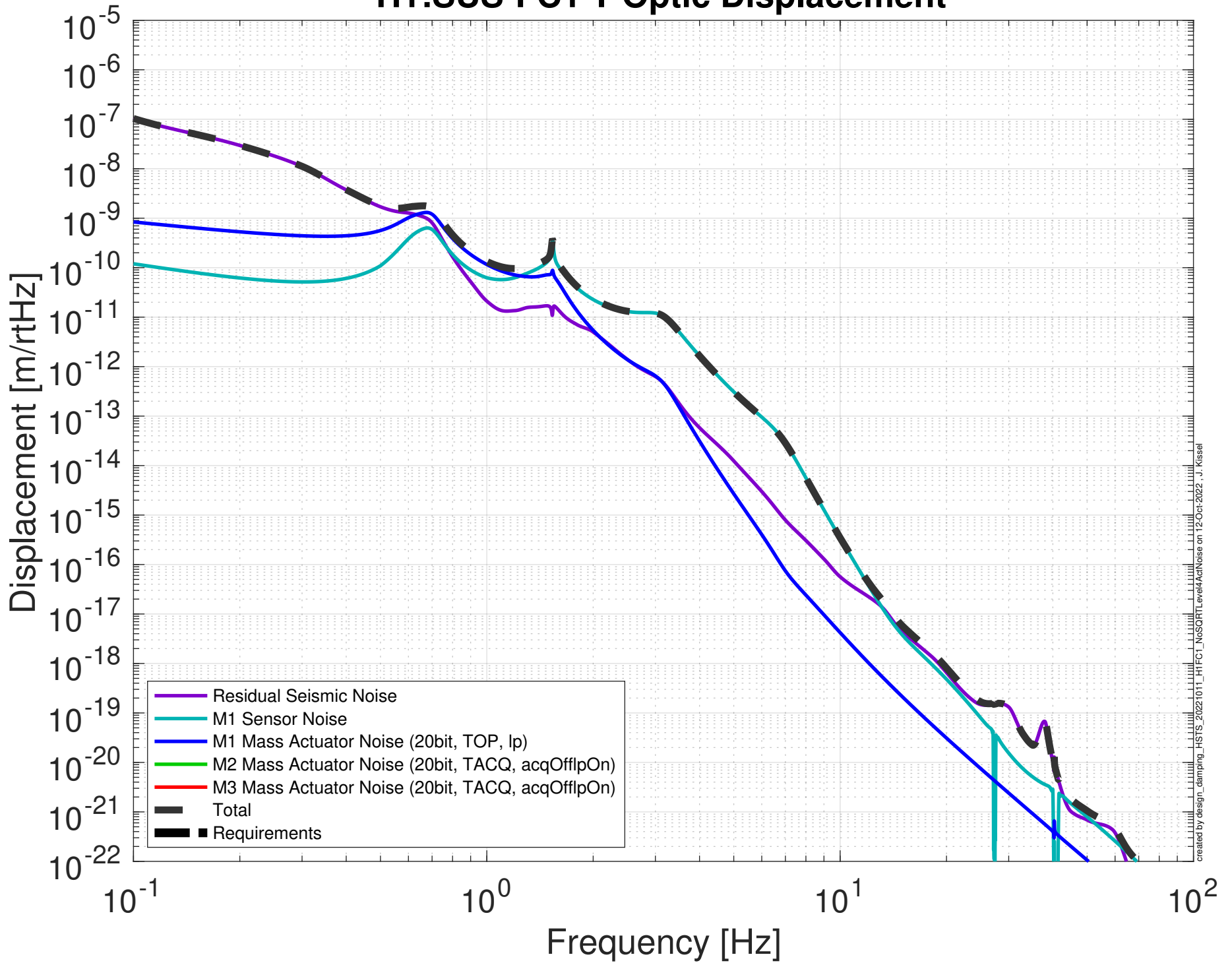


Projected M3 Mass Actuator > Optic Noise Budget H1:SUS-FC1, T Optic Displacement



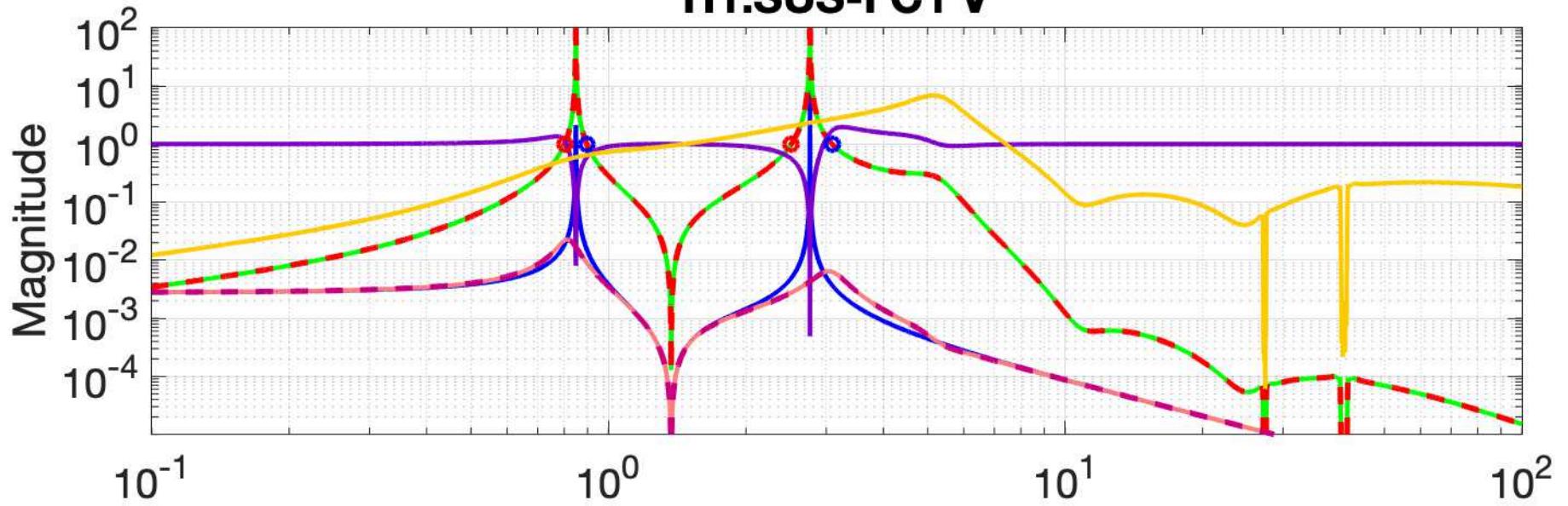
Damping Loop Performance

H1:SUS-FC1 T Optic Displacement



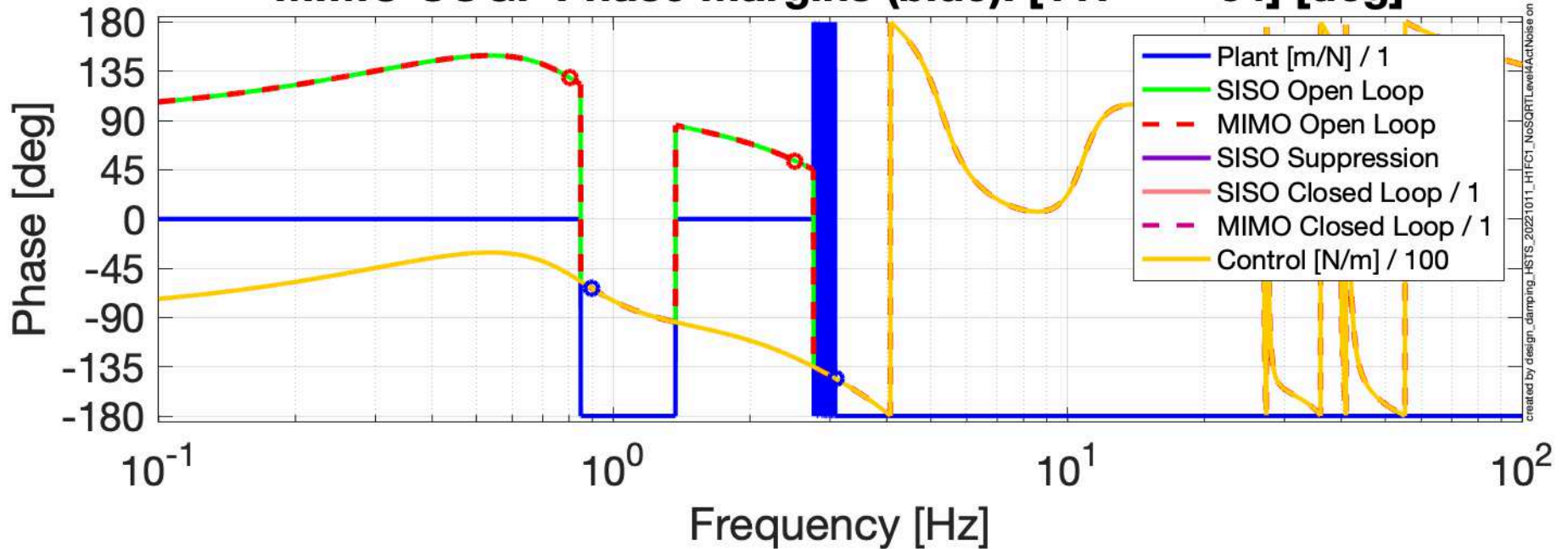
Damping Loop Design

H1:SUS-FC1 V



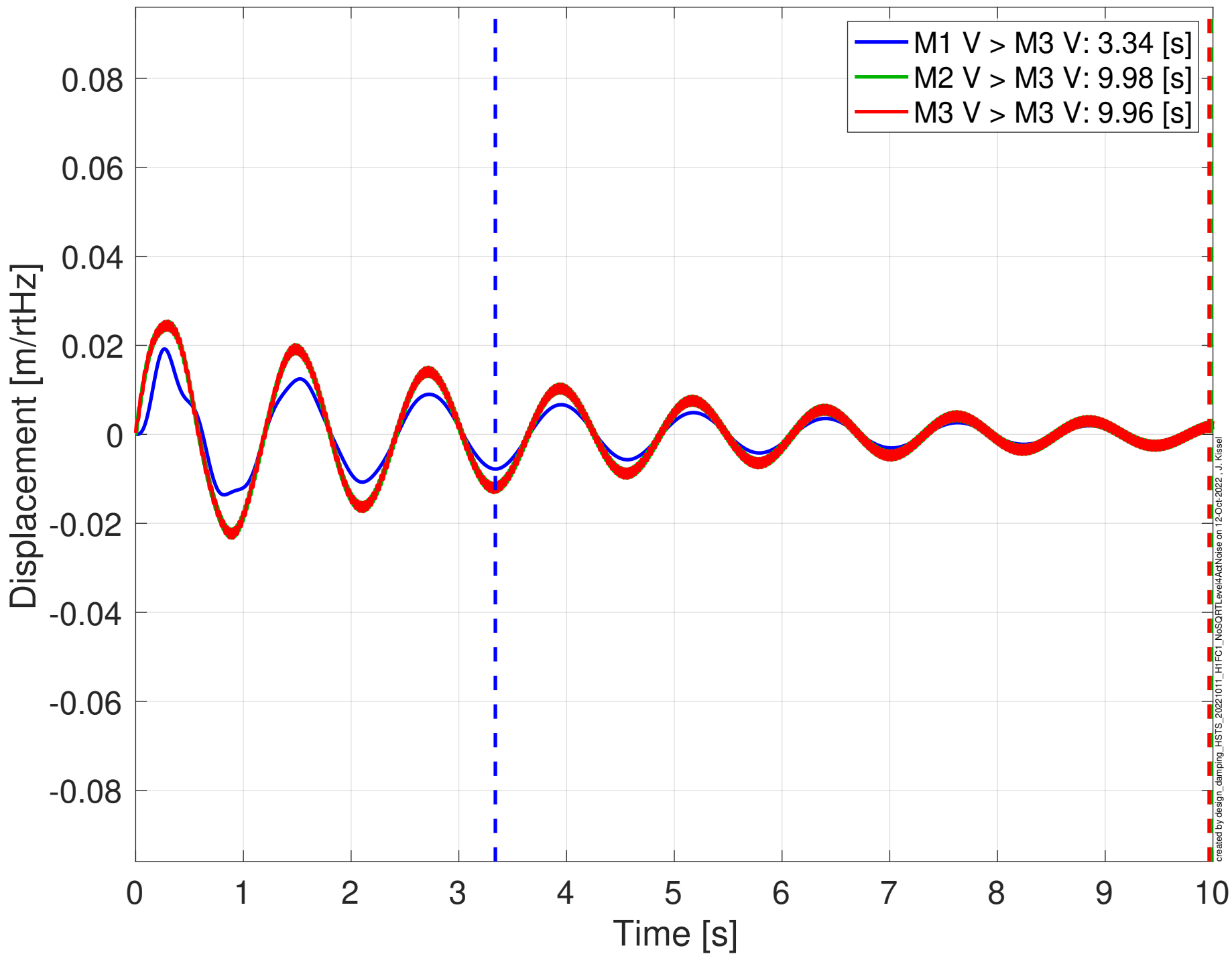
MIMO LUGF Phase Margins (red): [50.8 127] [deg]
MIMO UUGF Phase Margins (blue): [117 34] [deg]

127] [deg]
34] [deg]

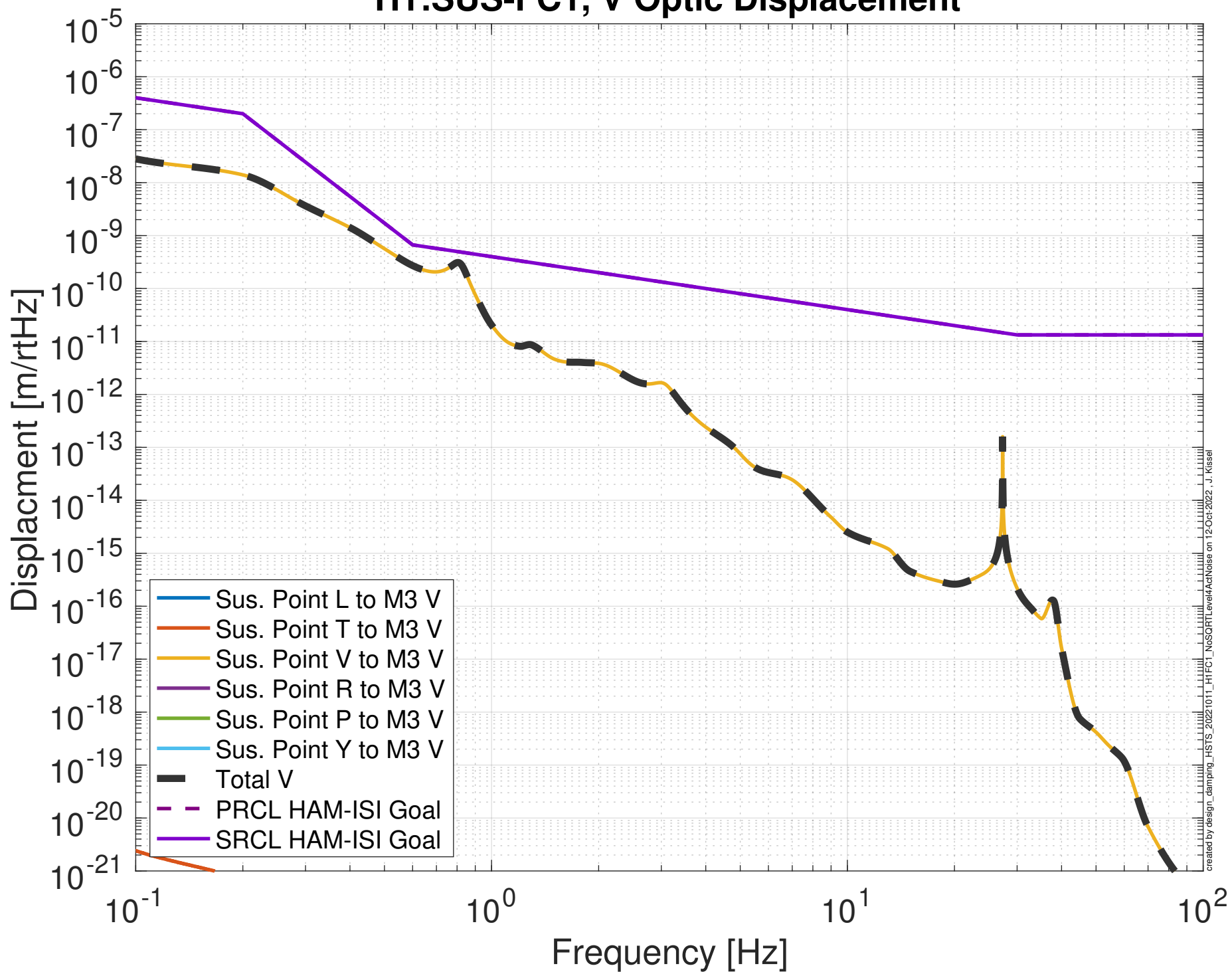


Damped Impulse Response

H1:SUS-FC1 V



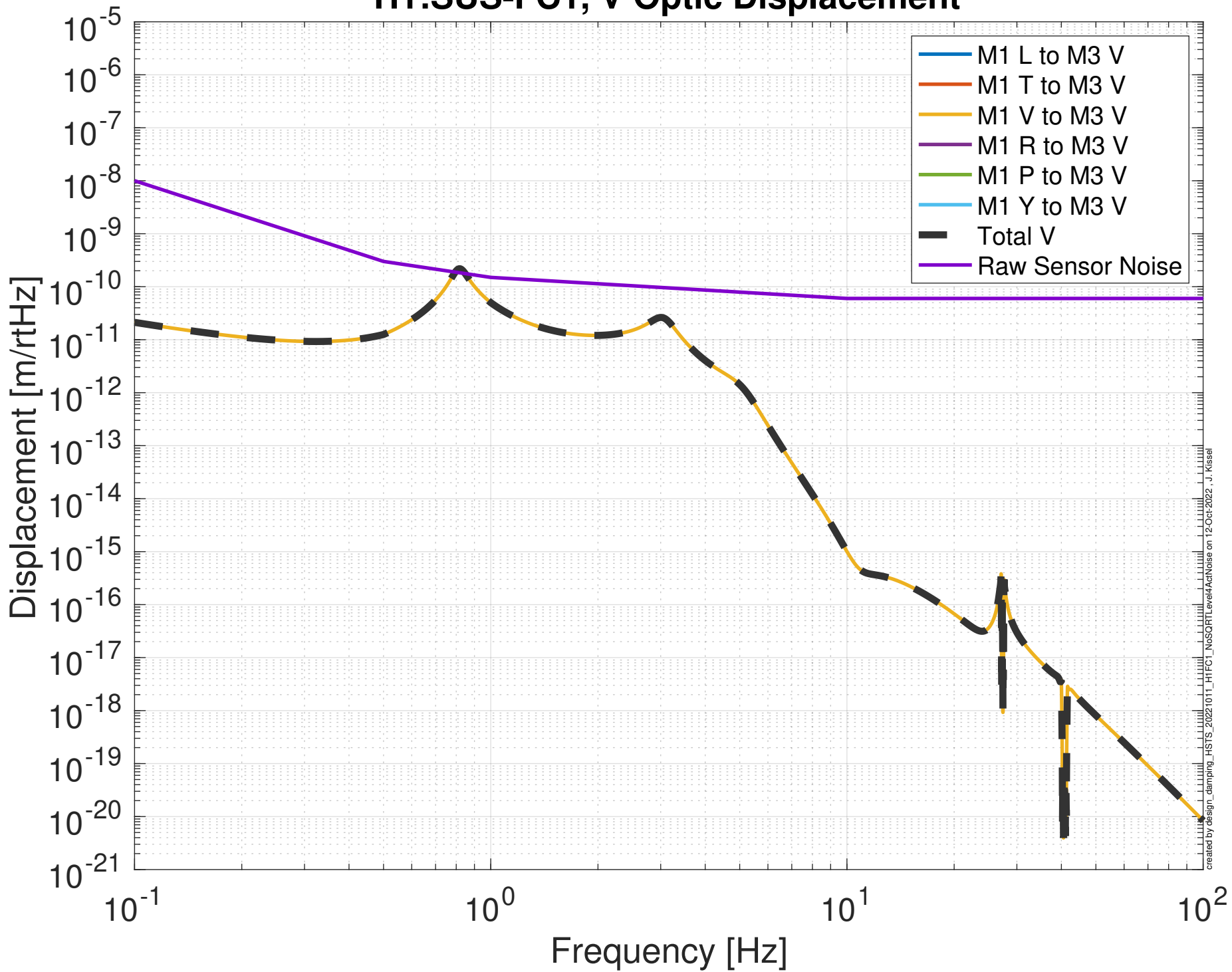
Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-FC1, V Optic Displacement



