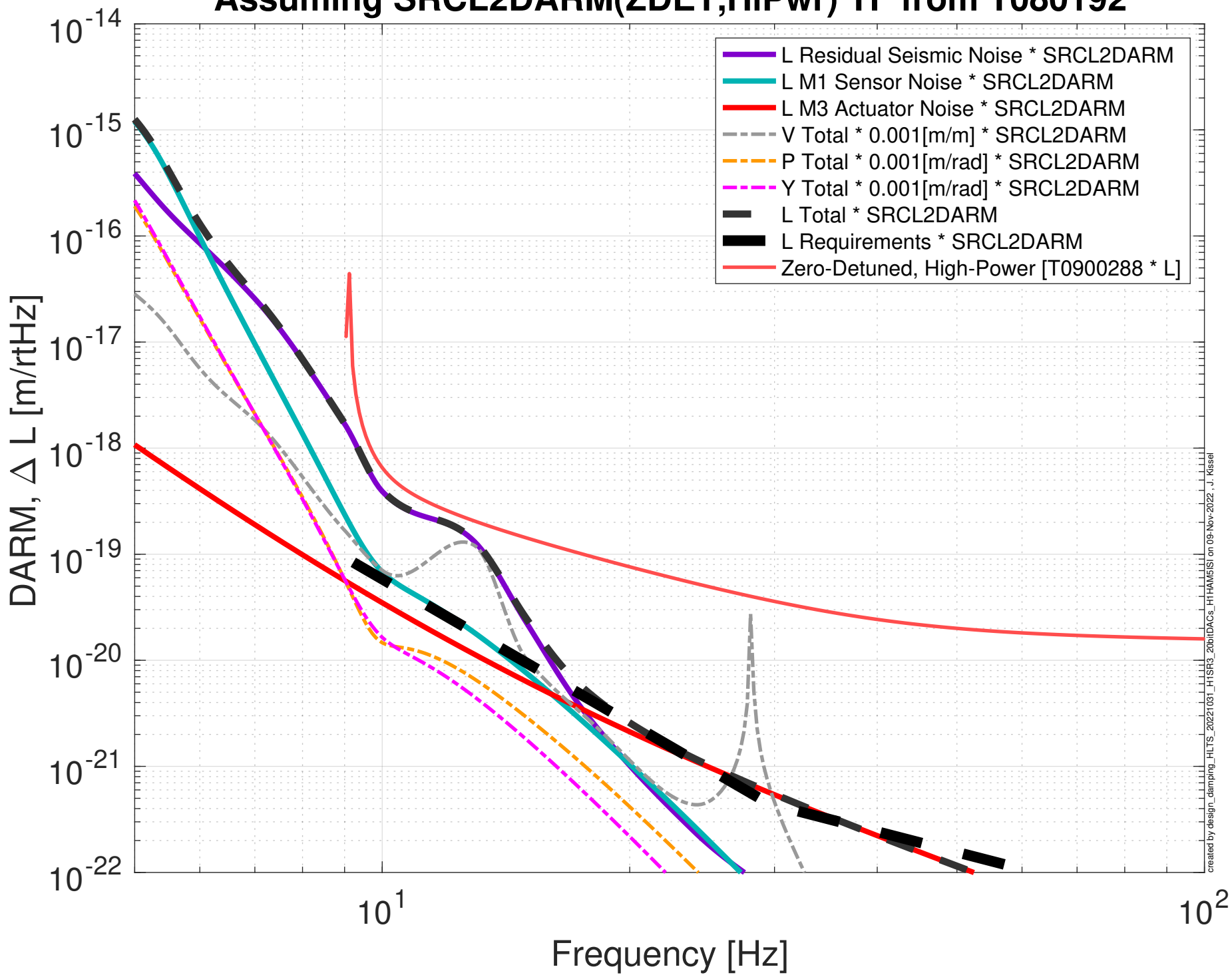
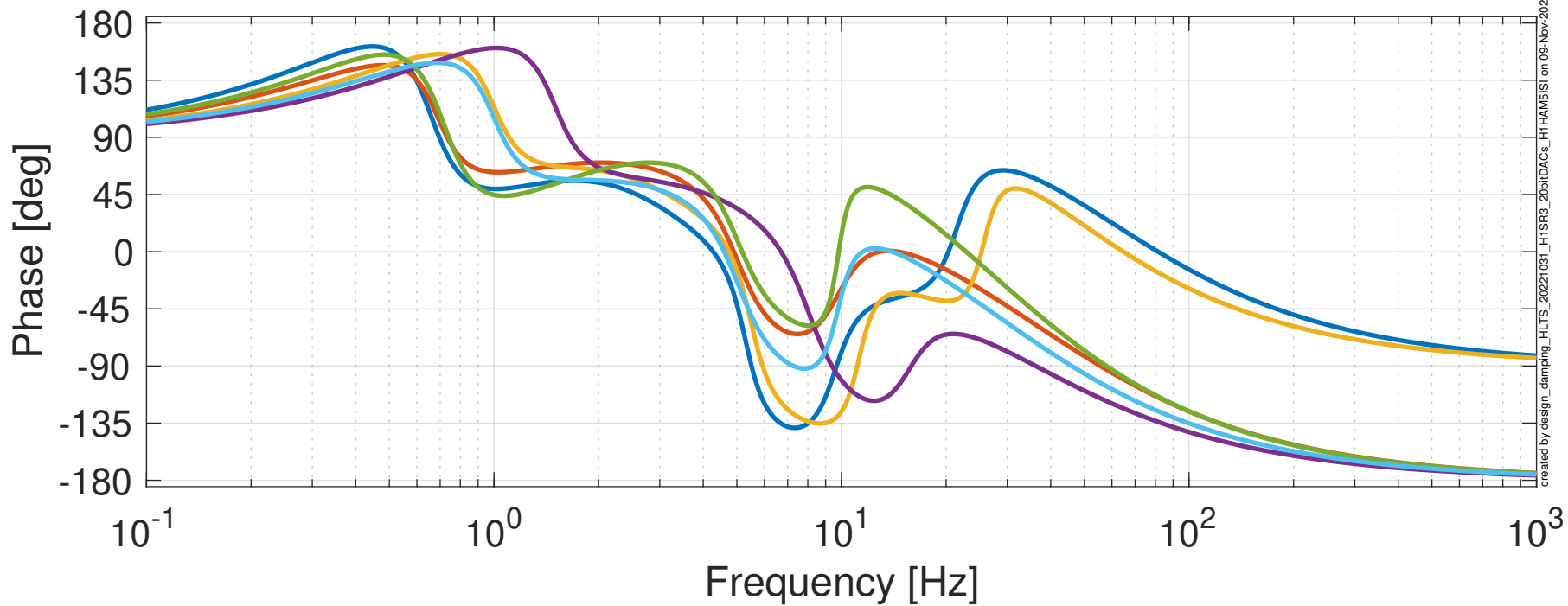
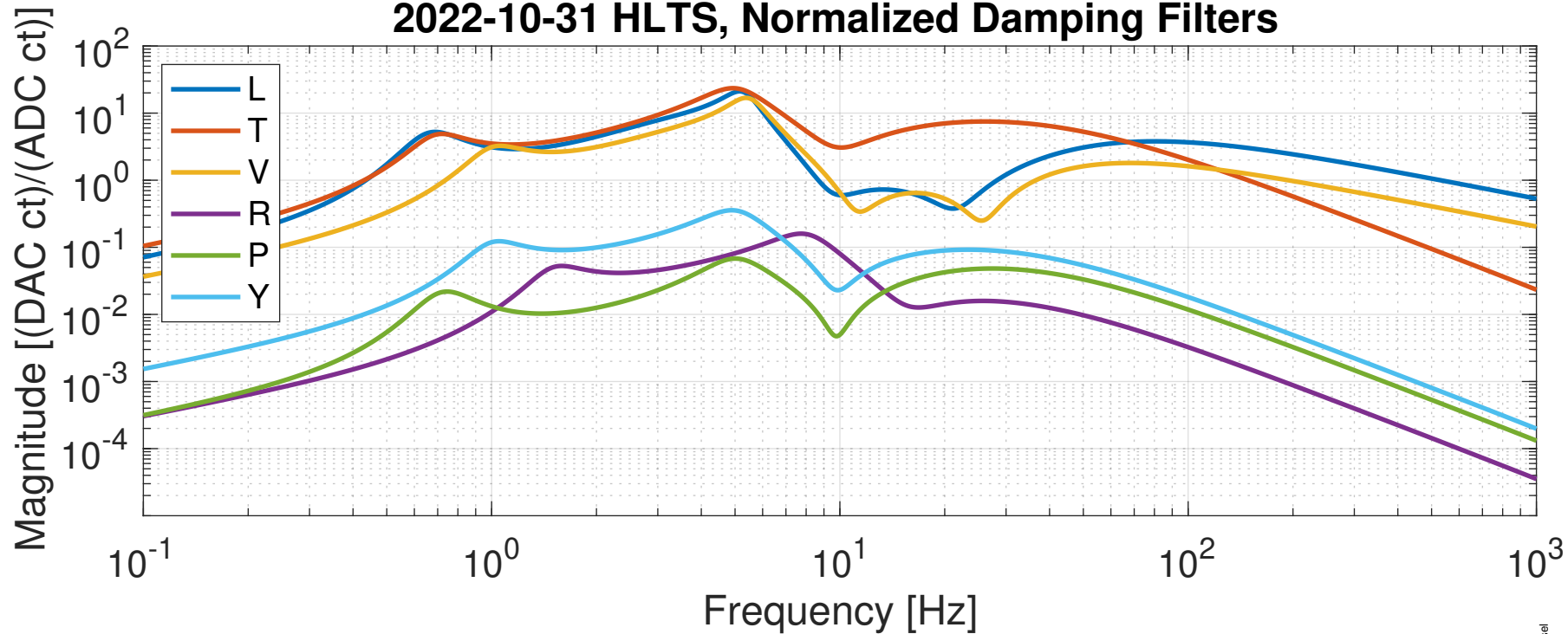