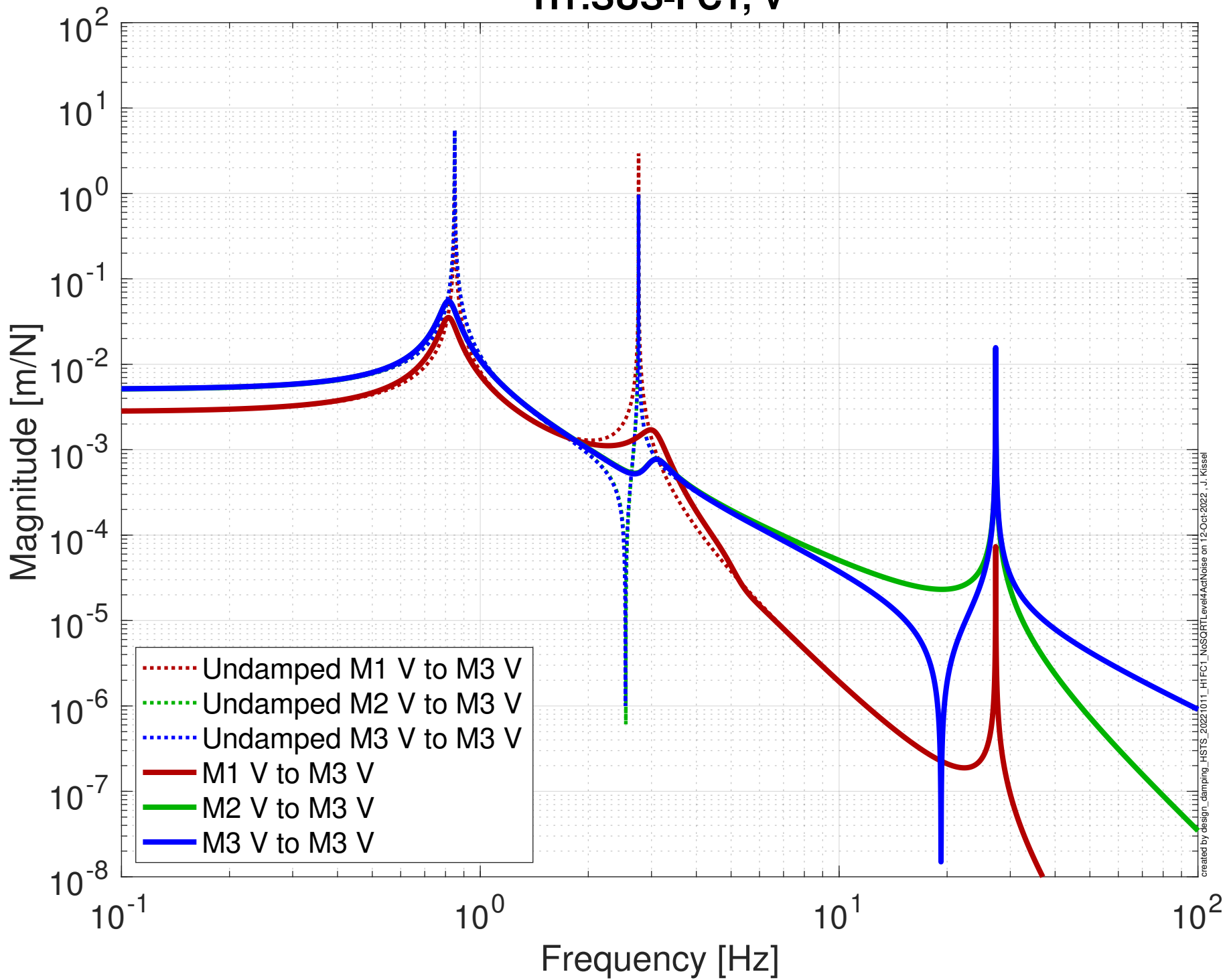
created by design_damping_H1STS_20221011_H1FC1_NUSORT_Level4ActNoise on 12 Oct 2022, J. Kissel

Projected Top Mass Sensor > Optic Noise Budget

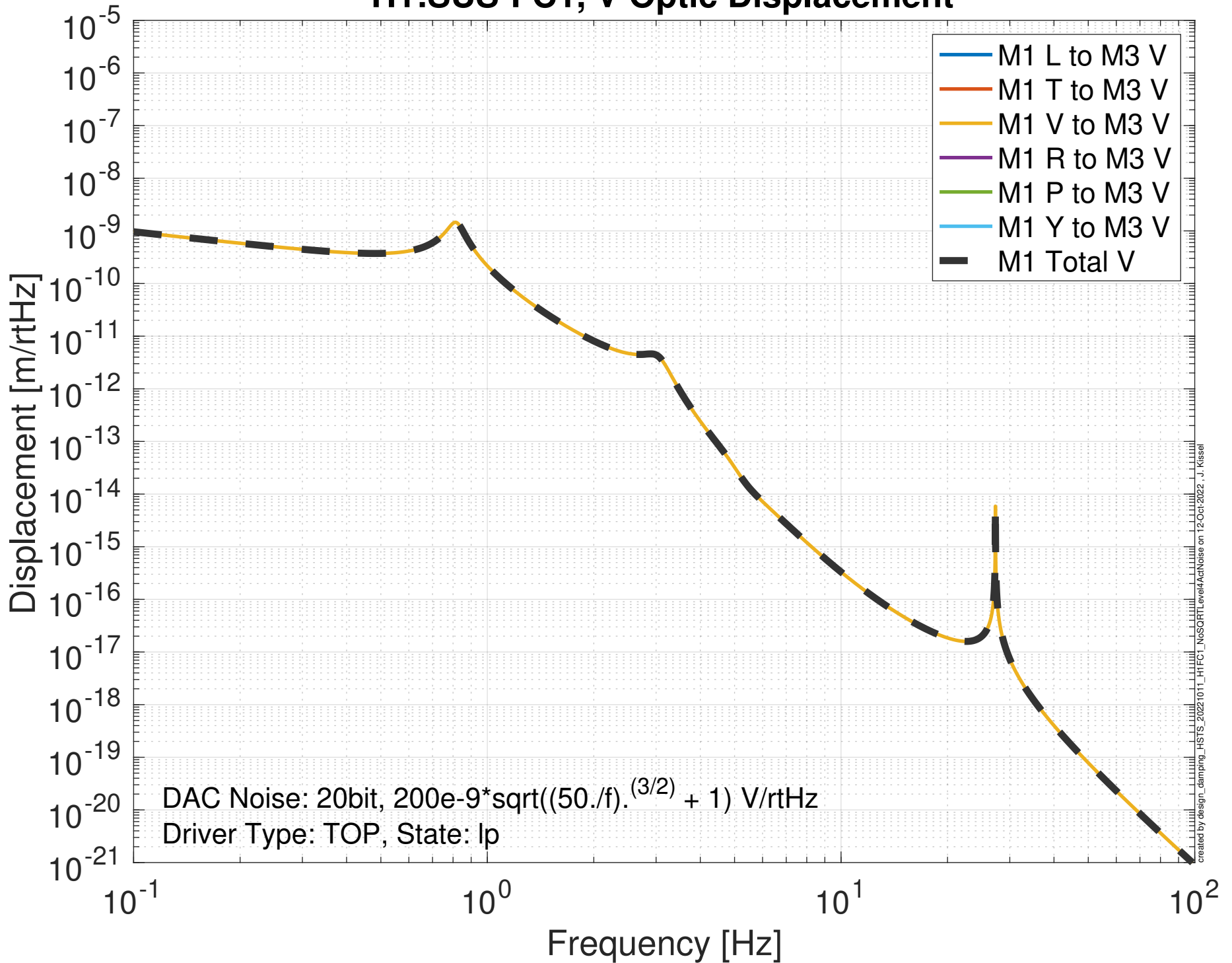
H1:SUS-FC1, V Optic Displacement



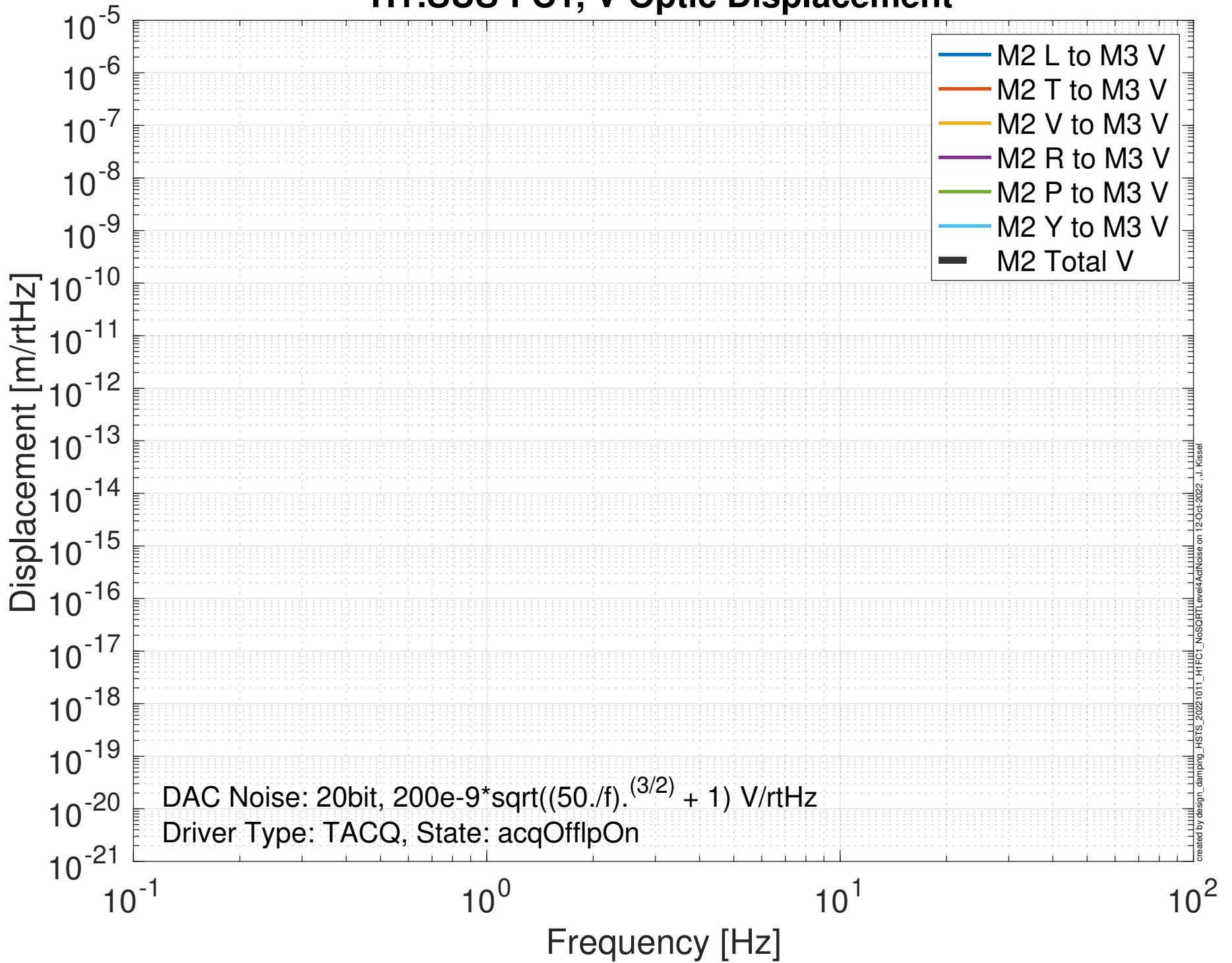
Global Control Transfer Functions to Optic H1:SUS-FC1, V



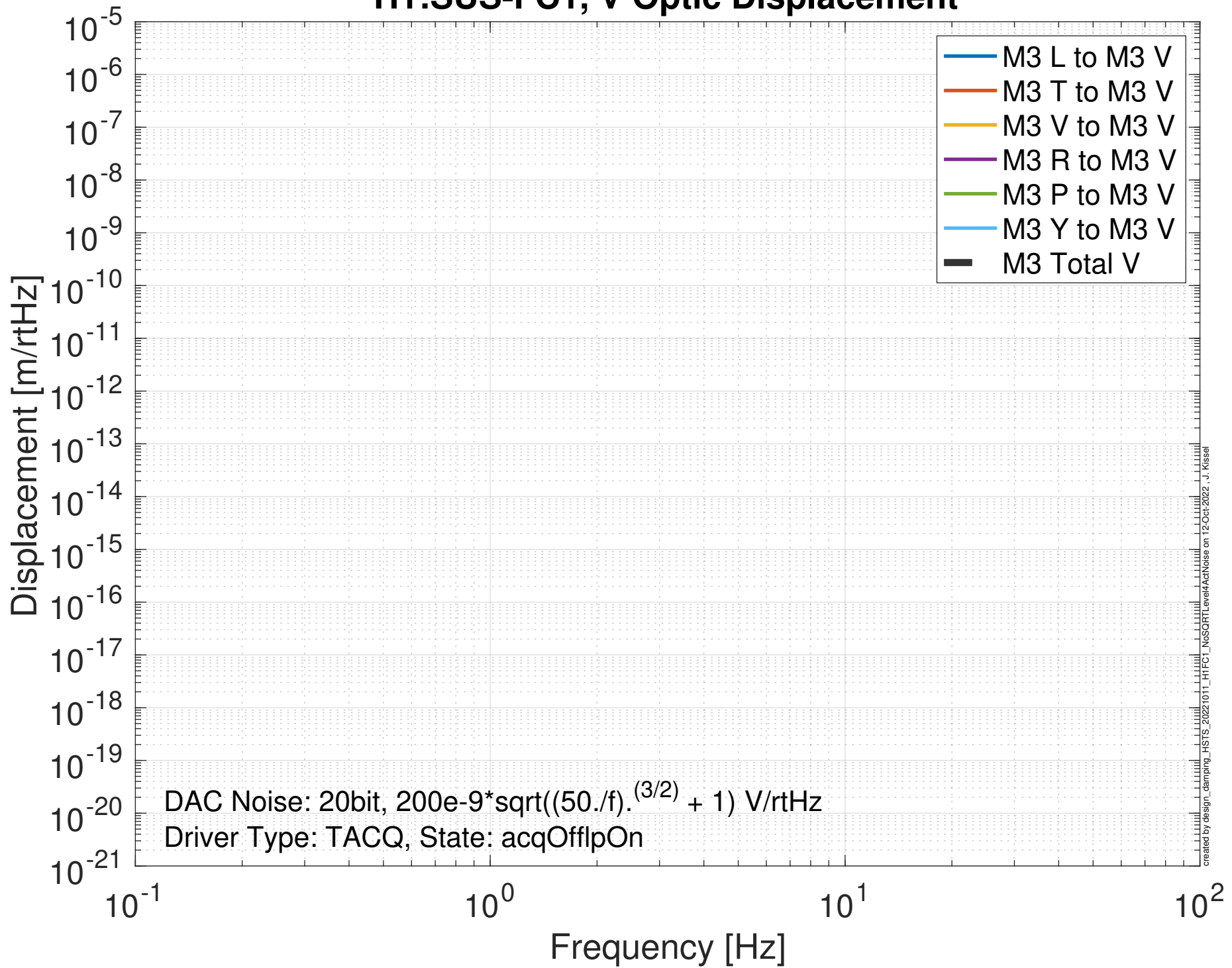
Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-FC1, V Optic Displacement



Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-FC1, V Optic Displacement

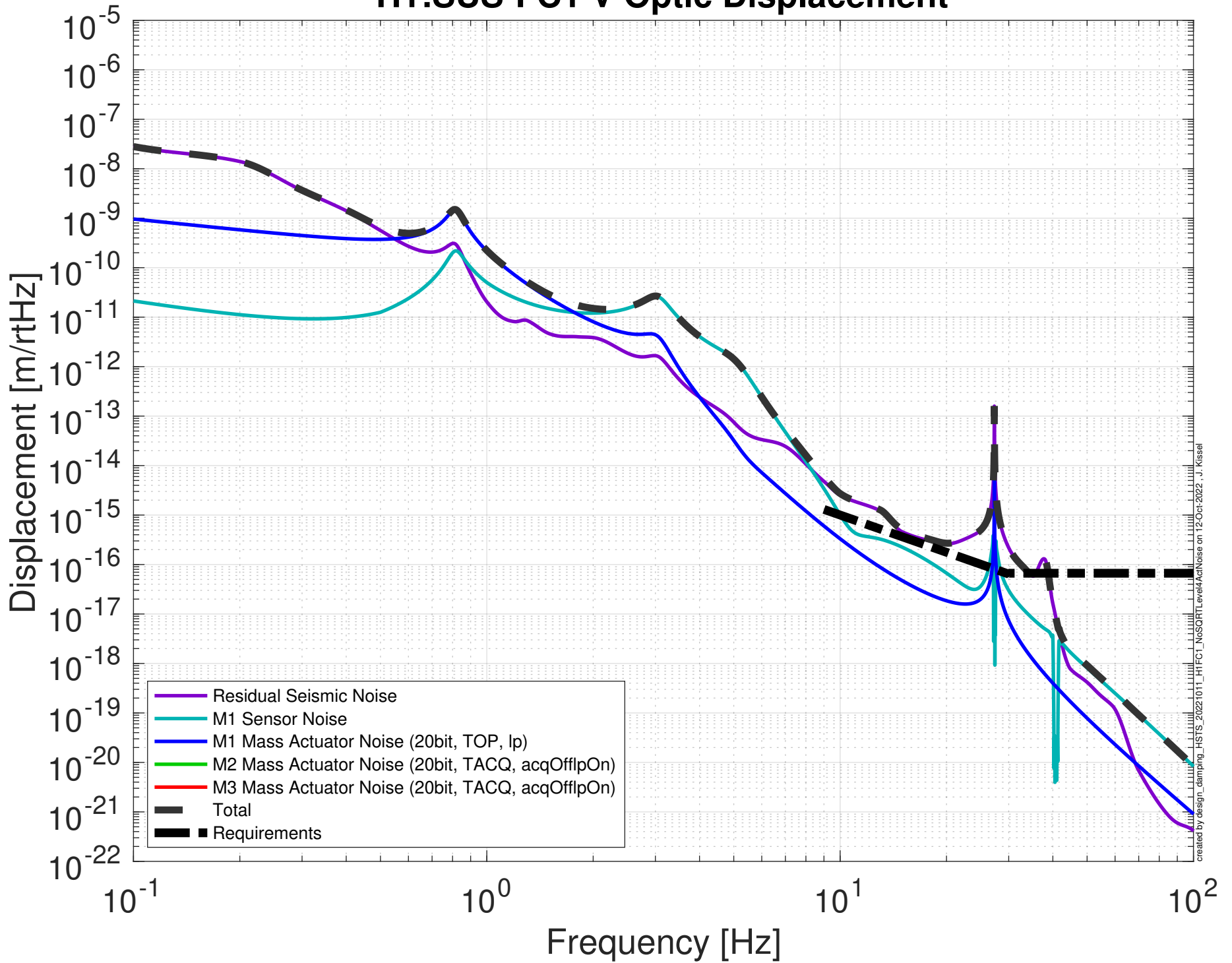


Projected M3 Mass Actuator > Optic Noise Budget H1:SUS-FC1, V Optic Displacement



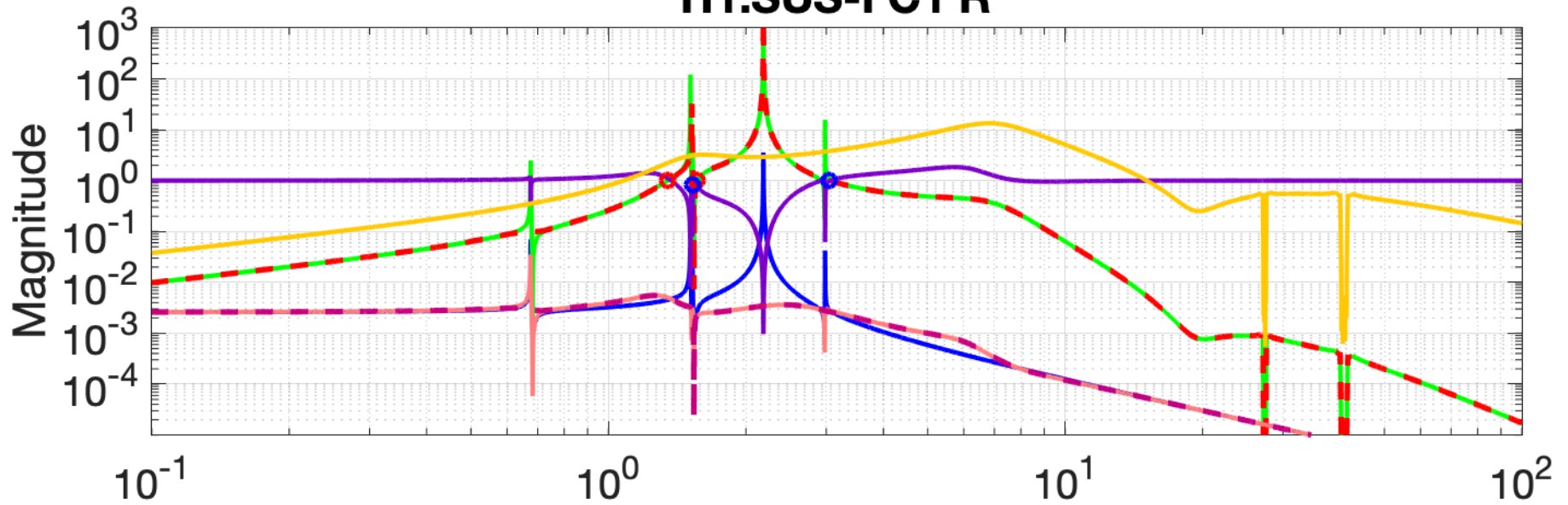
Damping Loop Performance

H1:SUS-FC1 V Optic Displacement

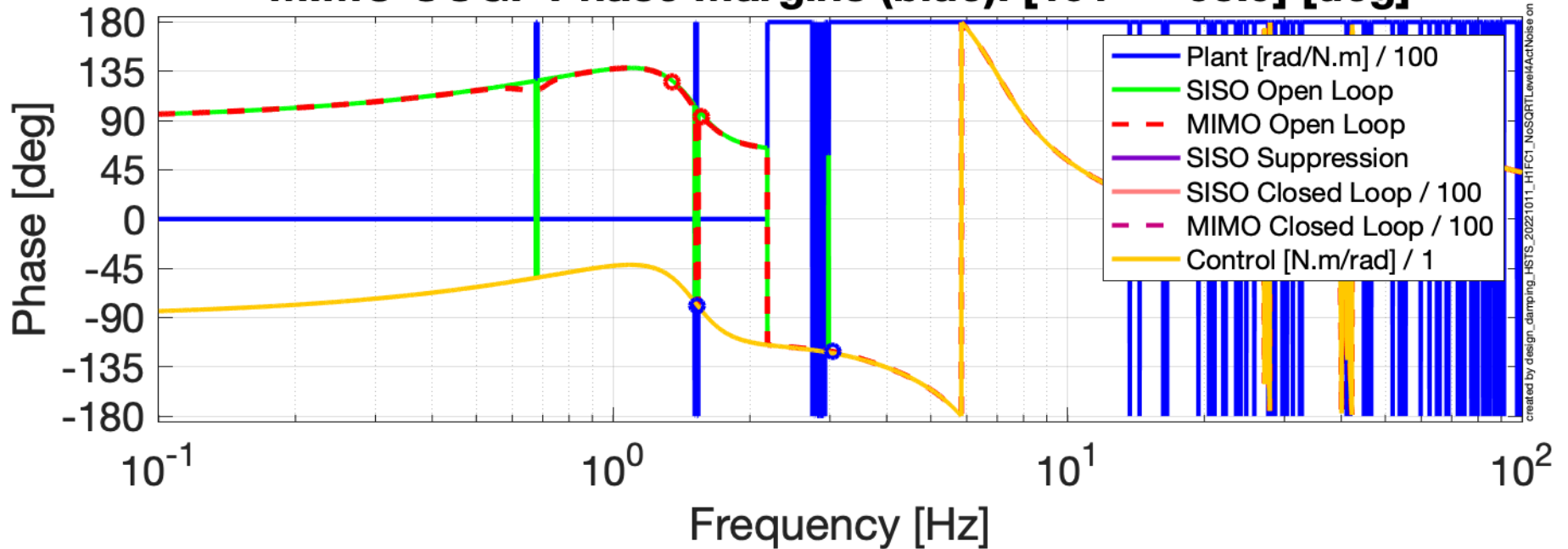


Damping Loop Design

H1:SUS-FC1 R

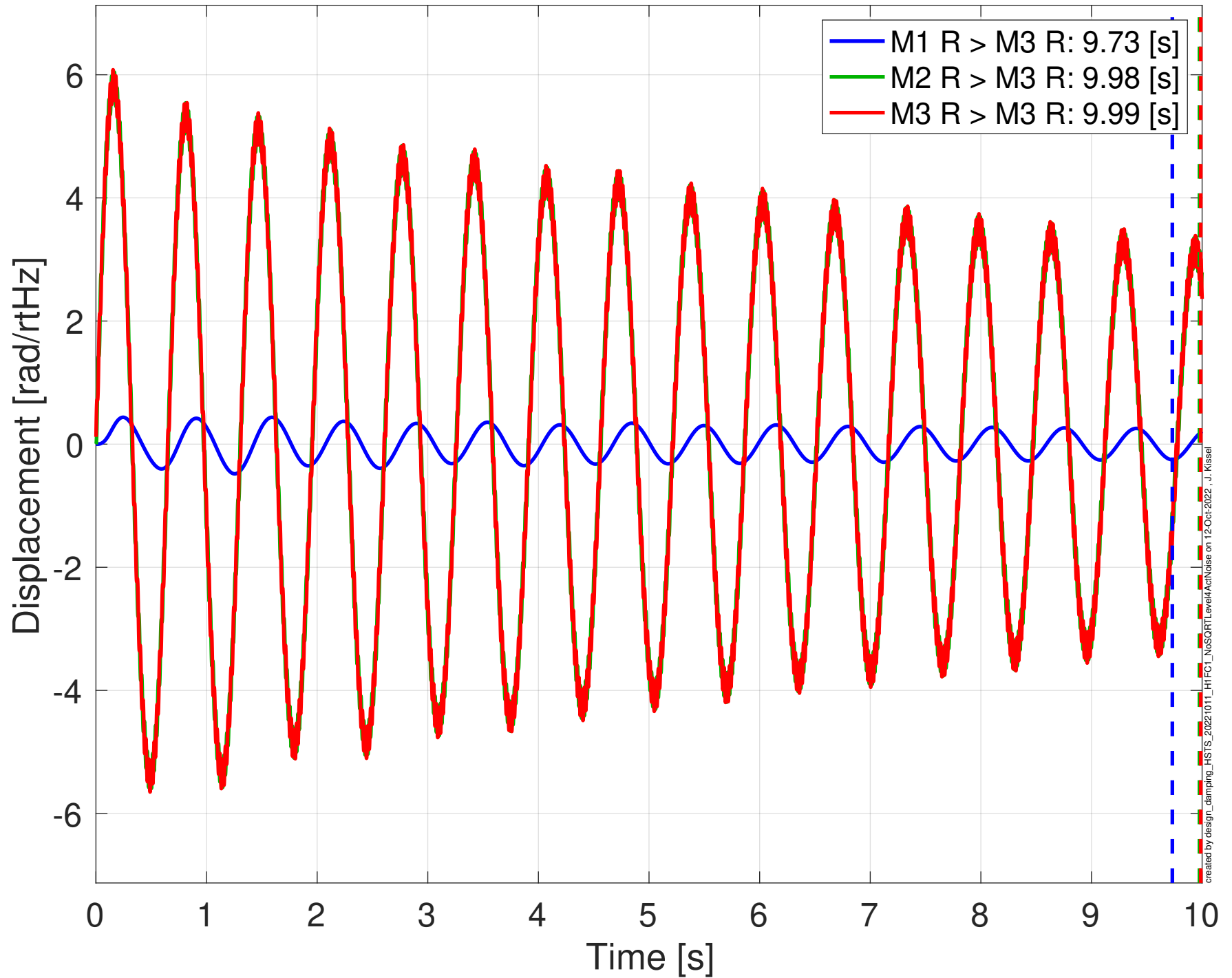


MIMO LUGF Phase Margins (red): [54.3 86.1] [deg]
MIMO UUGF Phase Margins (blue): [101 58.9] [deg]