HLTS Damping Loop Performance; Differential Arm Displacement Assuming SRCL2DARM(ZDET,HiPwr) TF from T080192



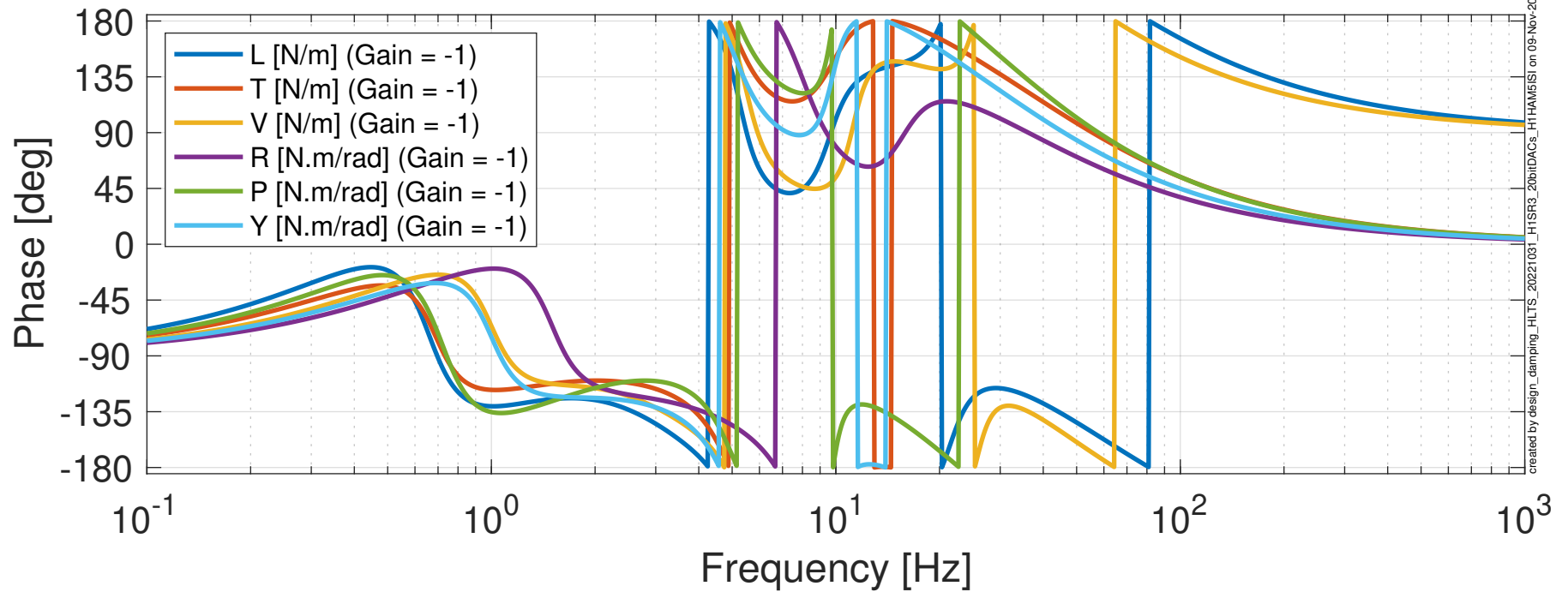
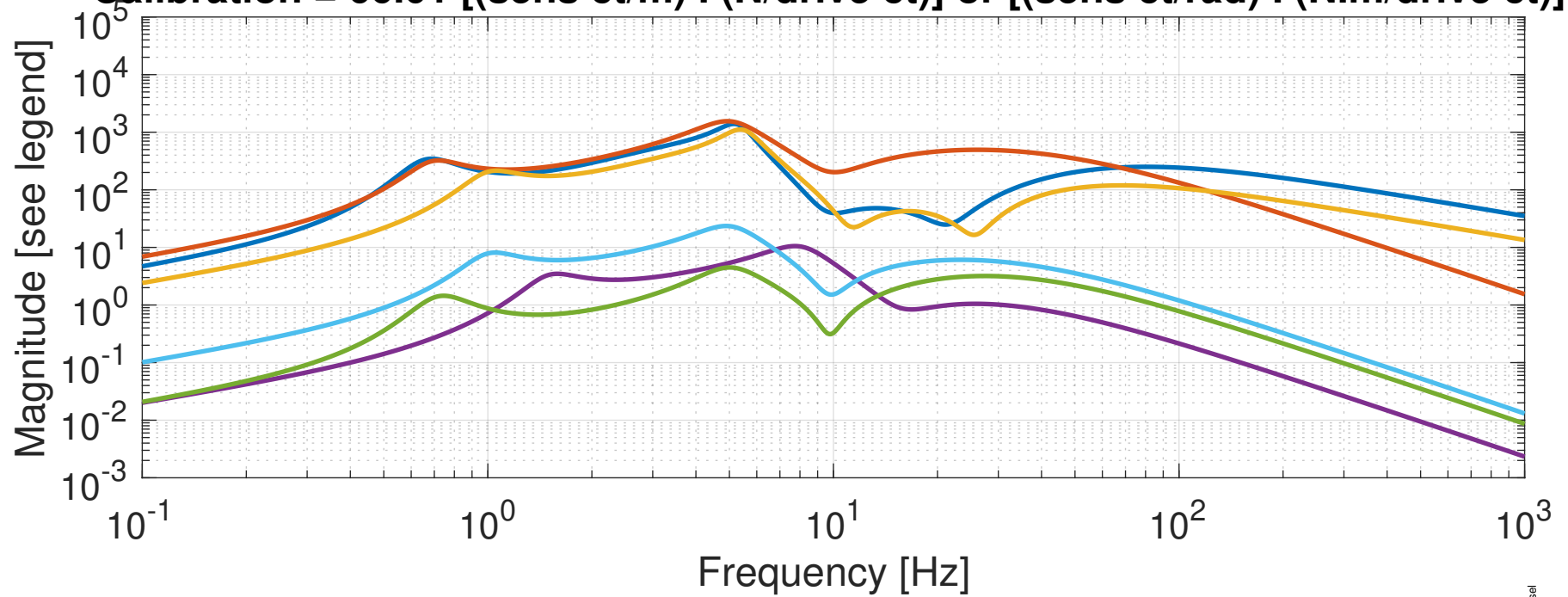
created by design_damping_HLTS_2021031_HISR3_20bitDACs_H1HAMIS1 on 09-Nov-2022, J. Kissel

2022-10-31 HLTS, Normalized Damping Filters



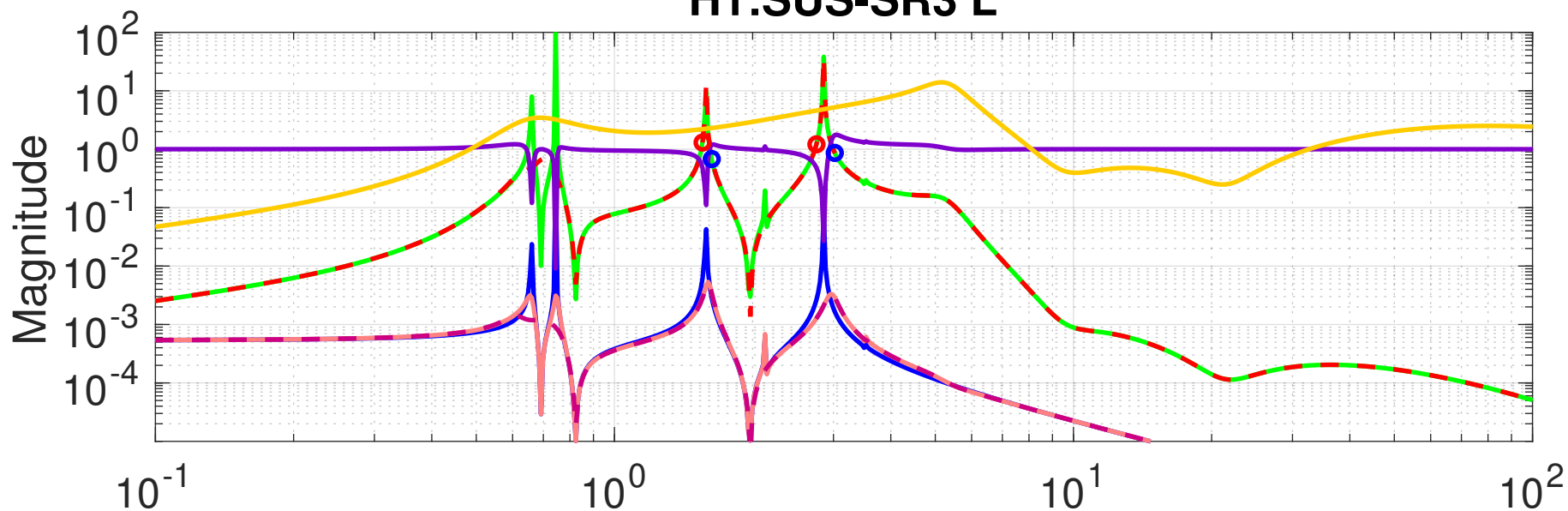
2022-10-31 HLTS, Calibrated Damping Filters

Calibration = 66.01 [(sens ct/m) . (N/drive ct)] or [(sens ct/rad) . (N.m/drive ct)]

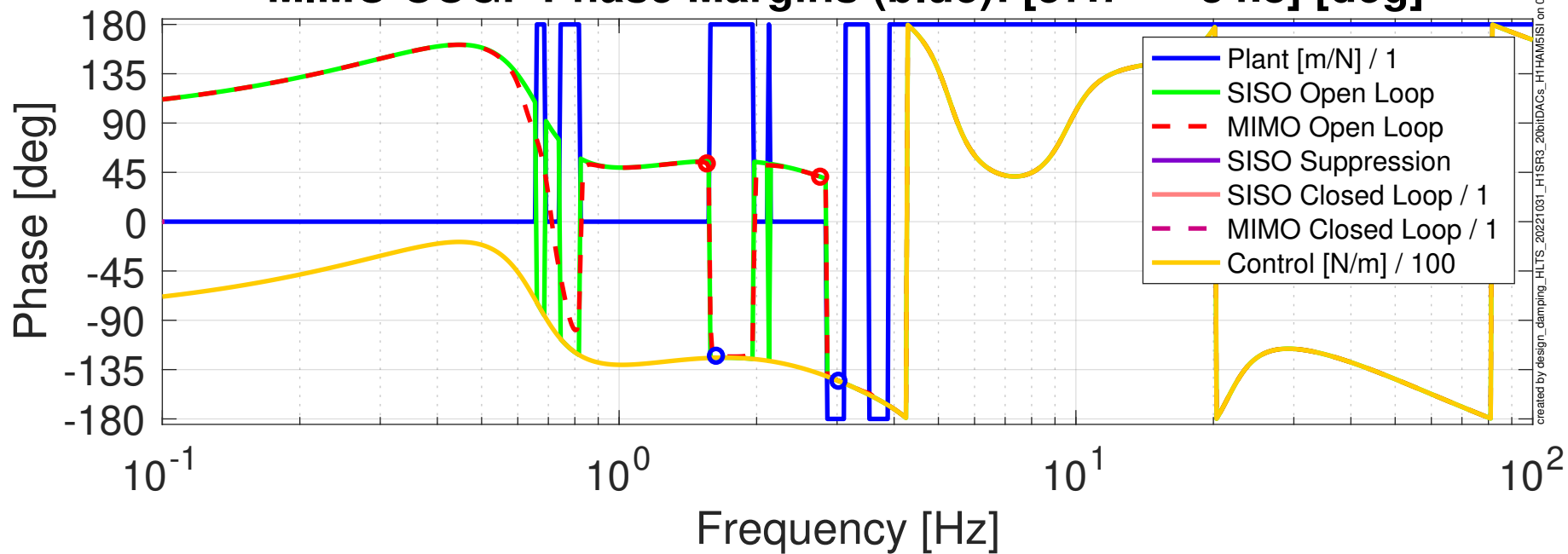


Damping Loop Design

H1:SUS-SR3 L

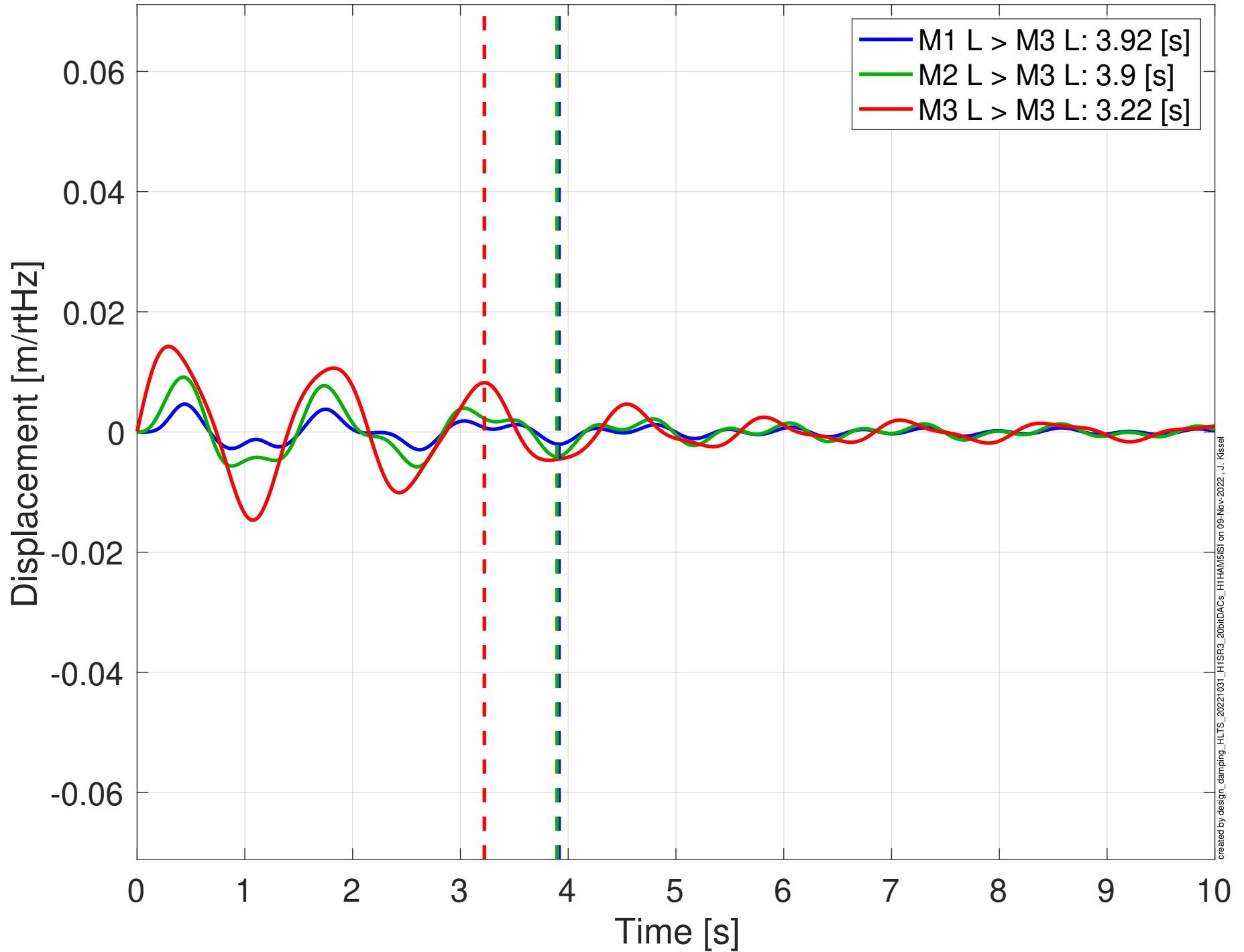


MIMO LUGF Phase Margins (red): [127 139] [deg]
MIMO UUGF Phase Margins (blue): [57.7 34.8] [deg]