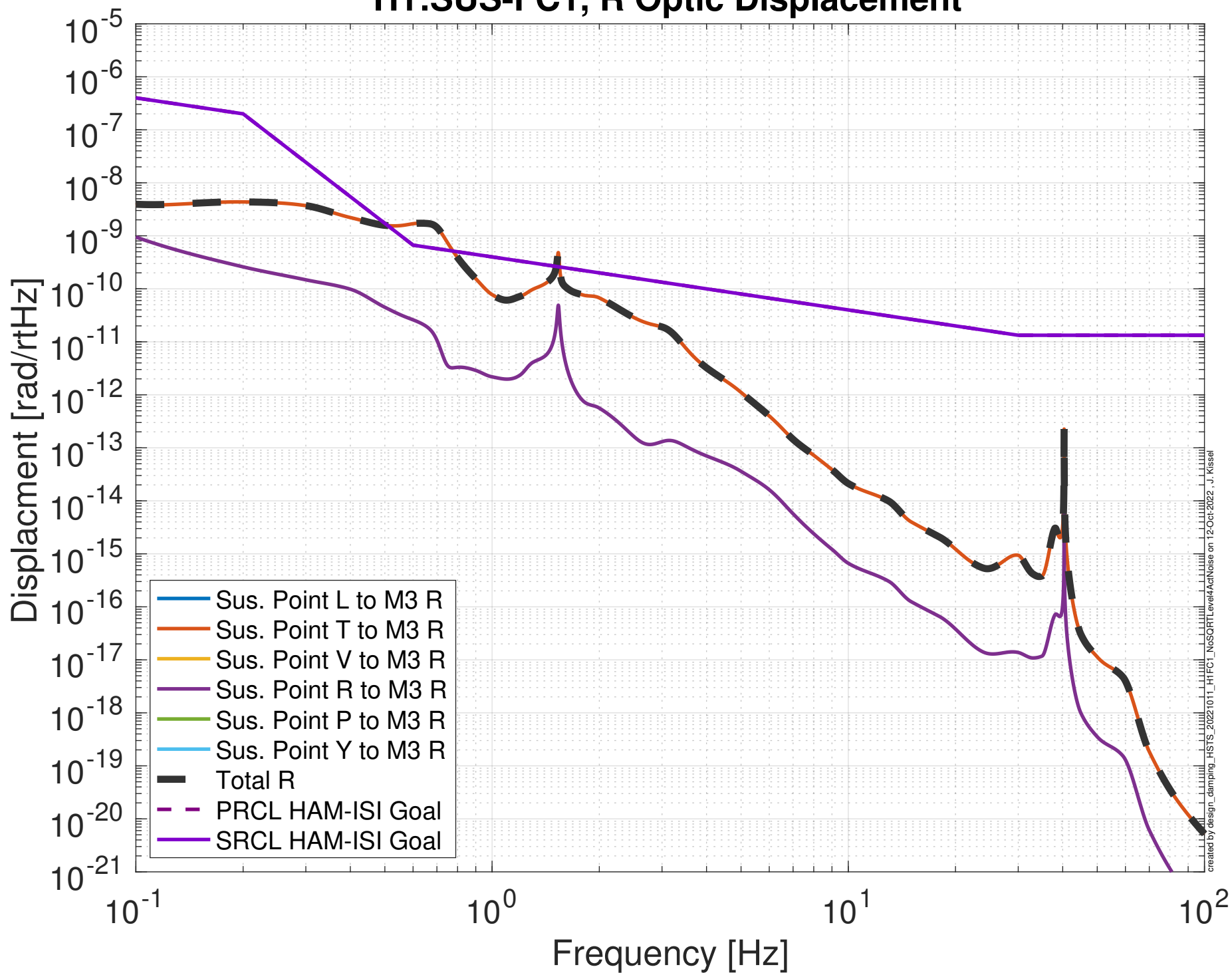


Damped Impulse Response

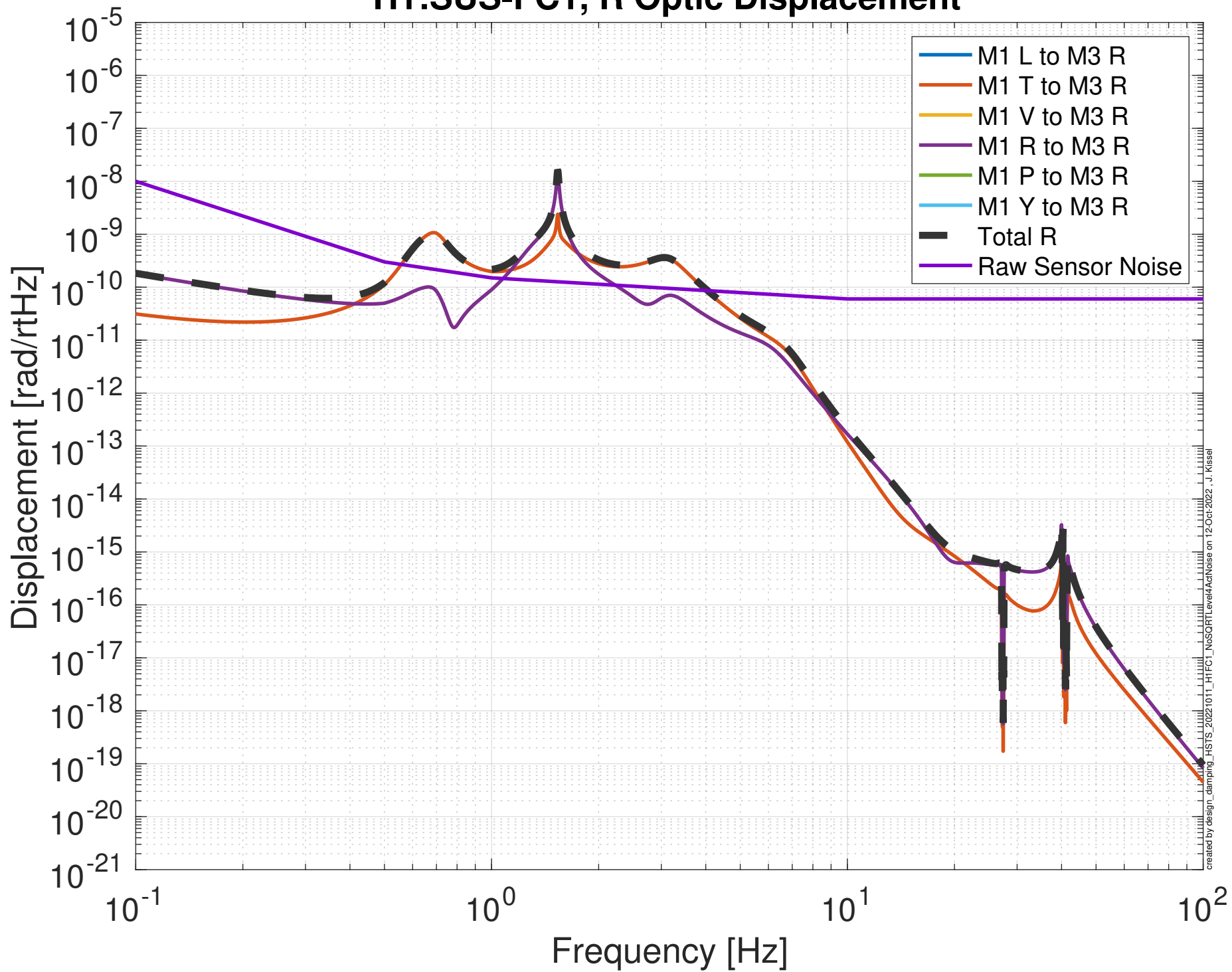
H1:SUS-FC1 R



Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-FC1, R Optic Displacement

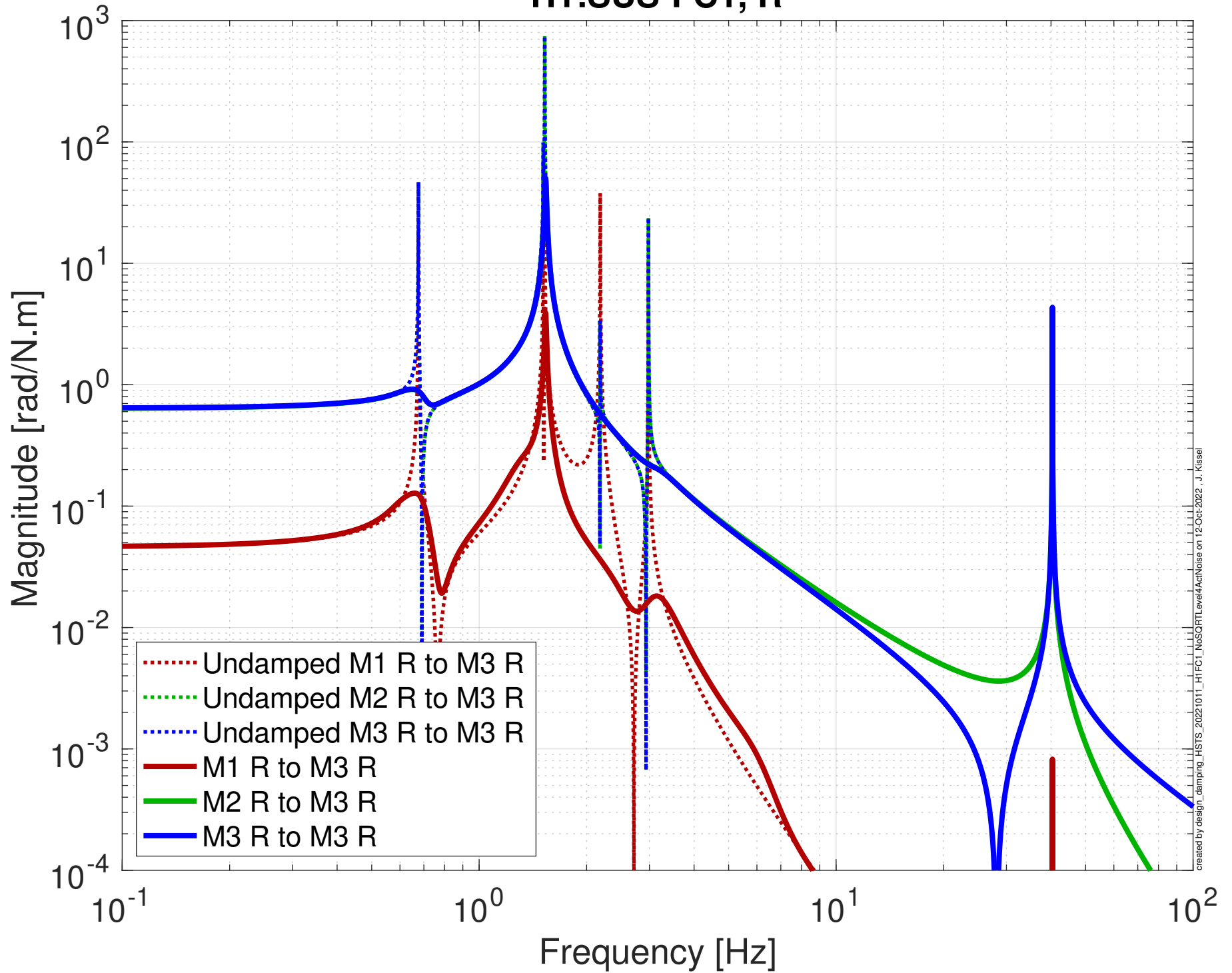


Projected Top Mass Sensor > Optic Noise Budget H1:SUS-FC1, R Optic Displacement

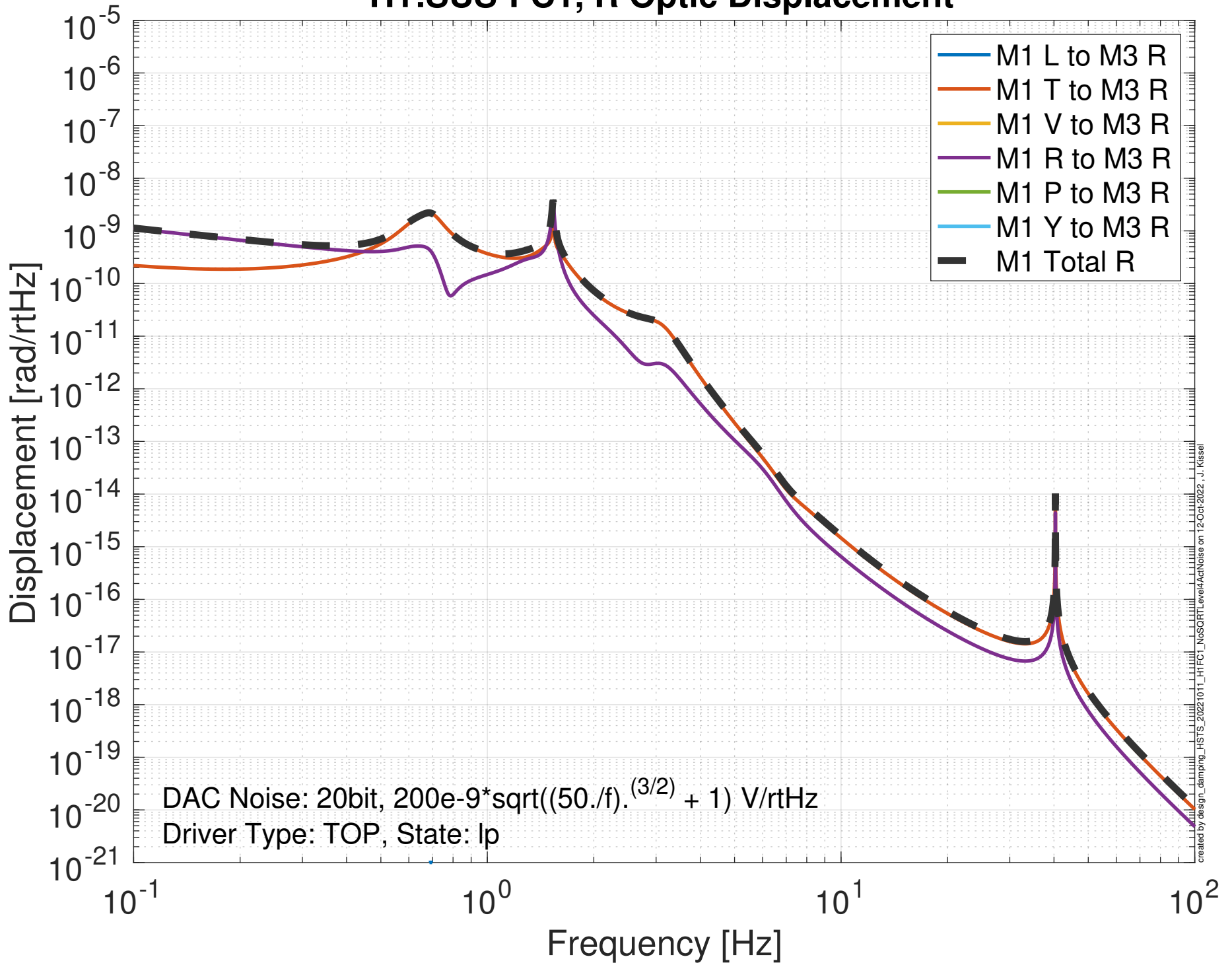


Global Control Transfer Functions to Optic

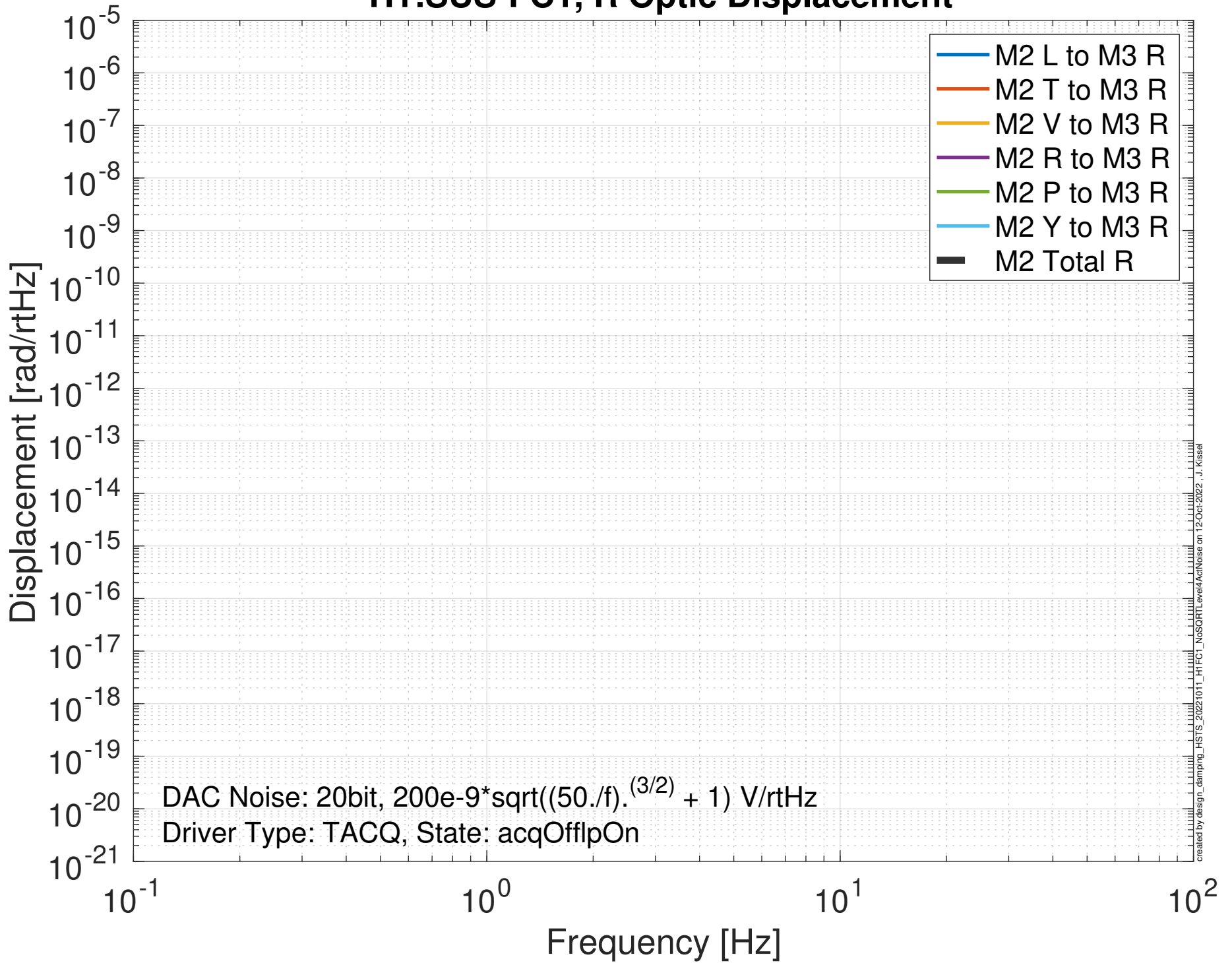
H1:SUS-FC1, R



Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-FC1, R Optic Displacement