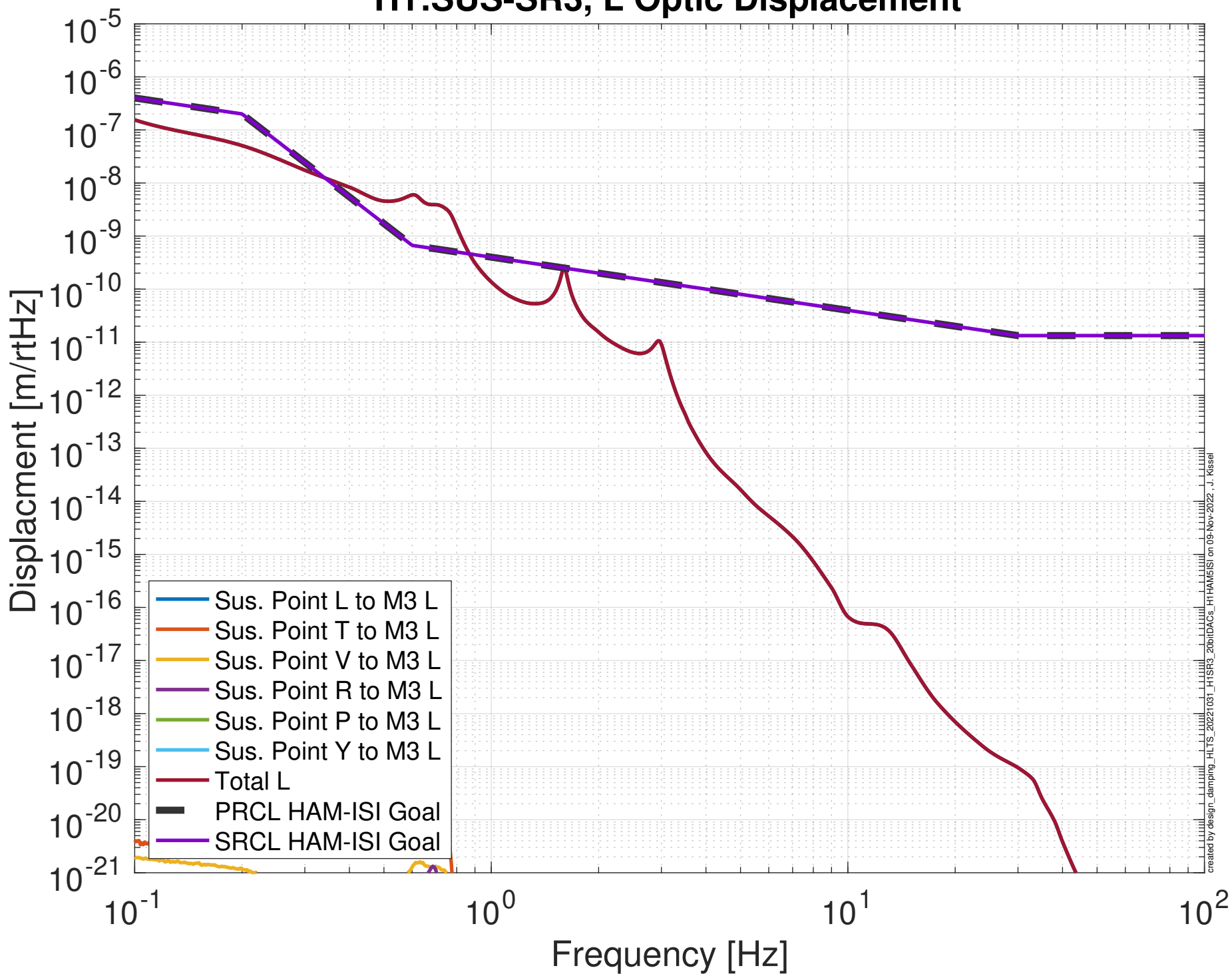


Damped Impulse Response

H1:SUS-SR3 L

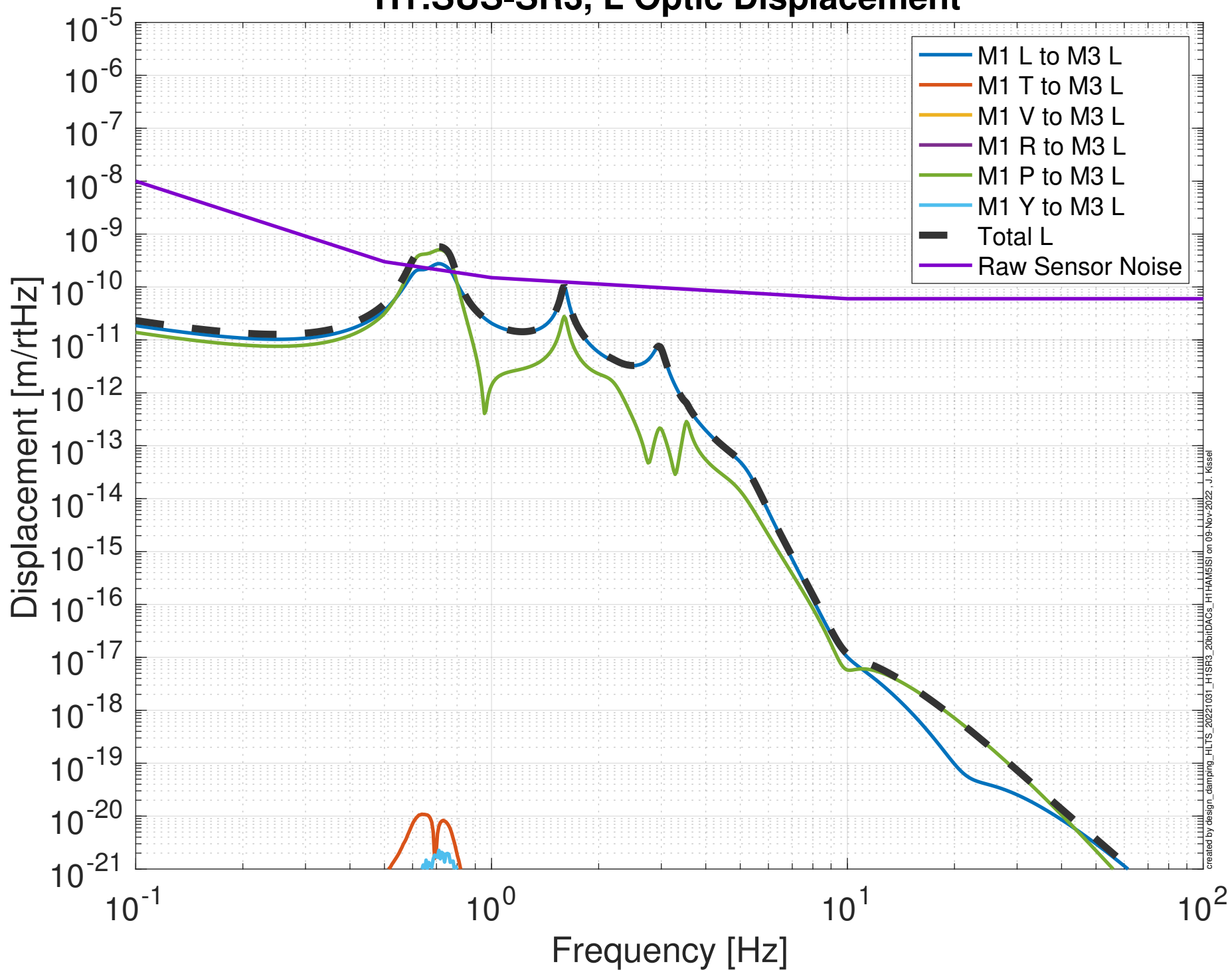


Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