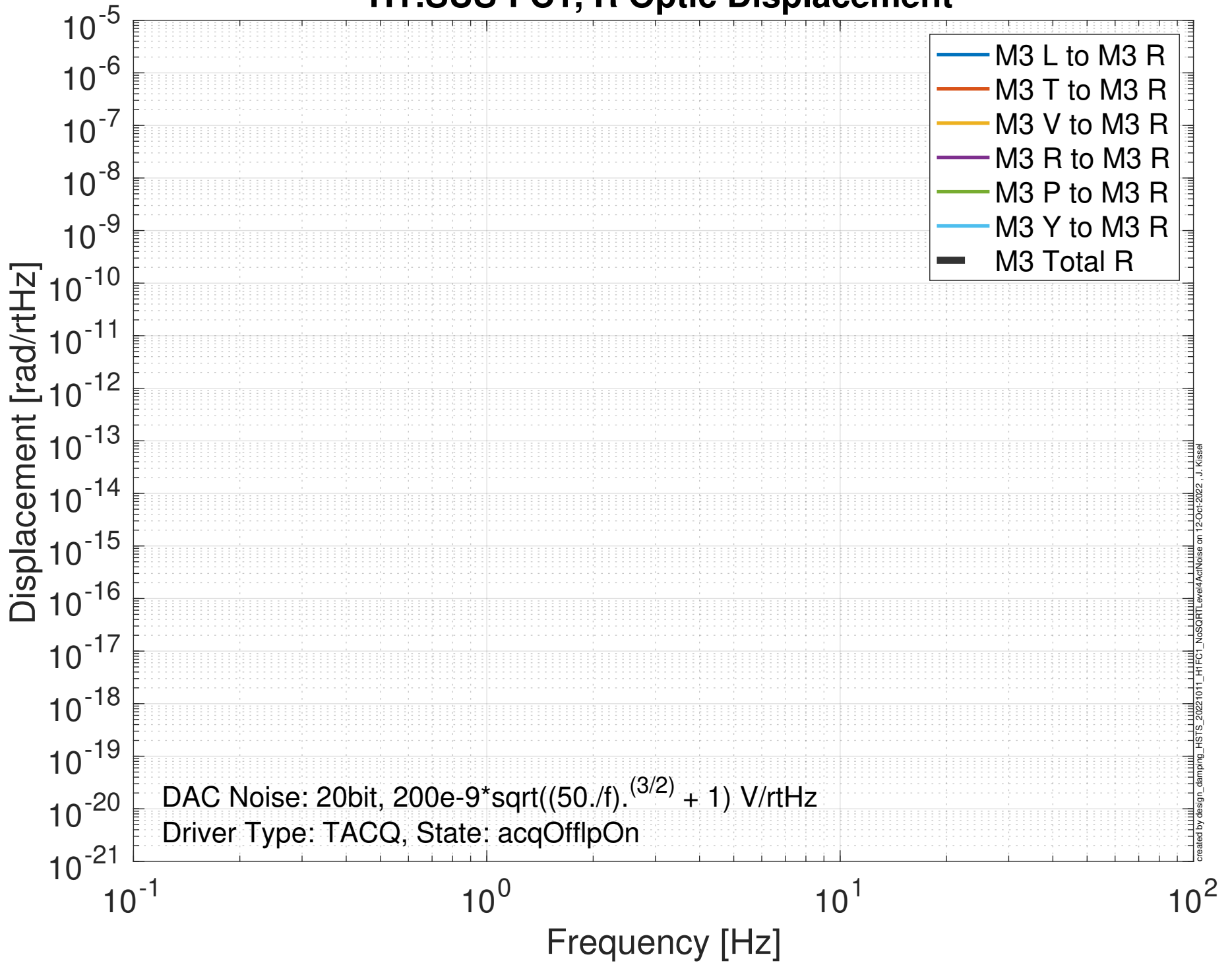


Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-FC1, R Optic Displacement



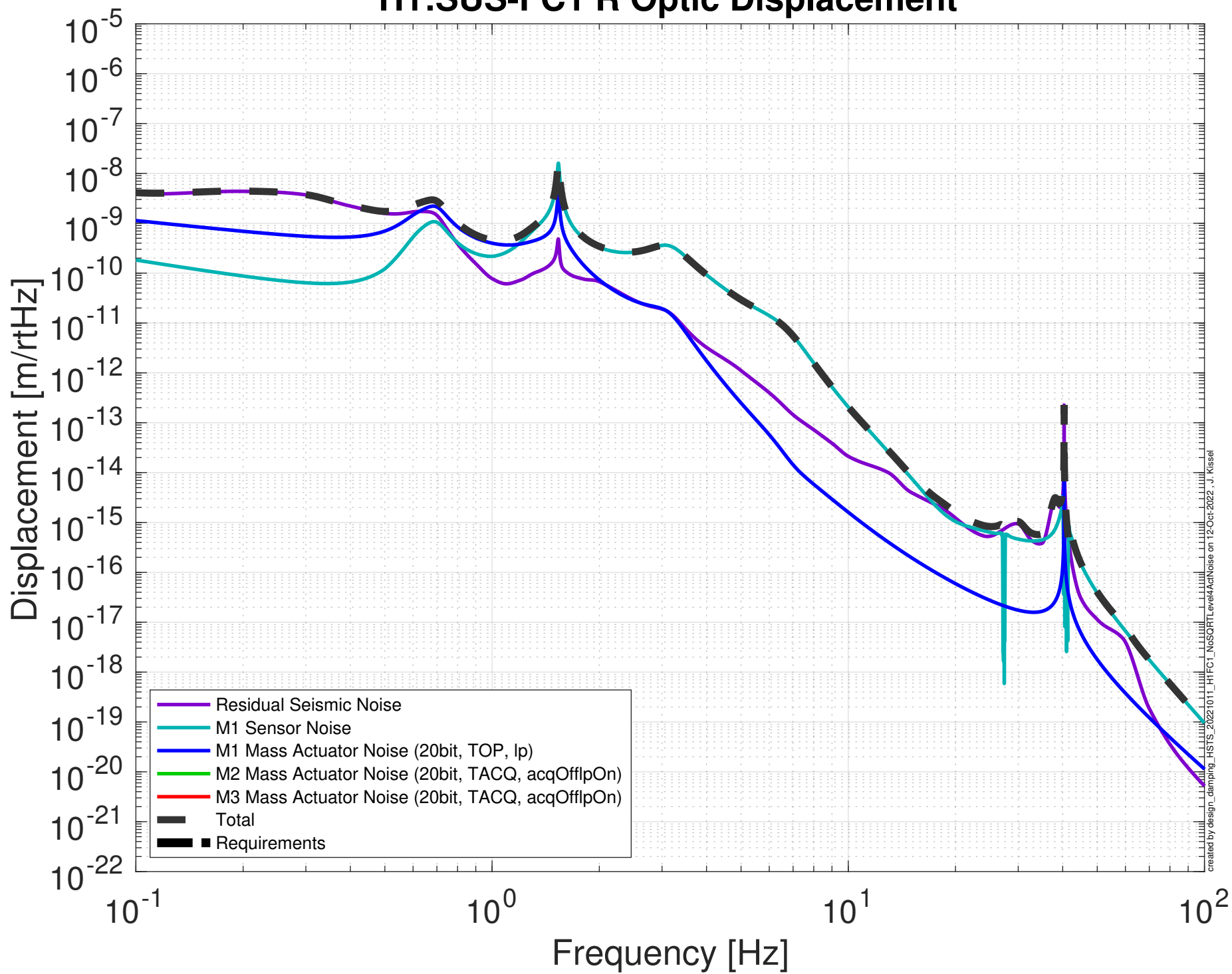
Projected M3 Mass Actuator > Optic Noise Budget

H1:SUS-FC1, R Optic Displacement



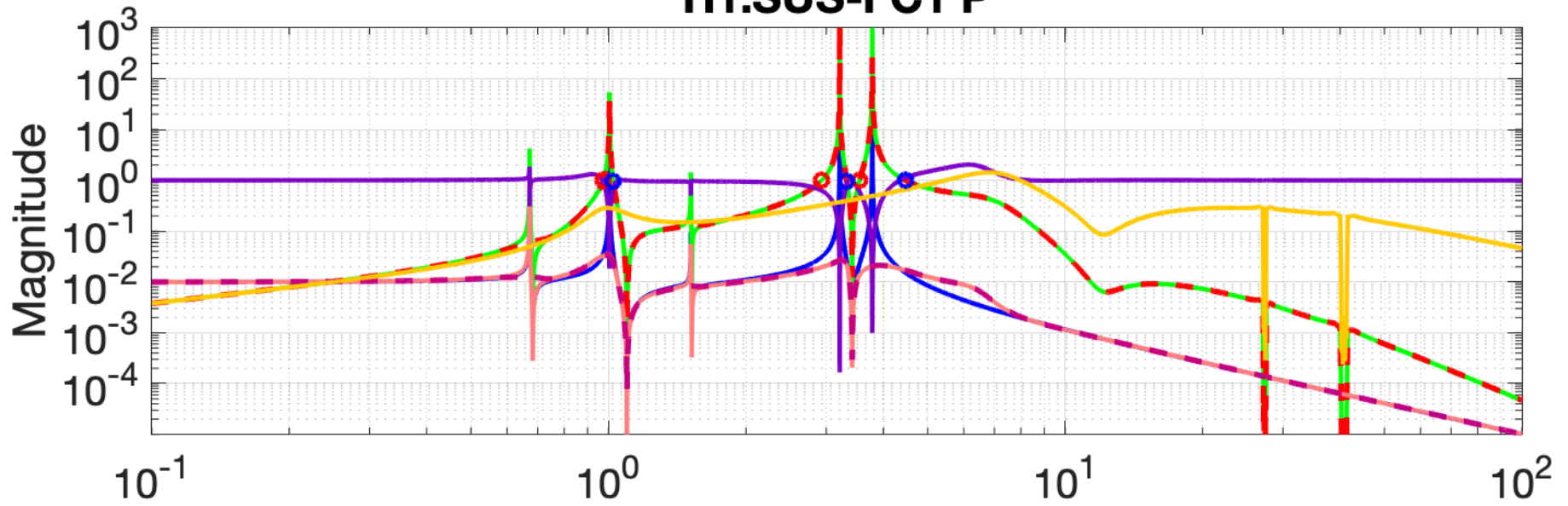
Damping Loop Performance

H1:SUS-FC1 R Optic Displacement

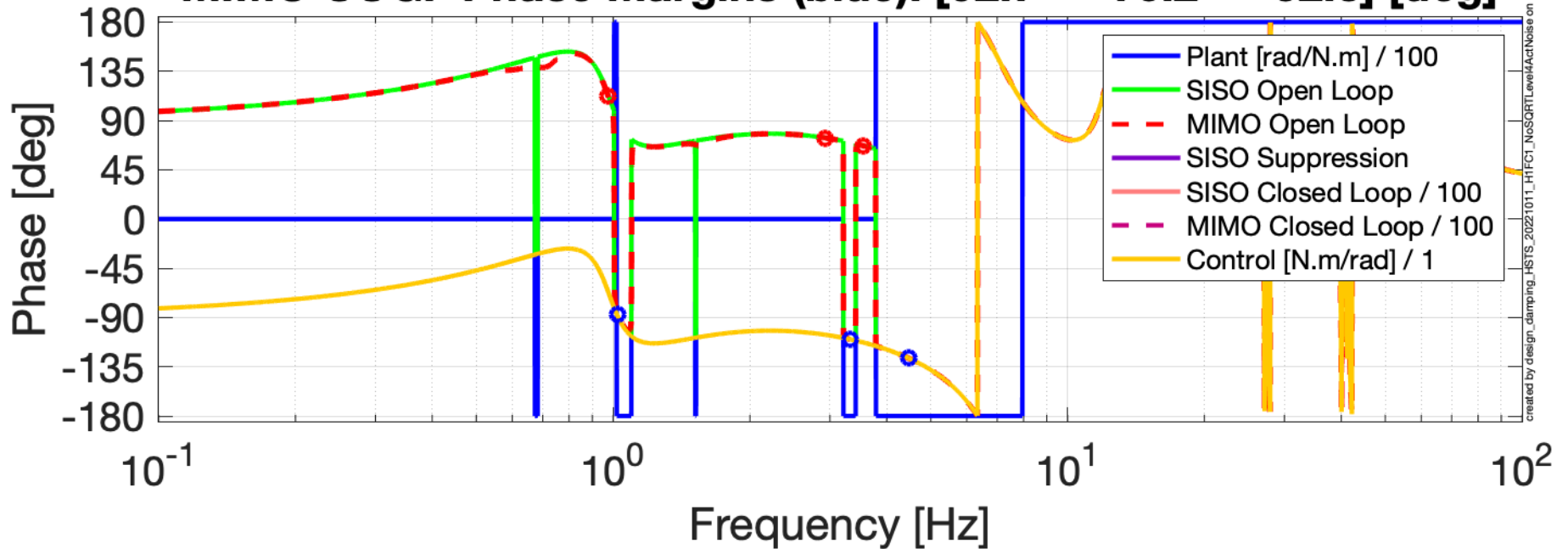


Damping Loop Design

H1:SUS-FC1 P

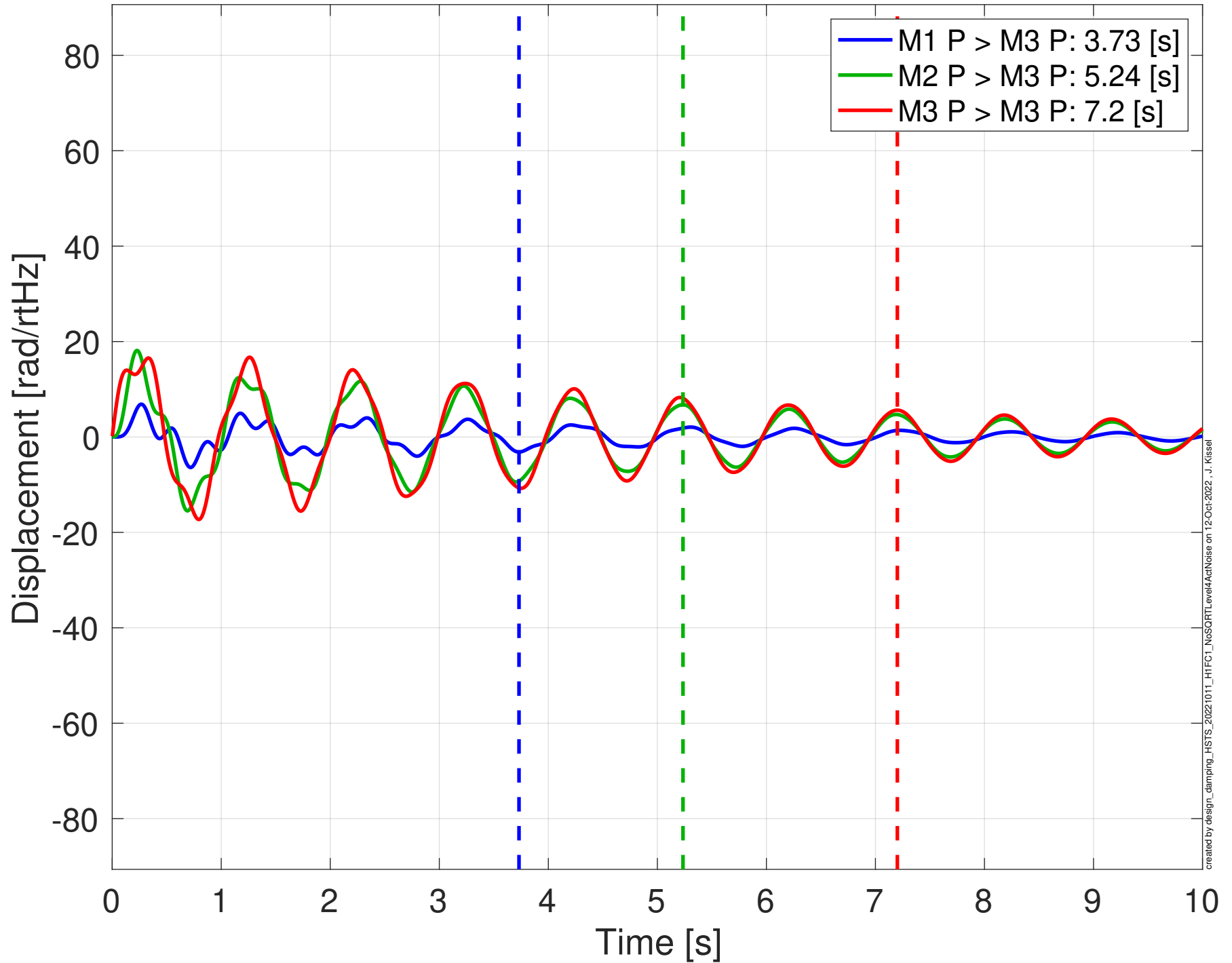


MIMO LUGF Phase Margins (red): [67.6 106 113] [deg]
MIMO UUGF Phase Margins (blue): [92.7 70.2 52.8] [deg]

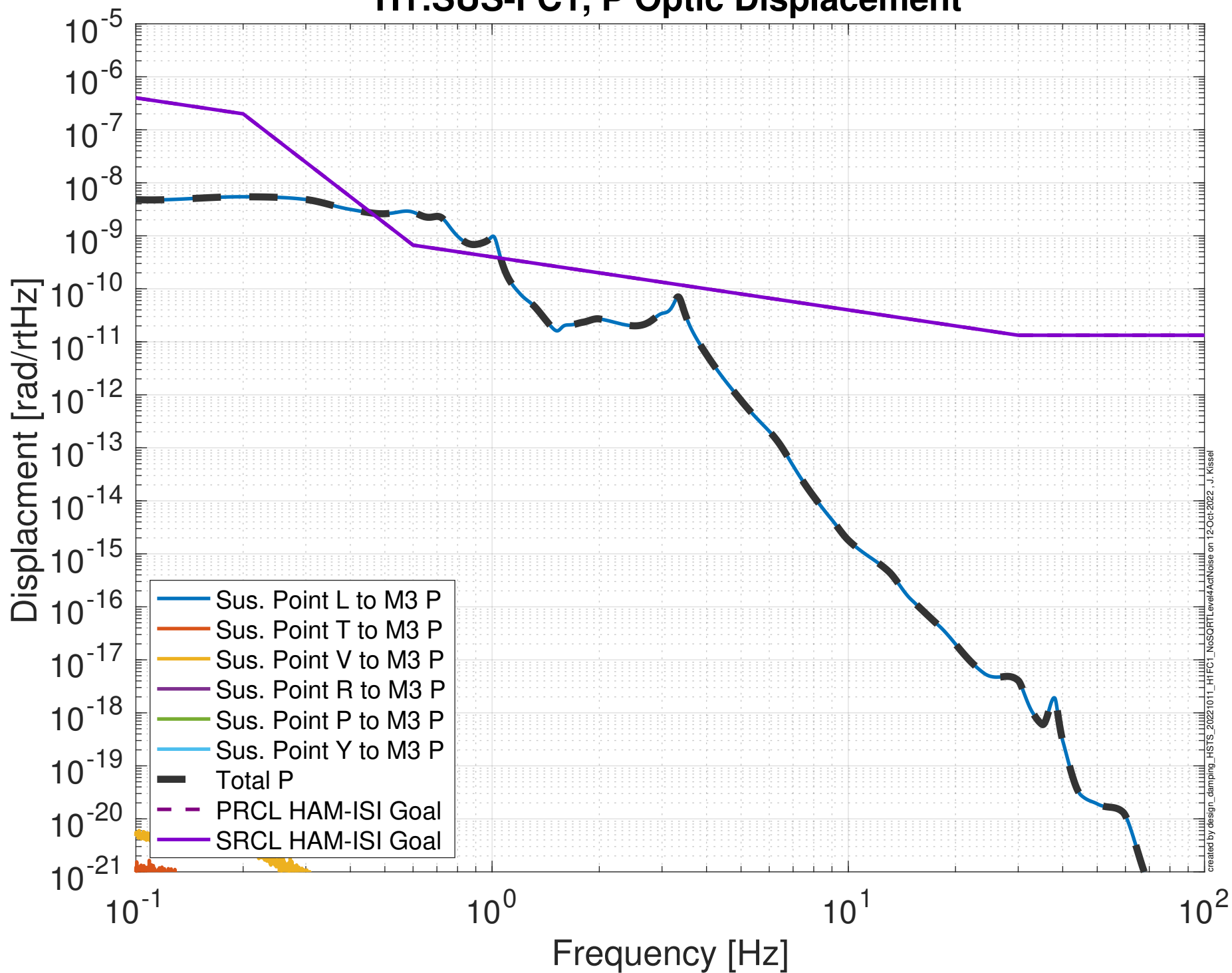


Damped Impulse Response

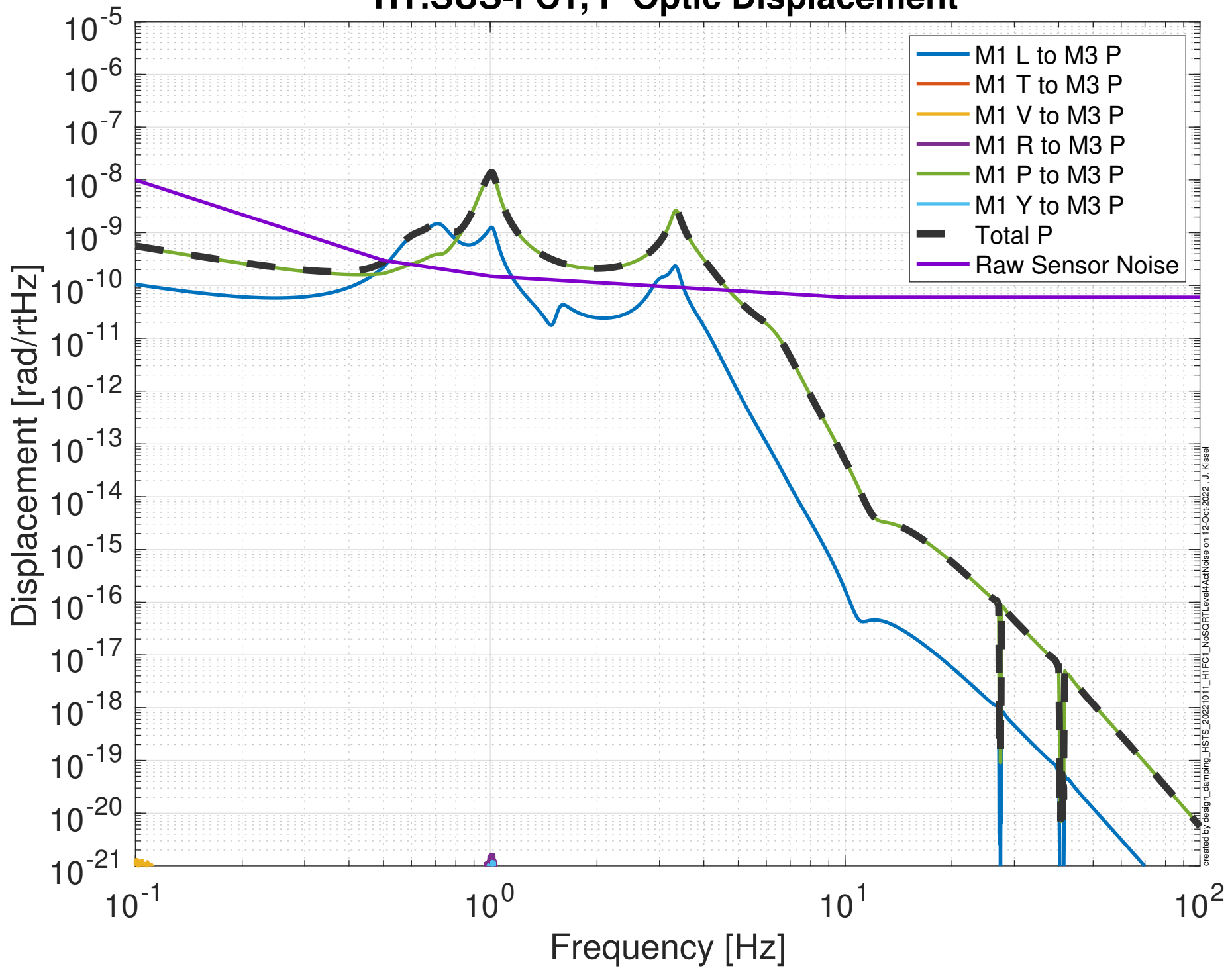
H1:SUS-FC1 P



Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-FC1, P Optic Displacement

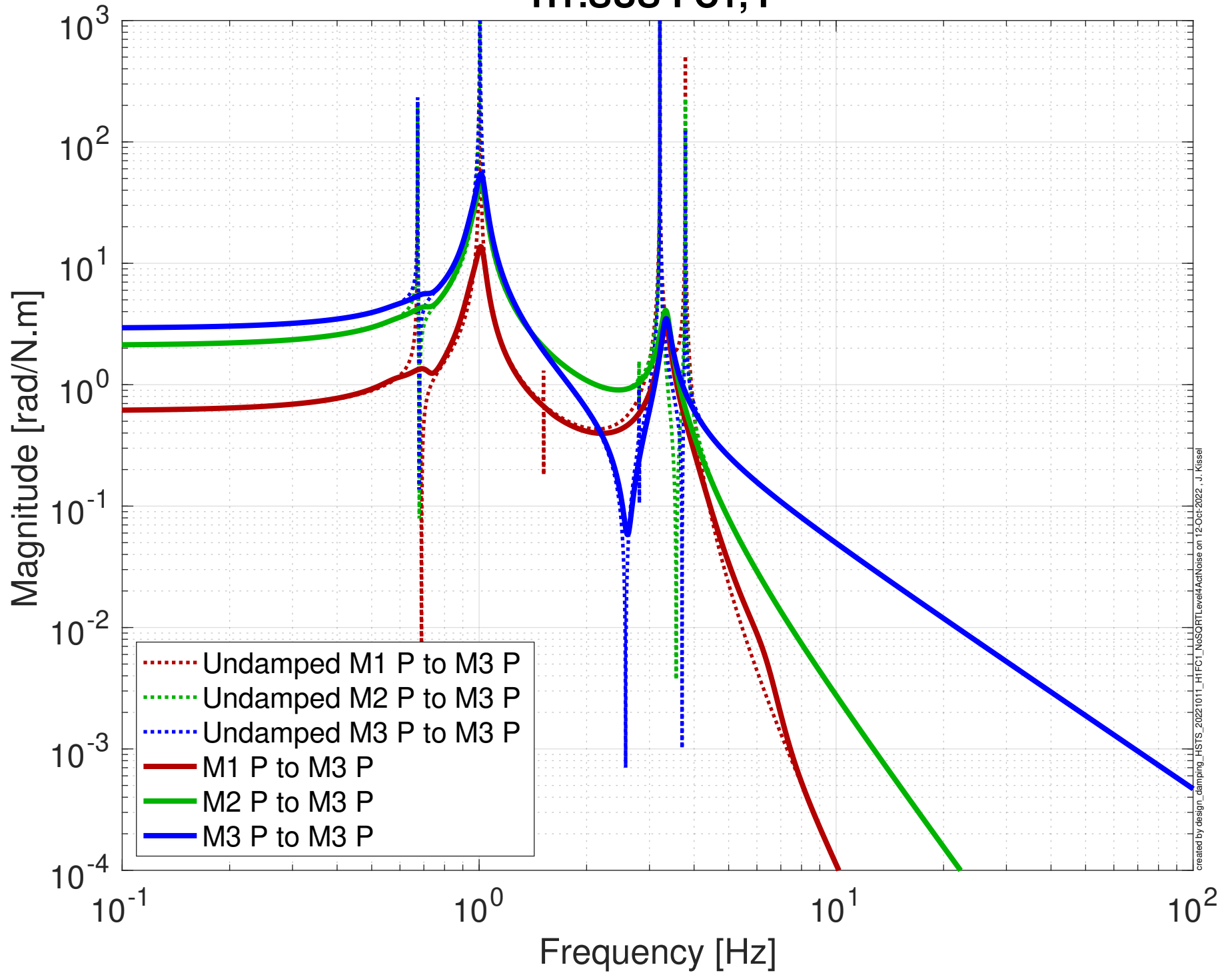


Projected Top Mass Sensor > Optic Noise Budget H1:SUS-FC1, P Optic Displacement

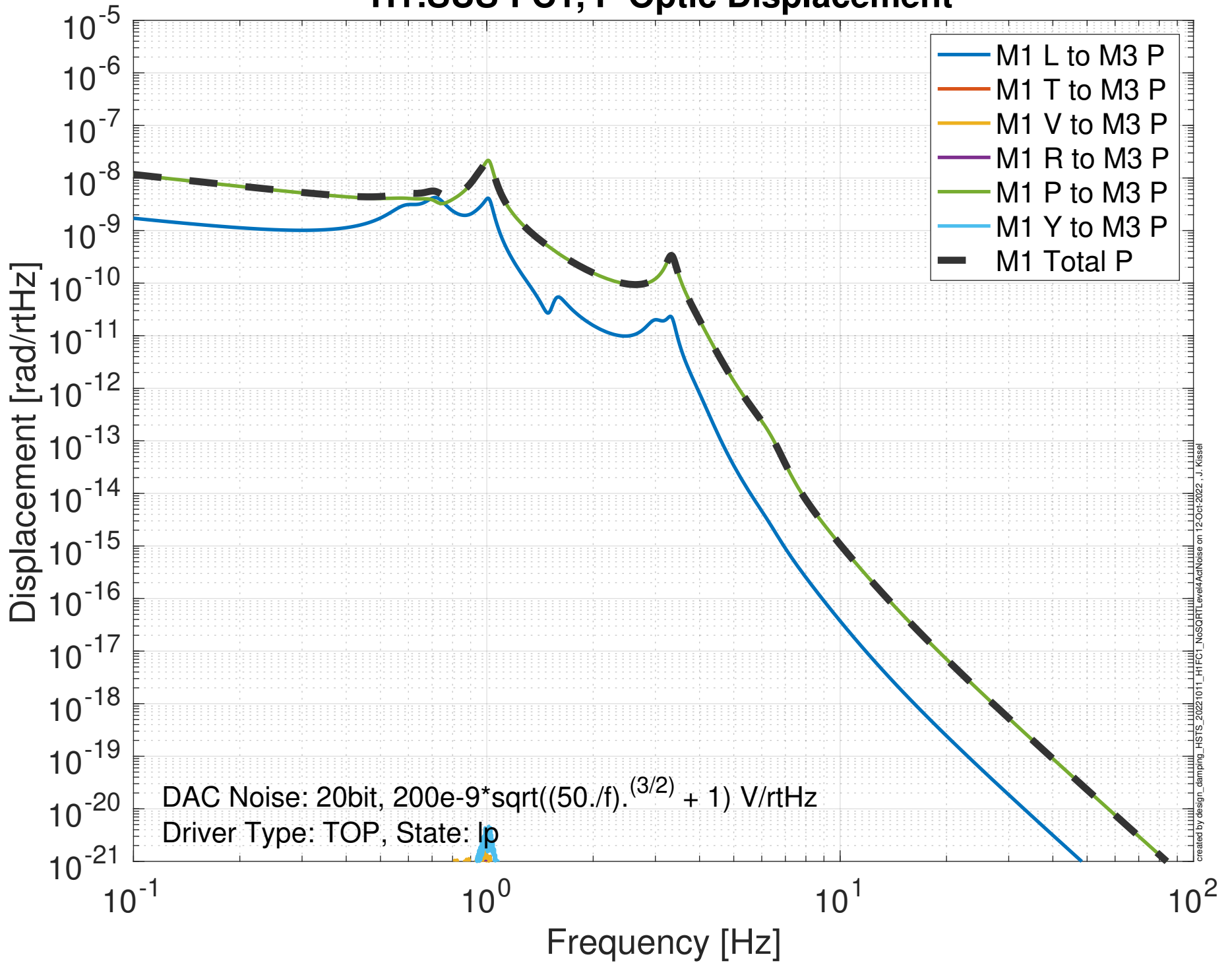


Global Control Transfer Functions to Optic

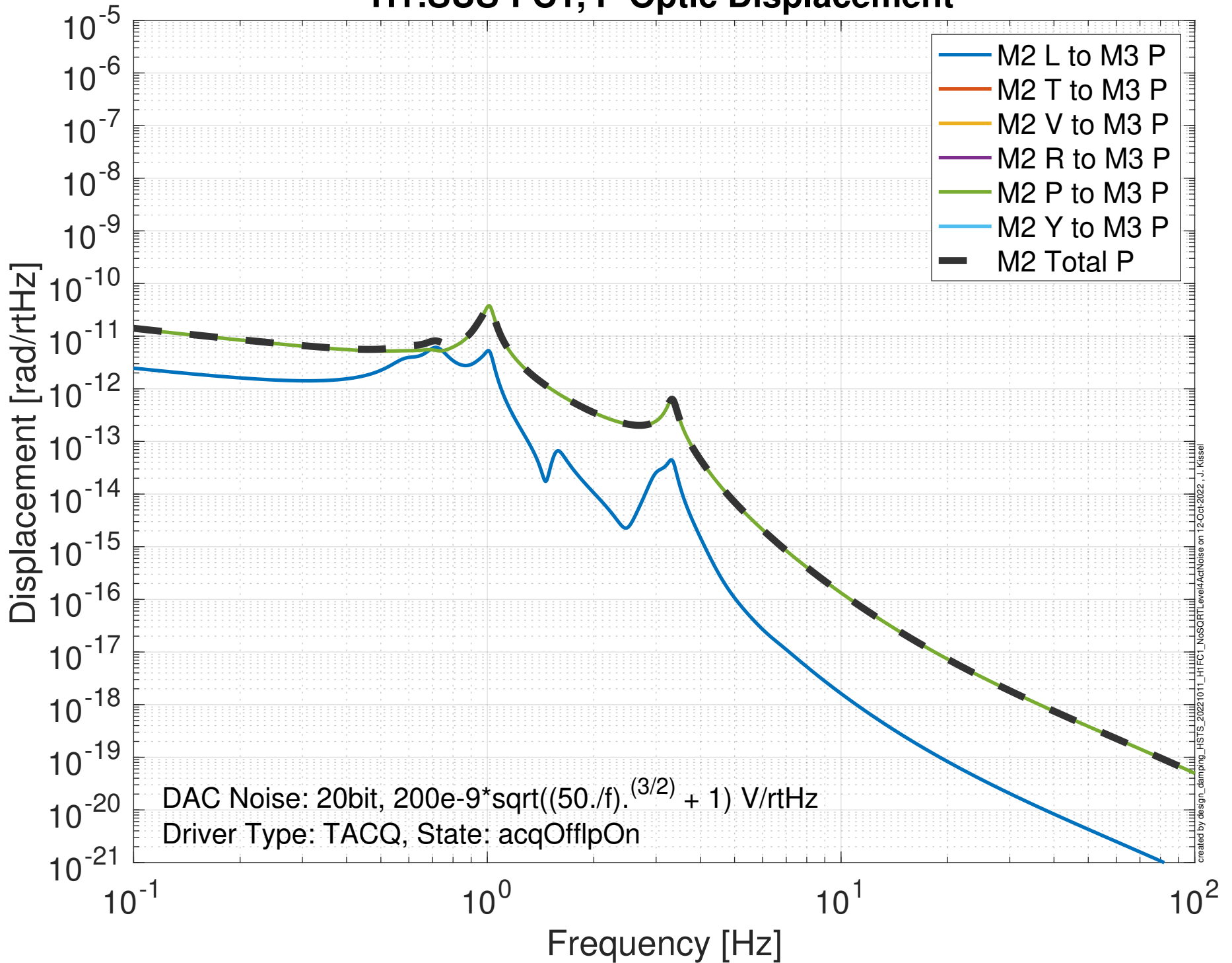
H1:SUS-FC1, P



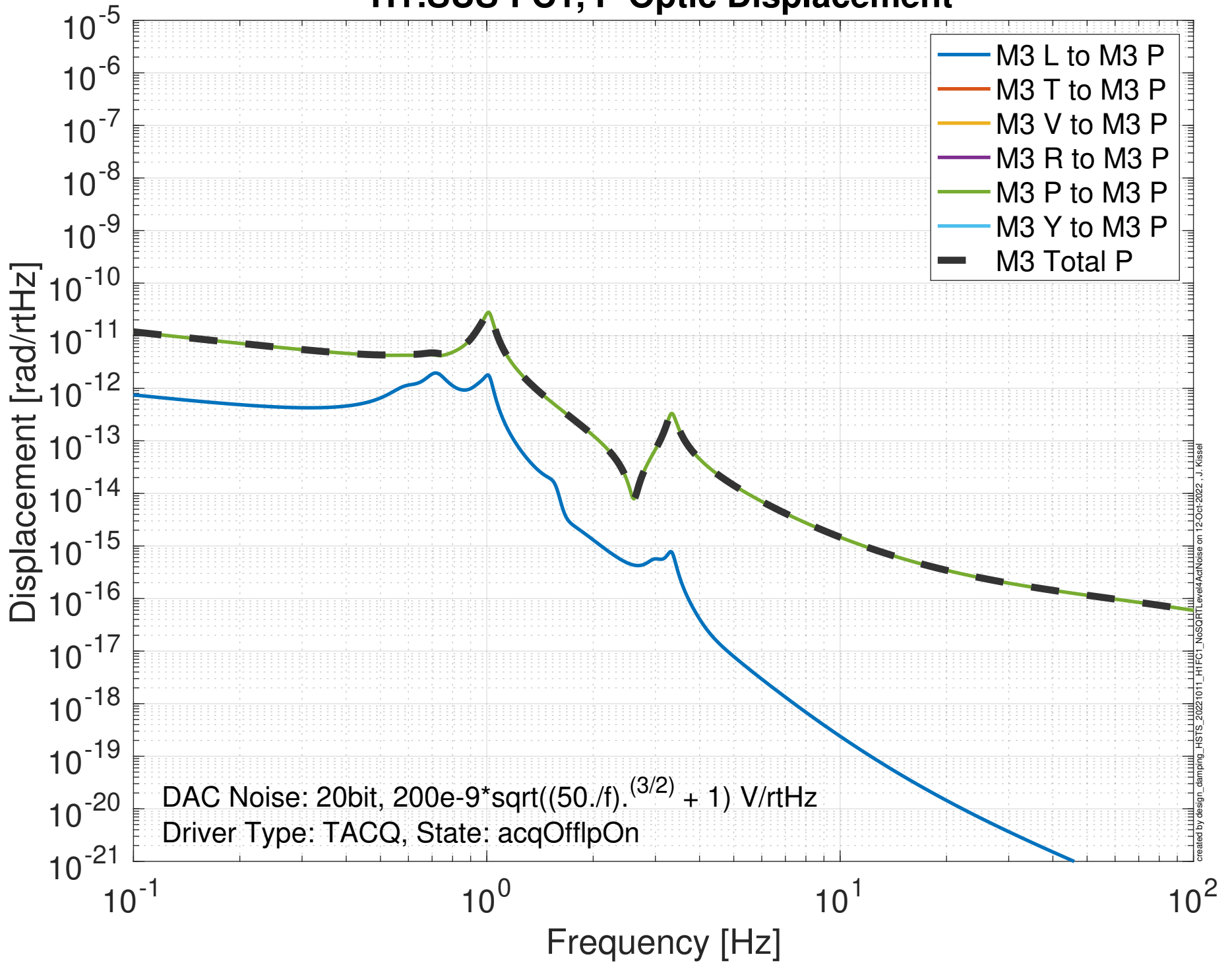
Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-FC1, P Optic Displacement



Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-FC1, P Optic Displacement

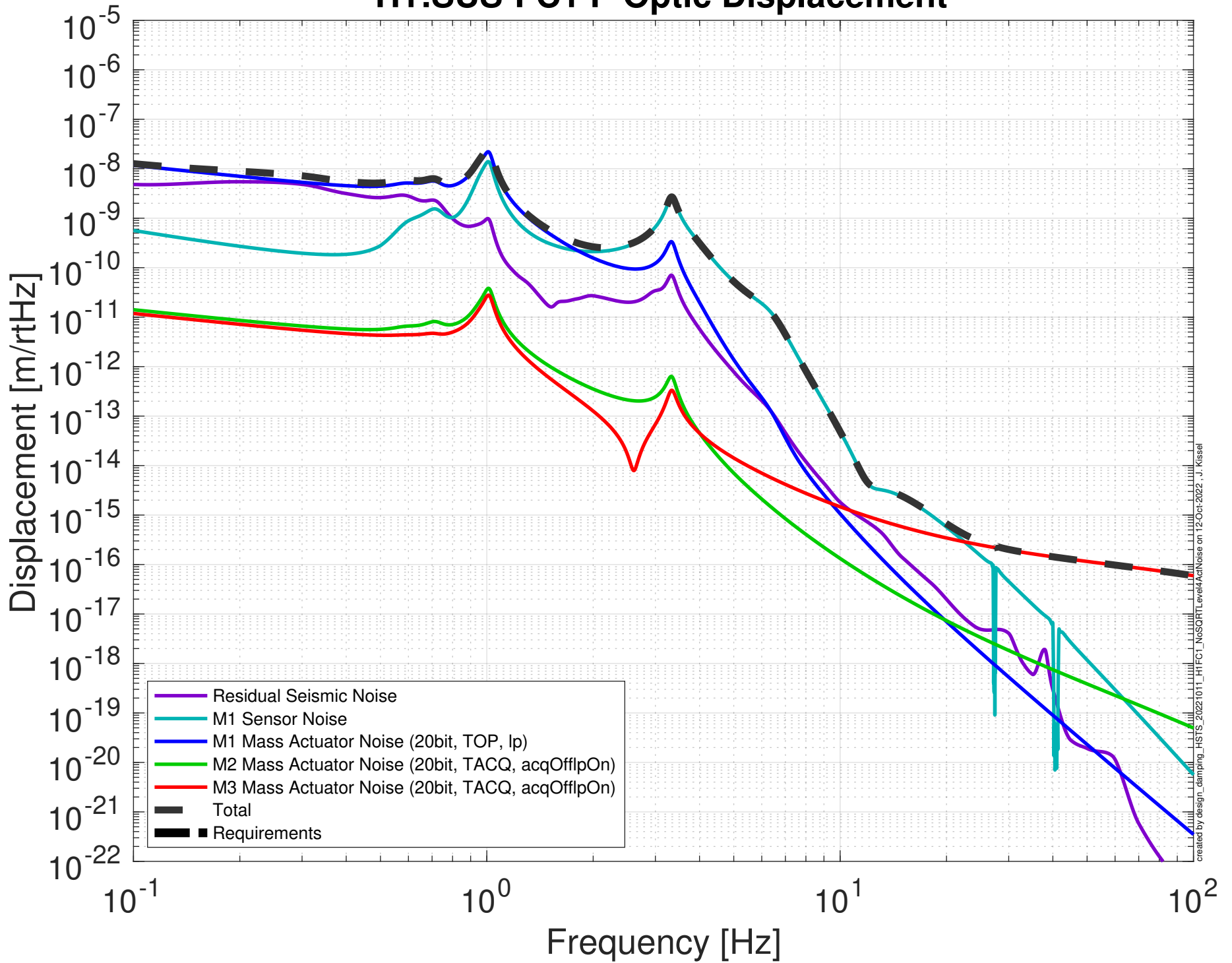


Projected M3 Mass Actuator > Optic Noise Budget H1:SUS-FC1, P Optic Displacement



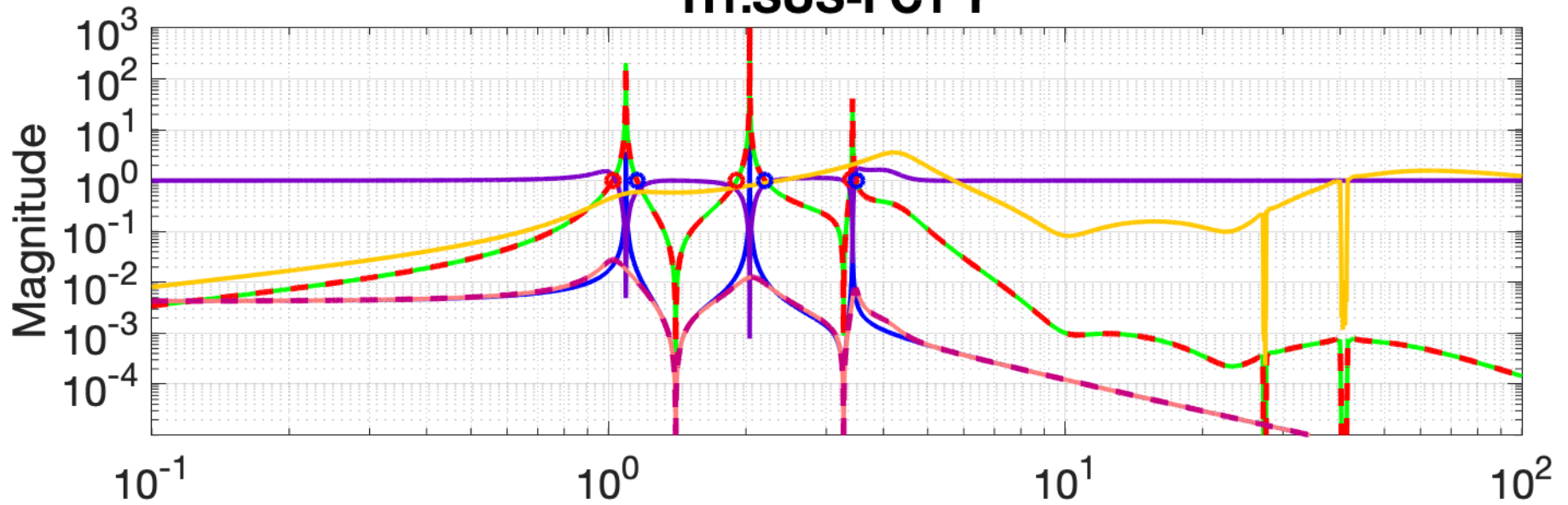
Damping Loop Performance

H1:SUS-FC1 P Optic Displacement

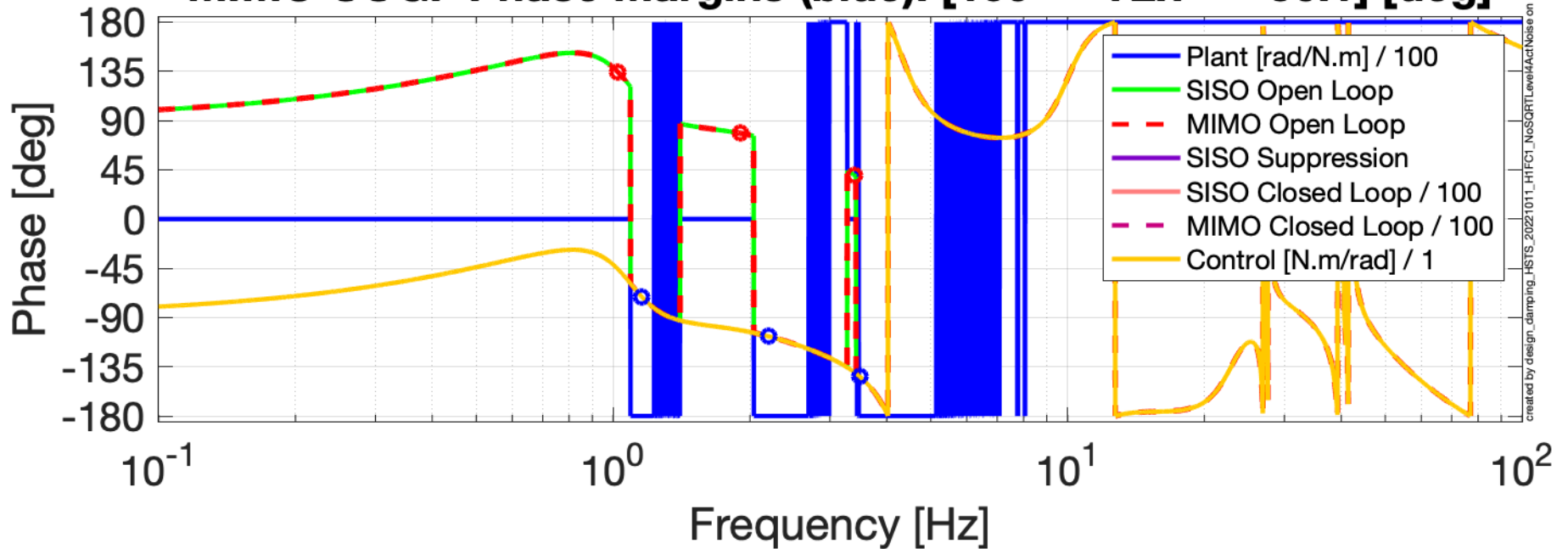


Damping Loop Design

H1:SUS-FC1 Y

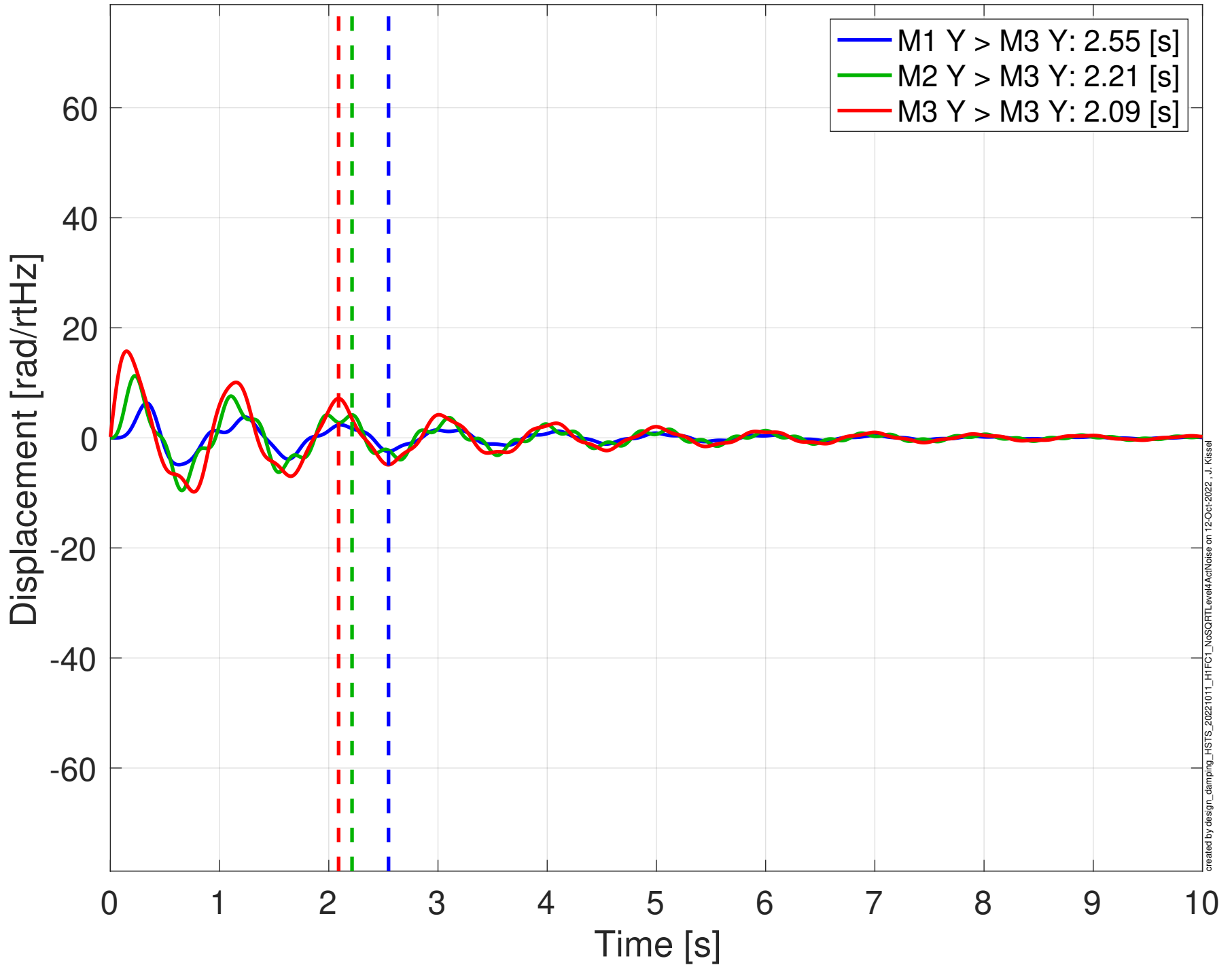


MIMO LUGF Phase Margins (red): [45.4 102 140] [deg]
MIMO UUGF Phase Margins (blue): [109 72.7 36.1] [deg]