-SR3, L Optic Displacement



Projected Top Mass Sensor > Optic Noise Budget

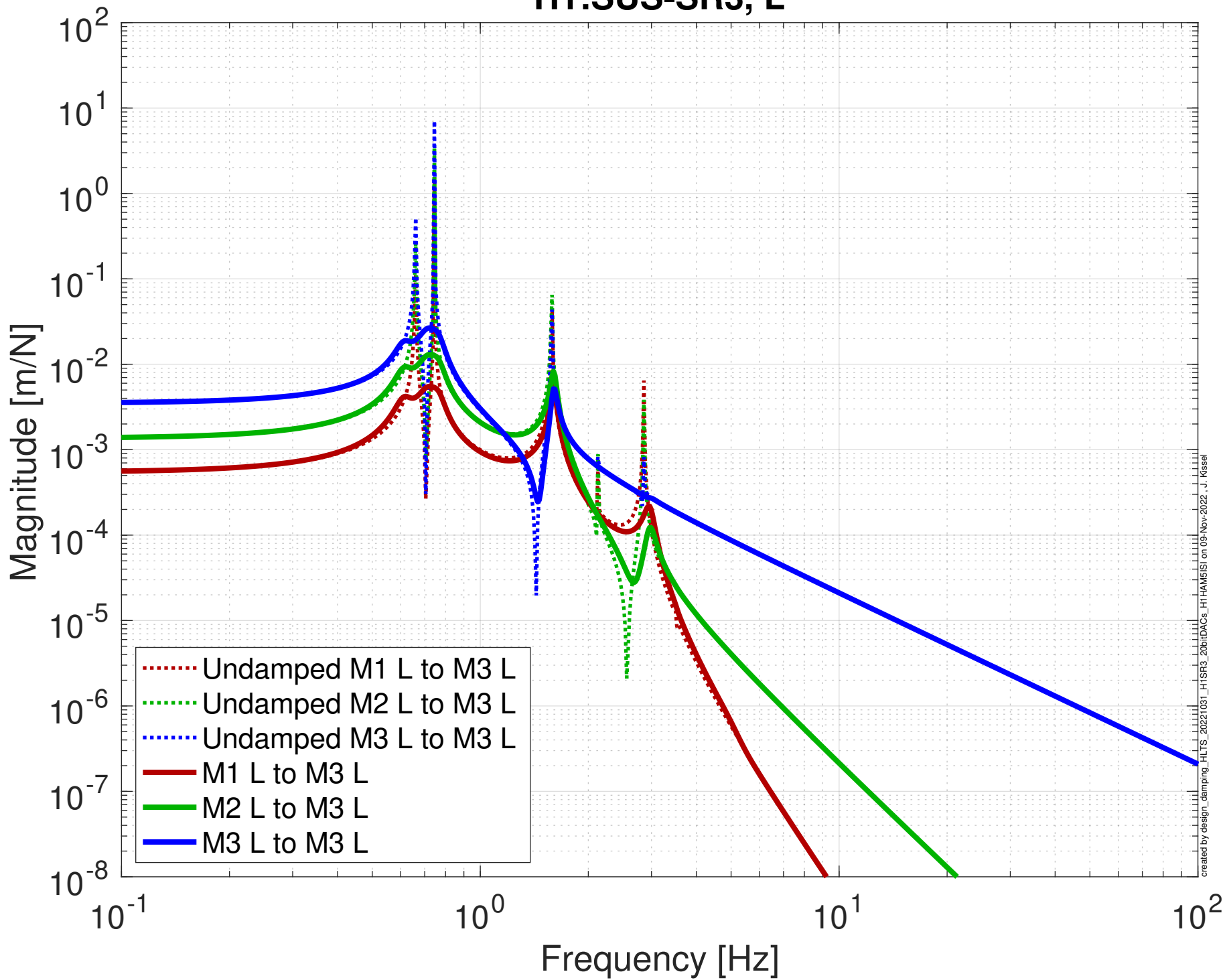