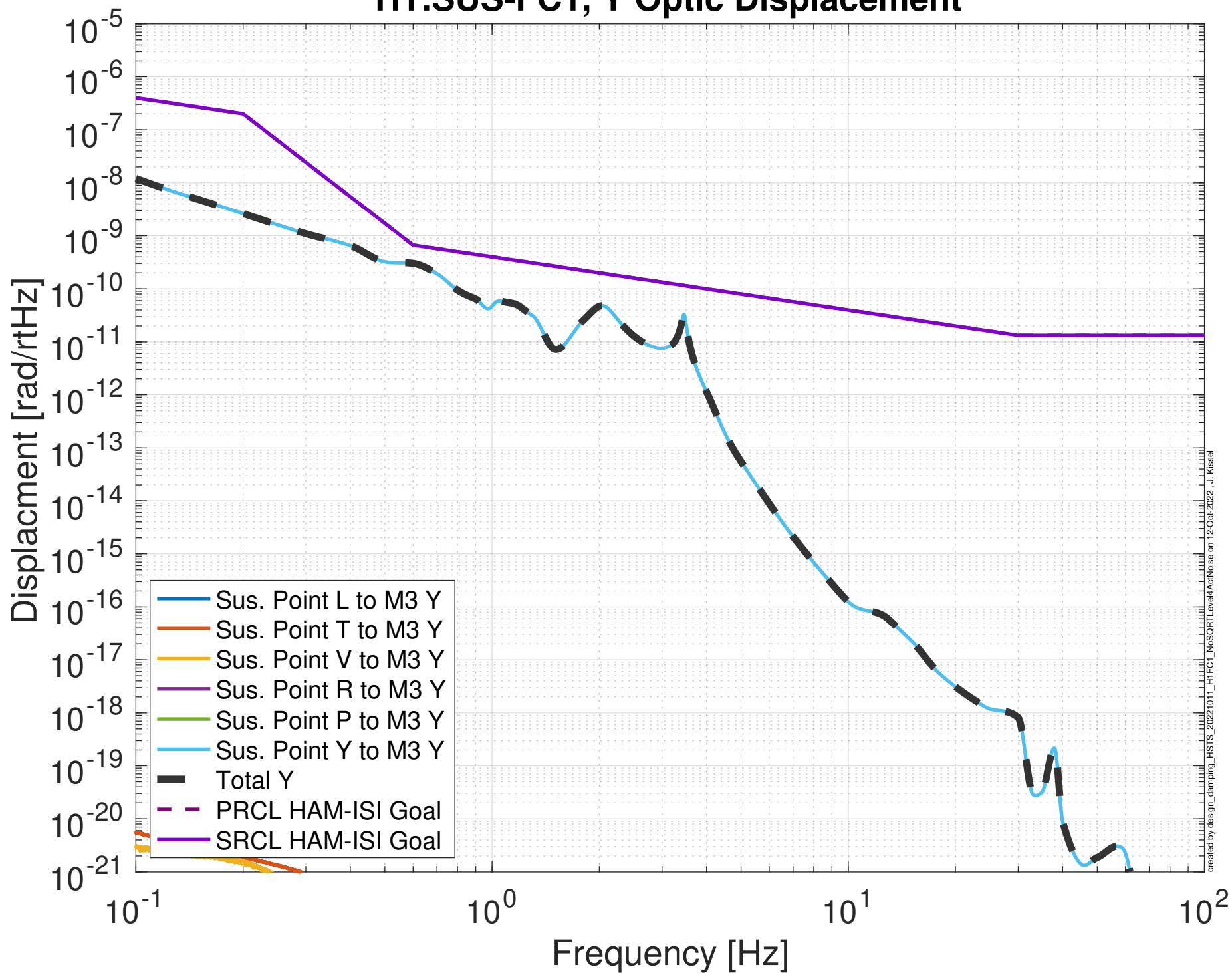


Damped Impulse Response

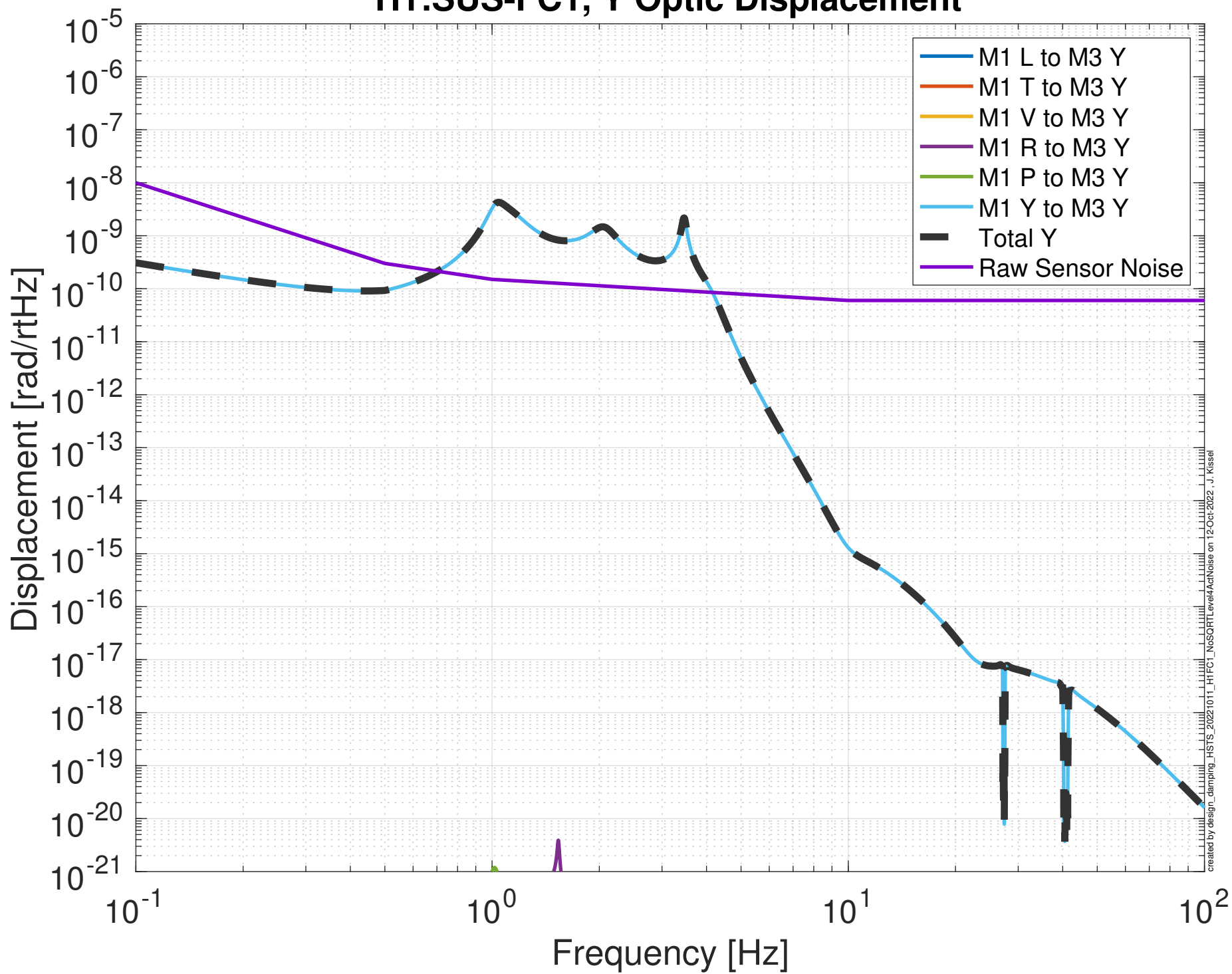
H1:SUS-FC1 Y



Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-FC1, Y Optic Displacement

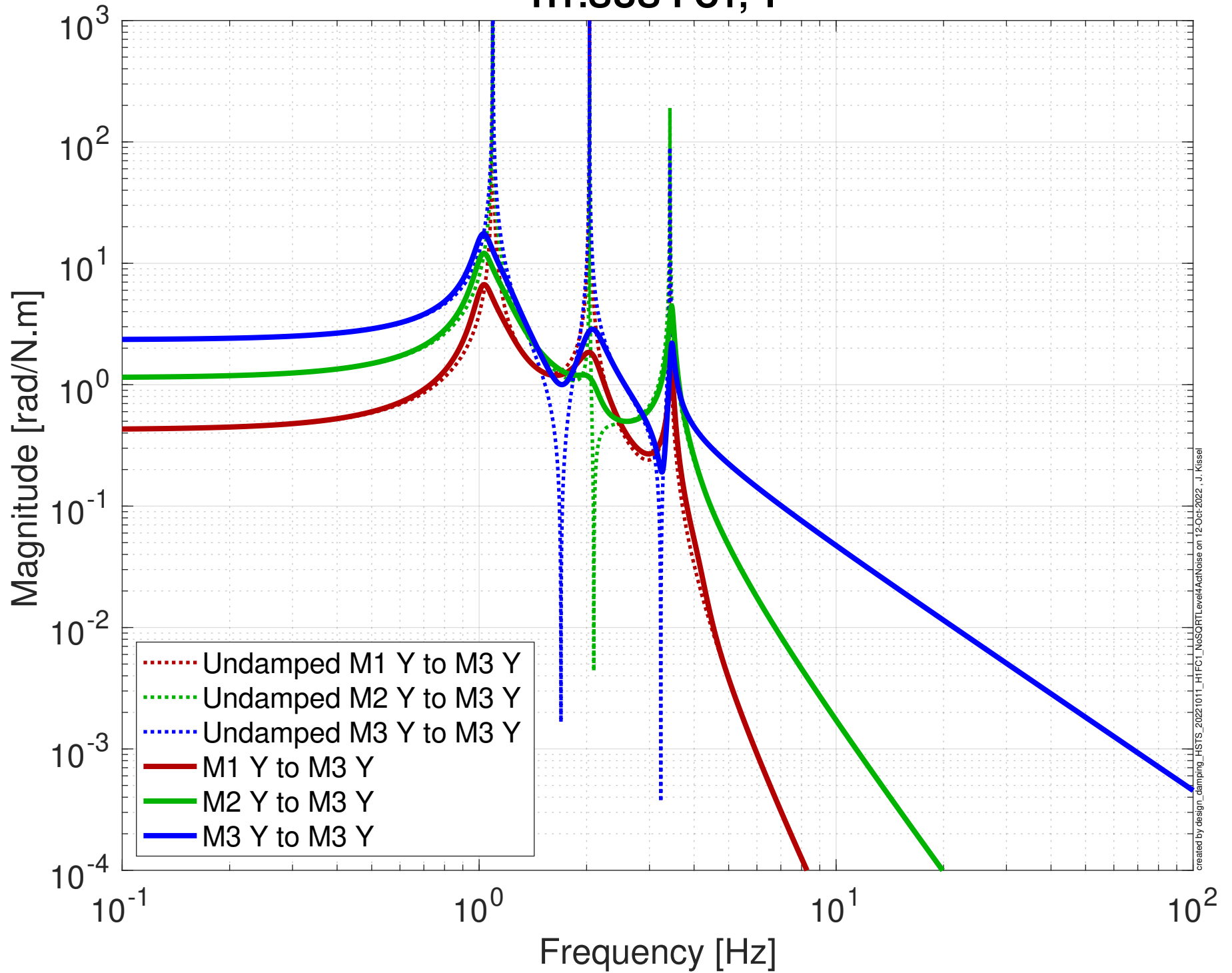


Projected Top Mass Sensor > Optic Noise Budget H1:SUS-FC1, Y Optic Displacement

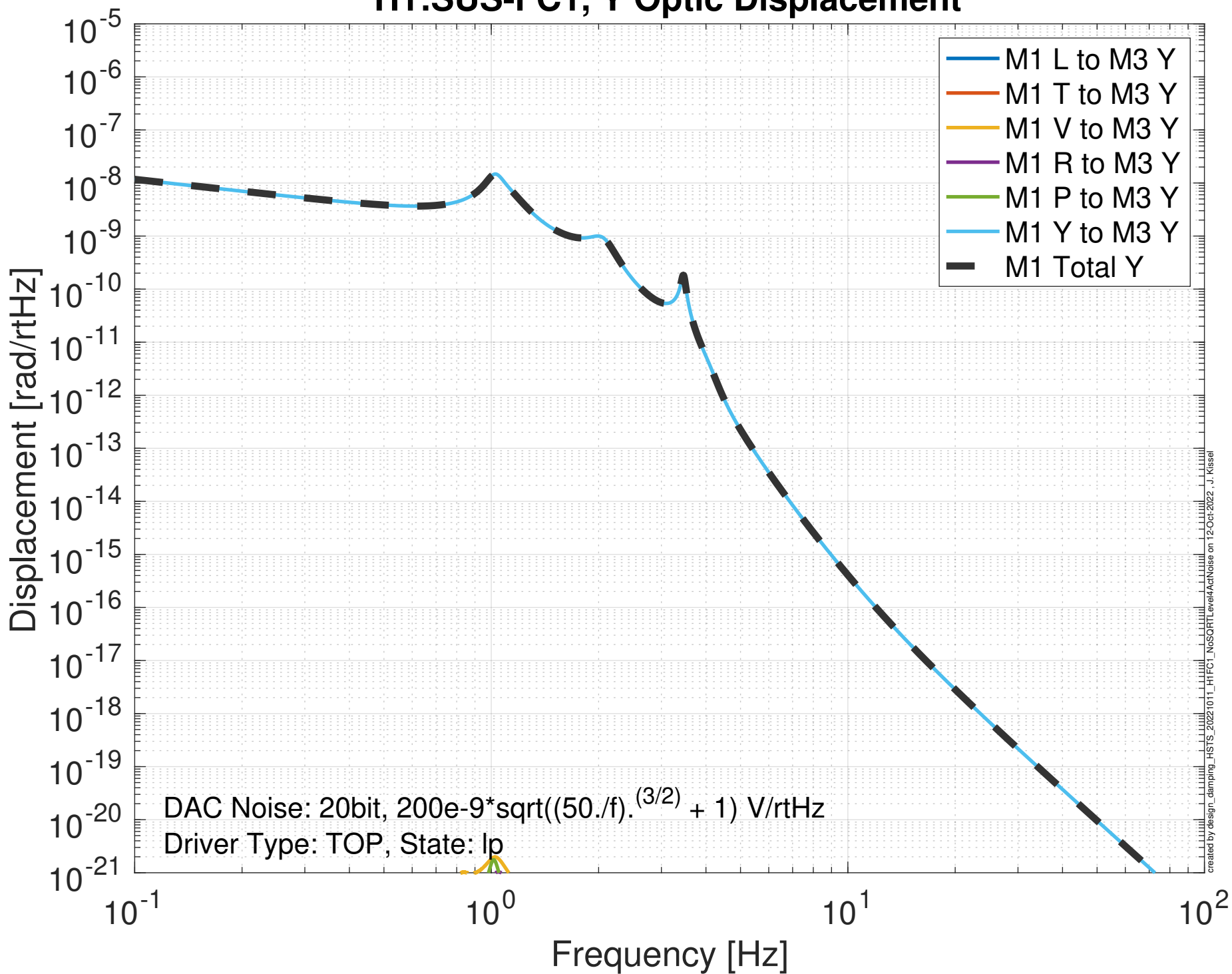


Global Control Transfer Functions to Optic

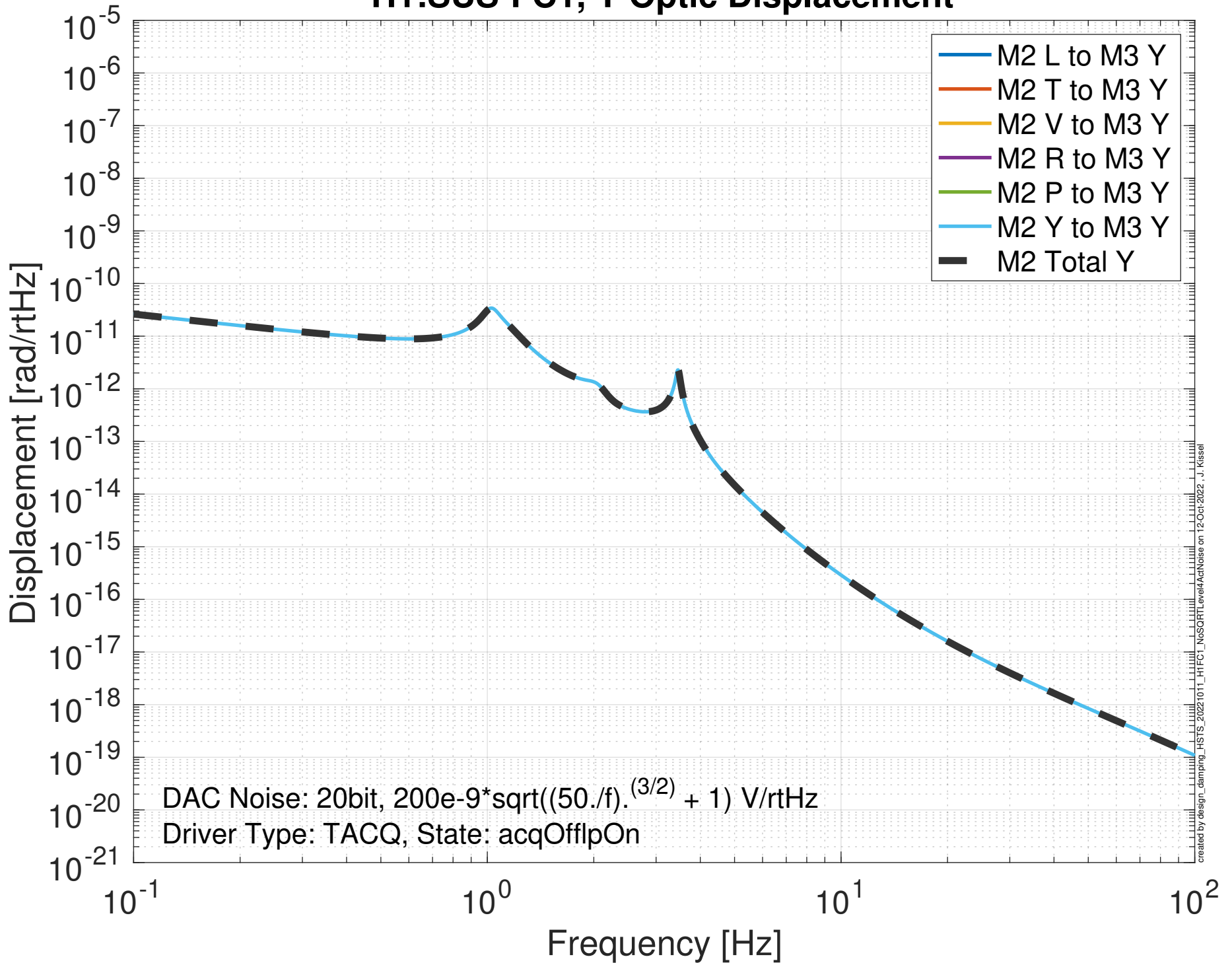
H1:SUS-FC1, Y



Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-FC1, Y Optic Displacement

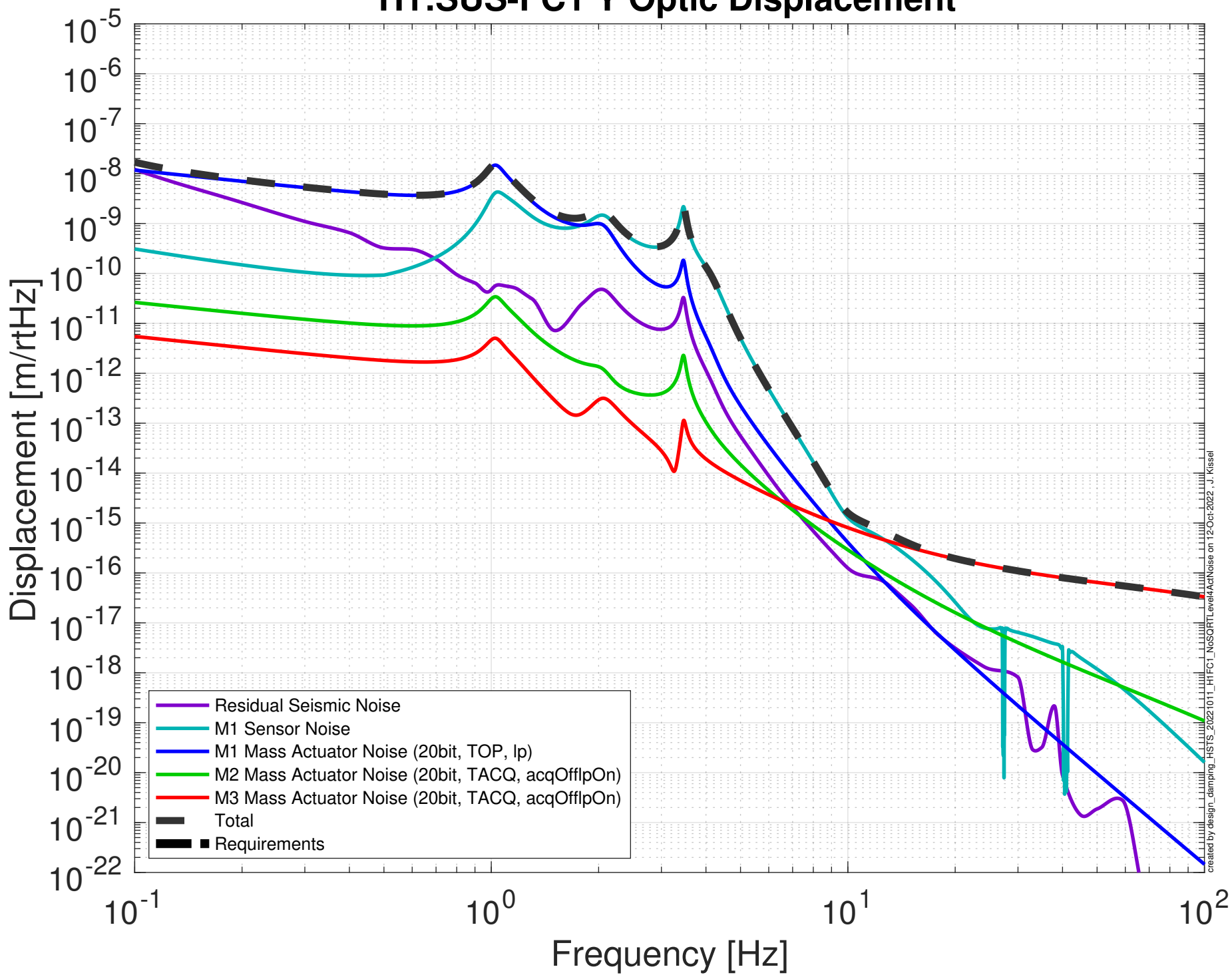


Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-FC1, Y Optic Displacement

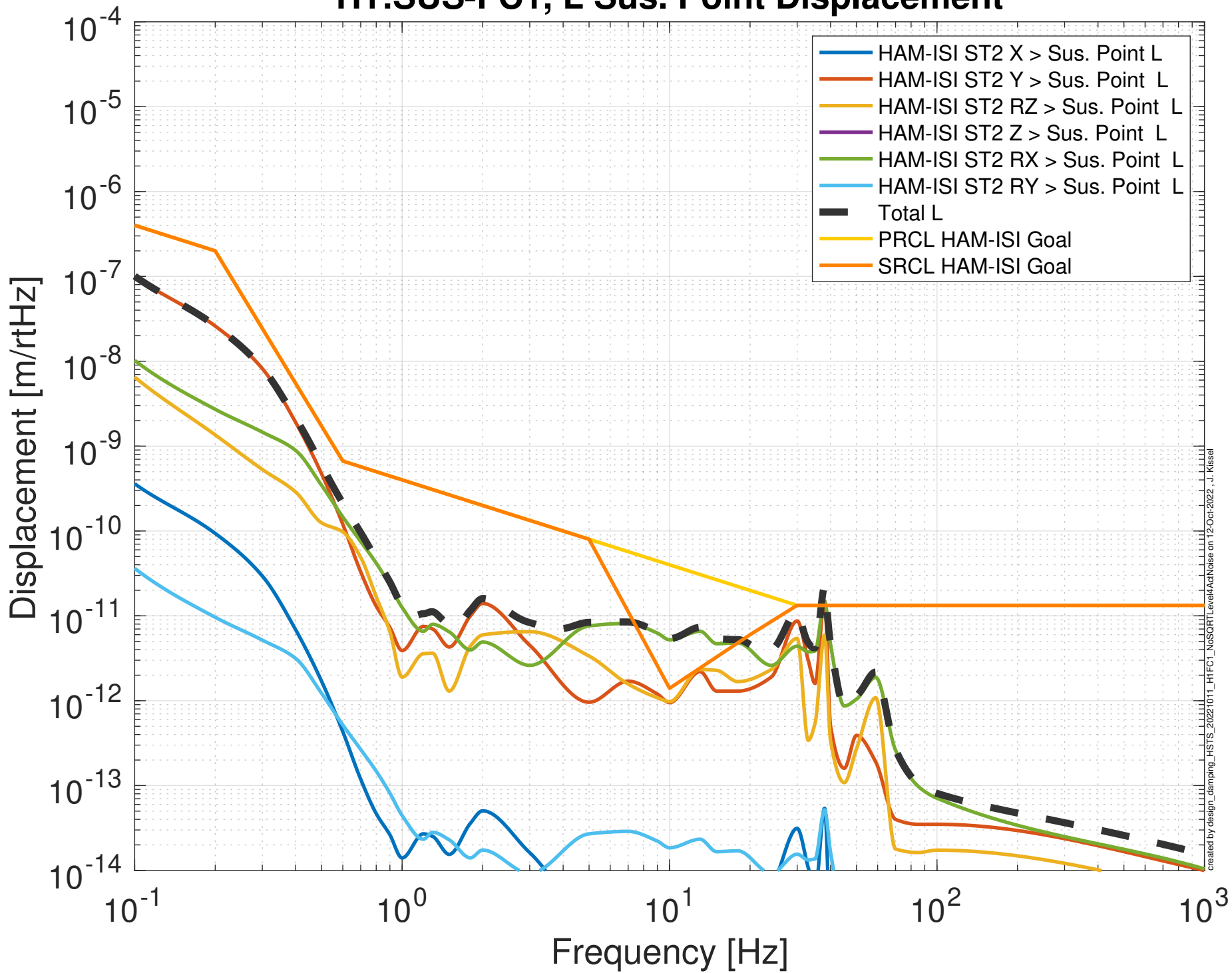


Damping Loop Performance

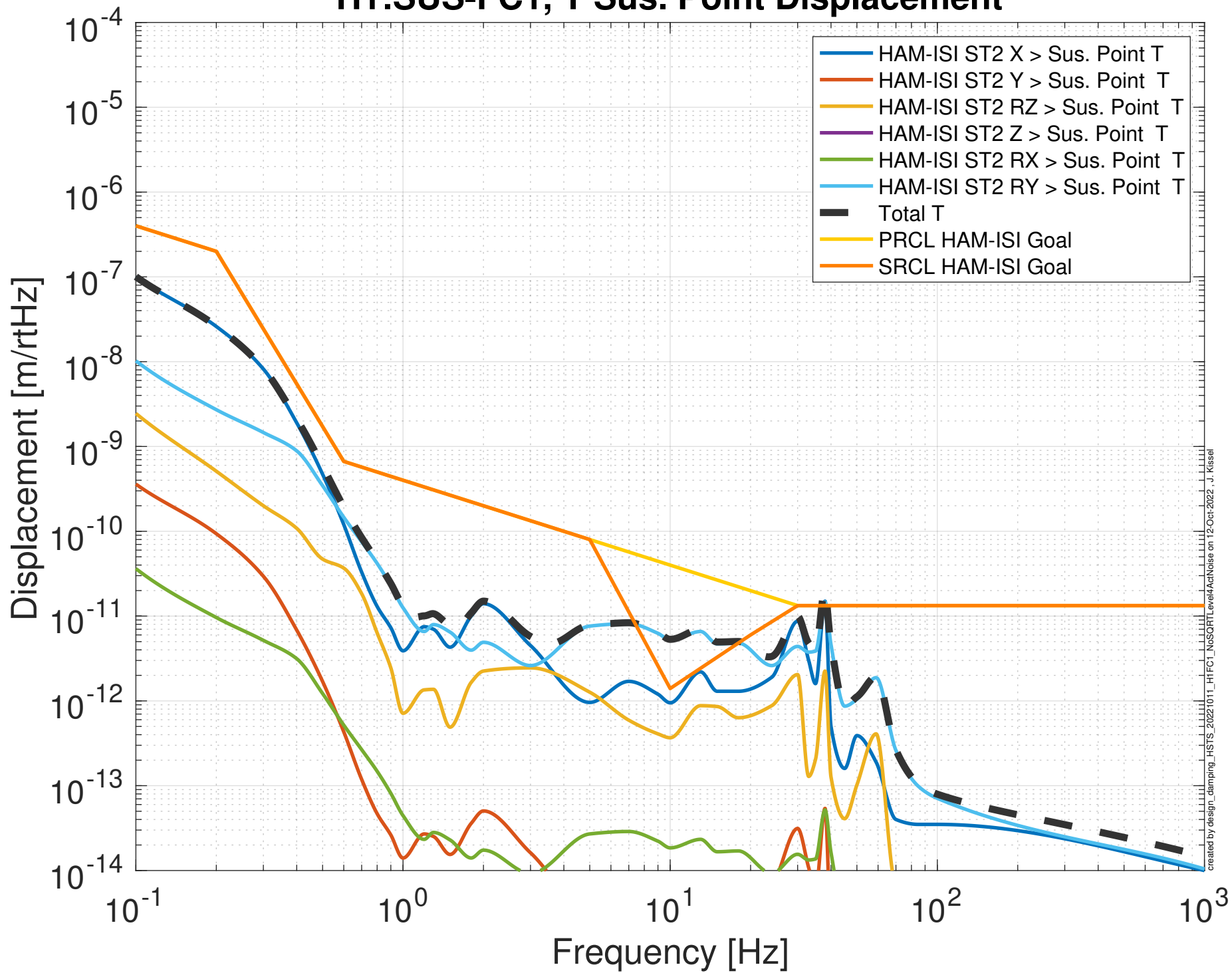
H1:SUS-FC1 Y Optic Displacement



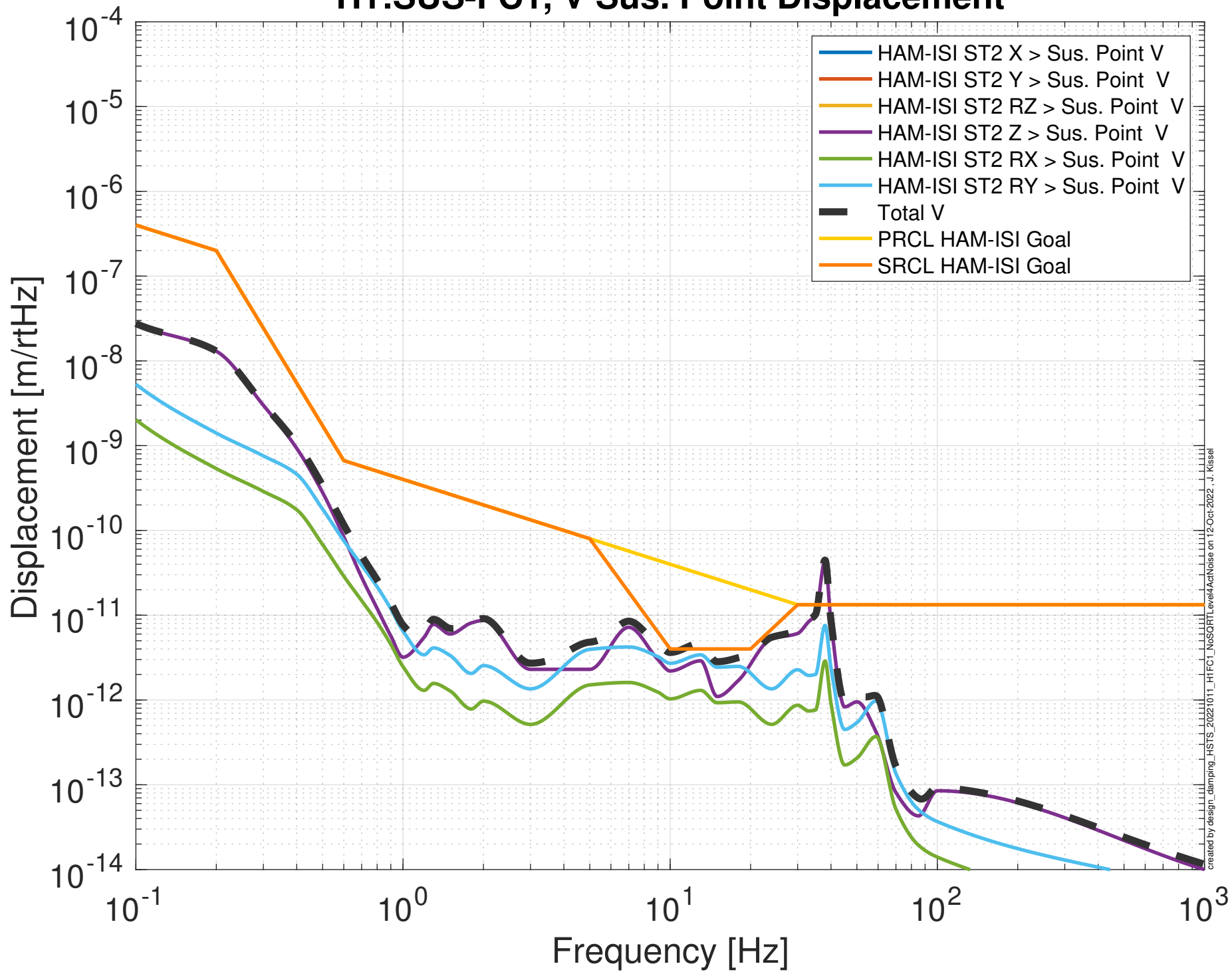
Projected ISI Seismic Noise Budget H1:SUS-FC1, L Sus. Point Displacement



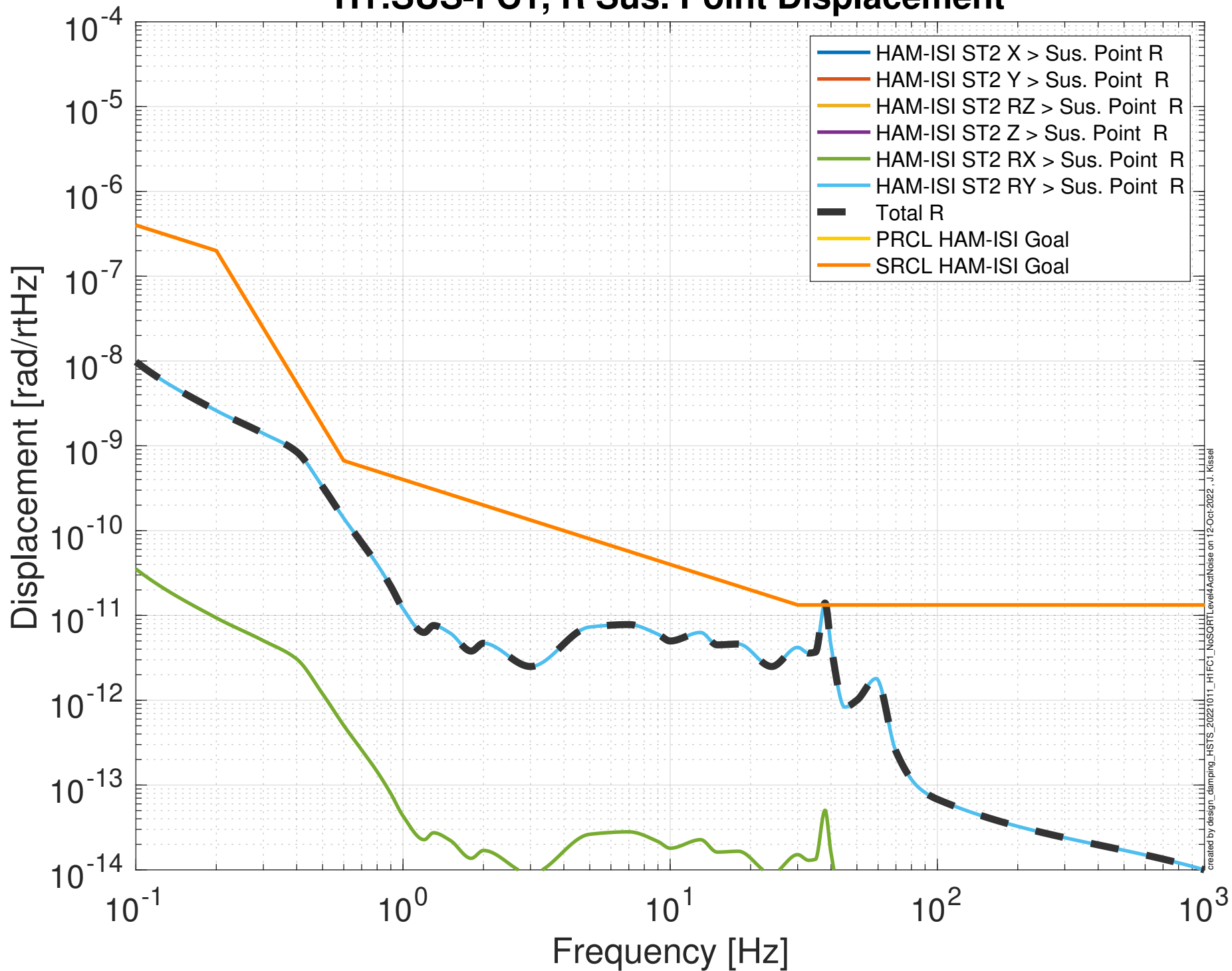
Projected ISI Seismic Noise Budget H1:SUS-FC1, T Sus. Point Displacement



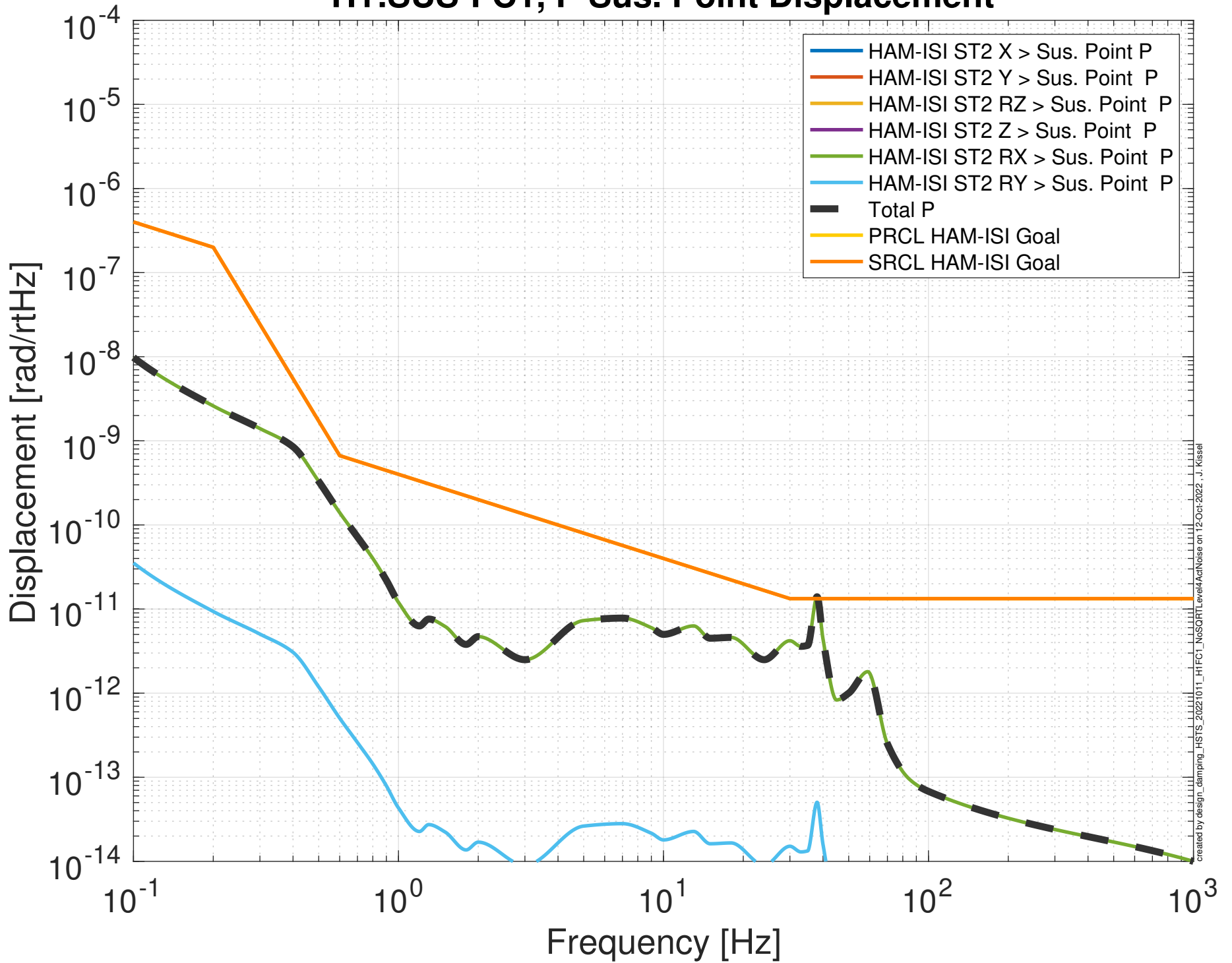
Projected ISI Seismic Noise Budget H1:SUS-FC1, V Sus. Point Displacement



Projected ISI Seismic Noise Budget H1:SUS-FC1, R Sus. Point Displacement

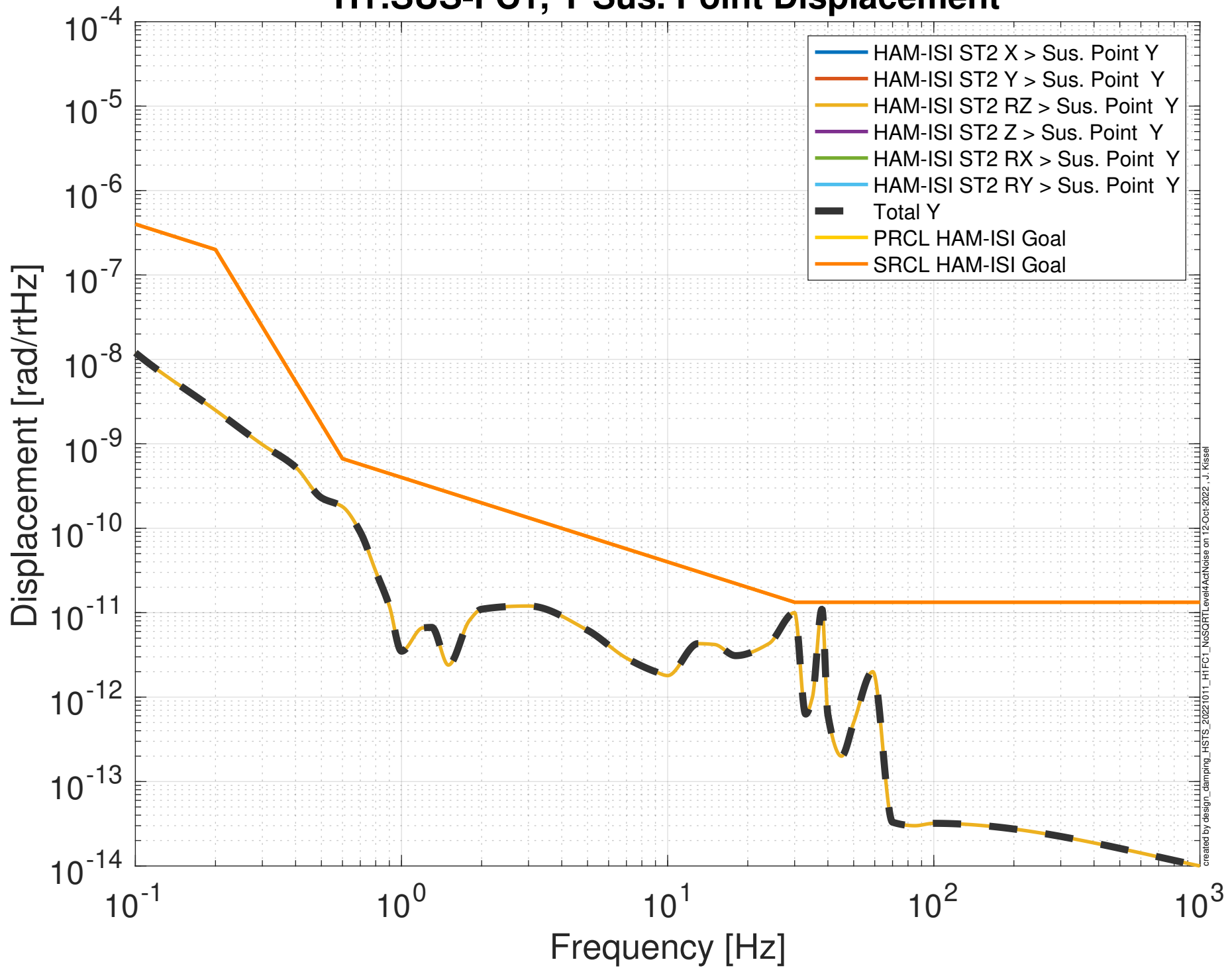


Projected ISI Seismic Noise Budget H1:SUS-FC1, P Sus. Point Displacement



created by design_damping_H1STS_20221011_H1FC1_NbSQR1Level4ActNoise on 12-Oct-2022, J. Kissel

Projected ISI Seismic Noise Budget H1:SUS-FC1, Y Sus. Point Displacement



created by design_damping_H1STS_20221011_H1FC1_NbSQR1Level4ActNoise on 12-Oct-2022, J. Kissel

Projected Input Top Mass Sensor Noise Budget