H1:SUS-SR3, L Optic Displacement



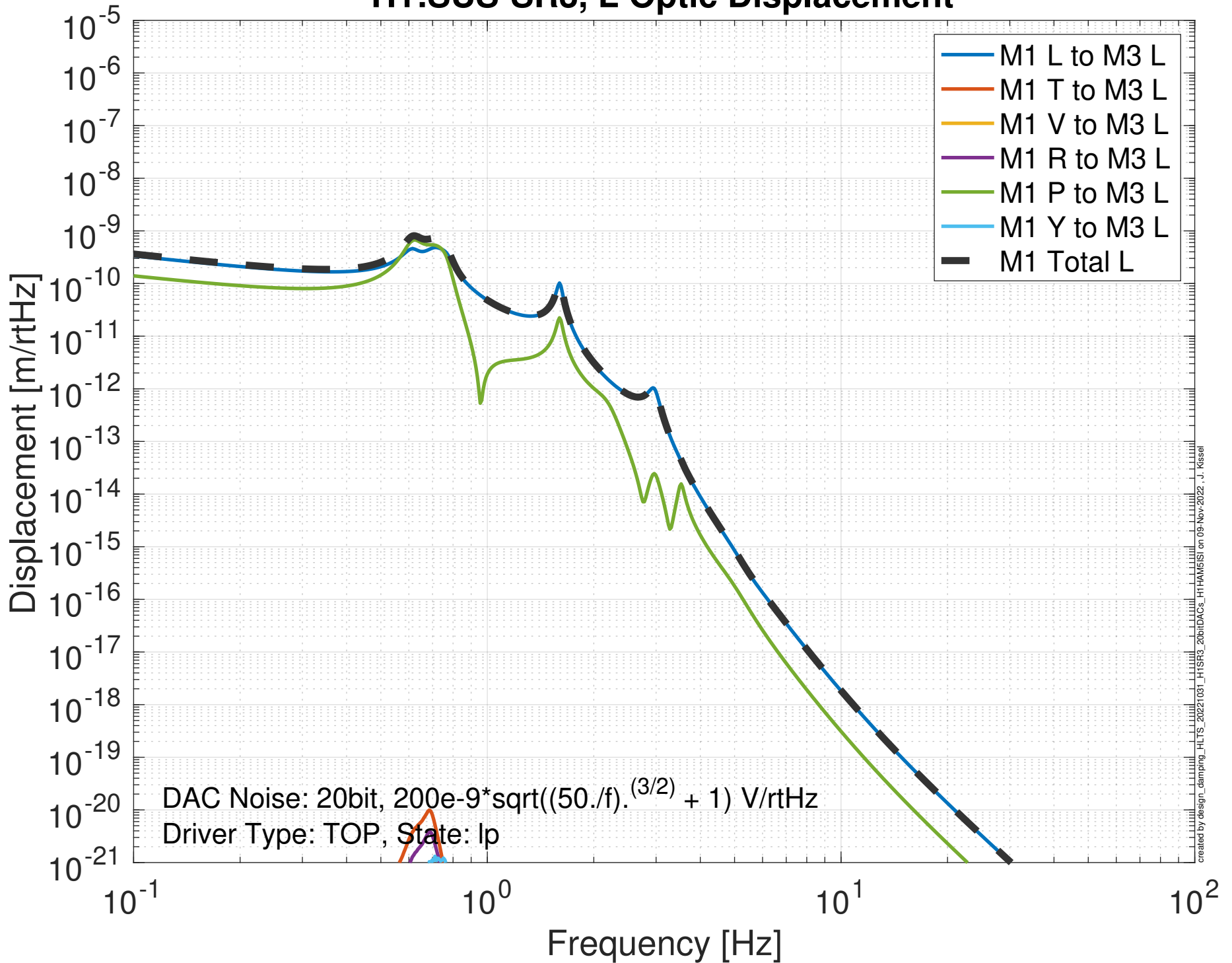
created by design_camping_HLTS_20221031_H1SR3_20bitDACs_H1HAMIS1 on 09-Nov-2022, J. Kissel

Global Control Transfer Functions to Optic

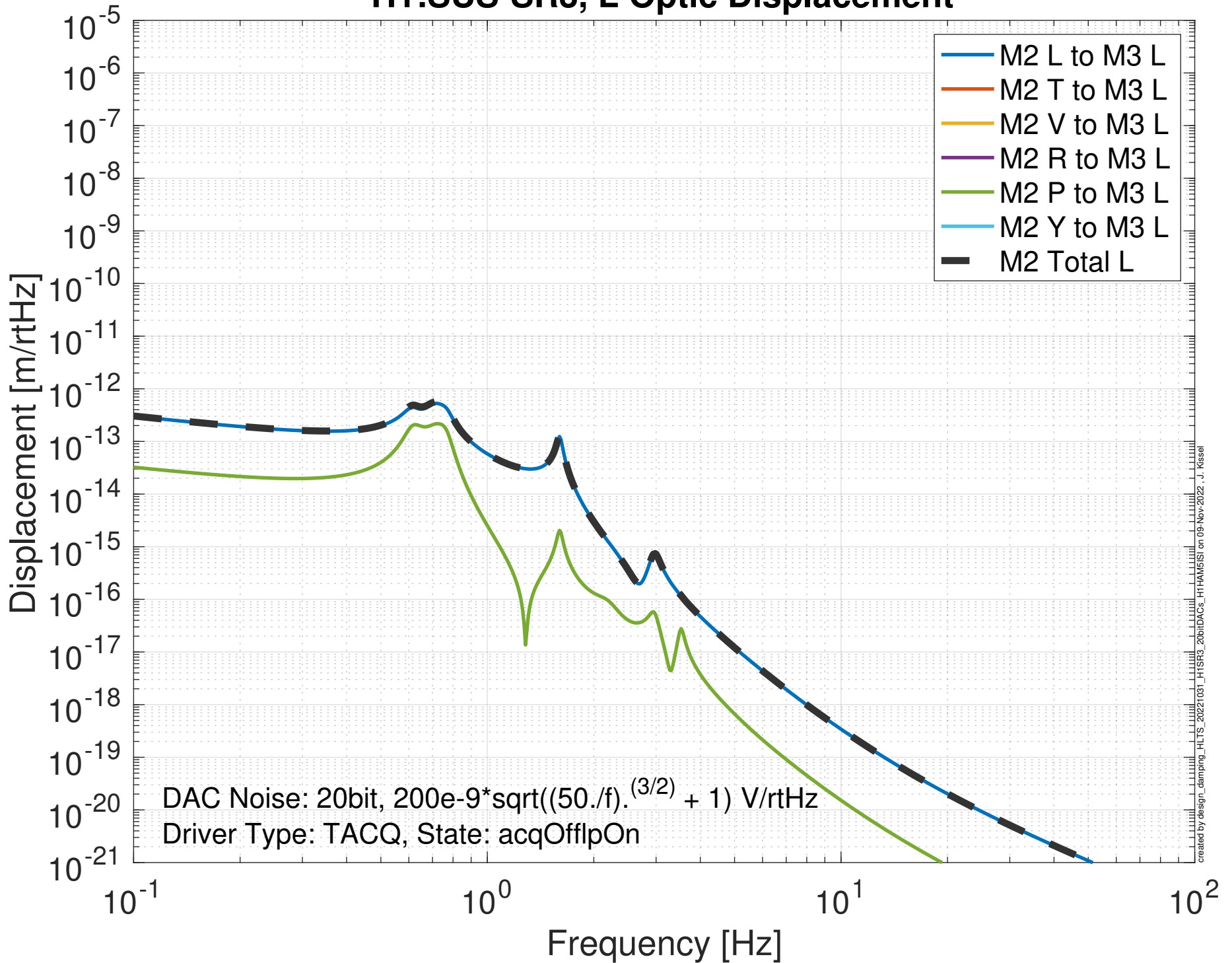
H1:SUS-SR3, L



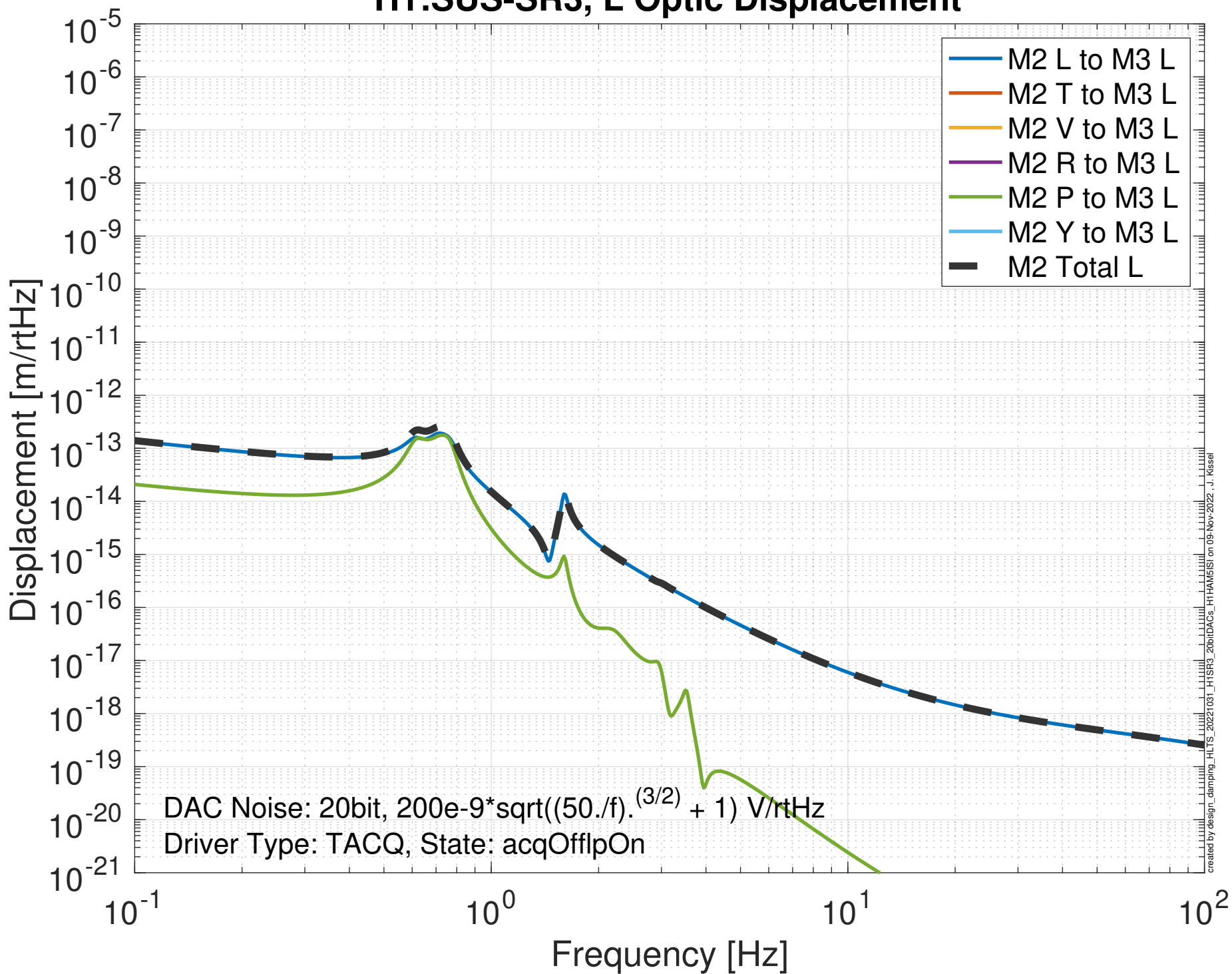
Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-SR3, L Optic Displacement



Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-SR3, L Optic Displacement

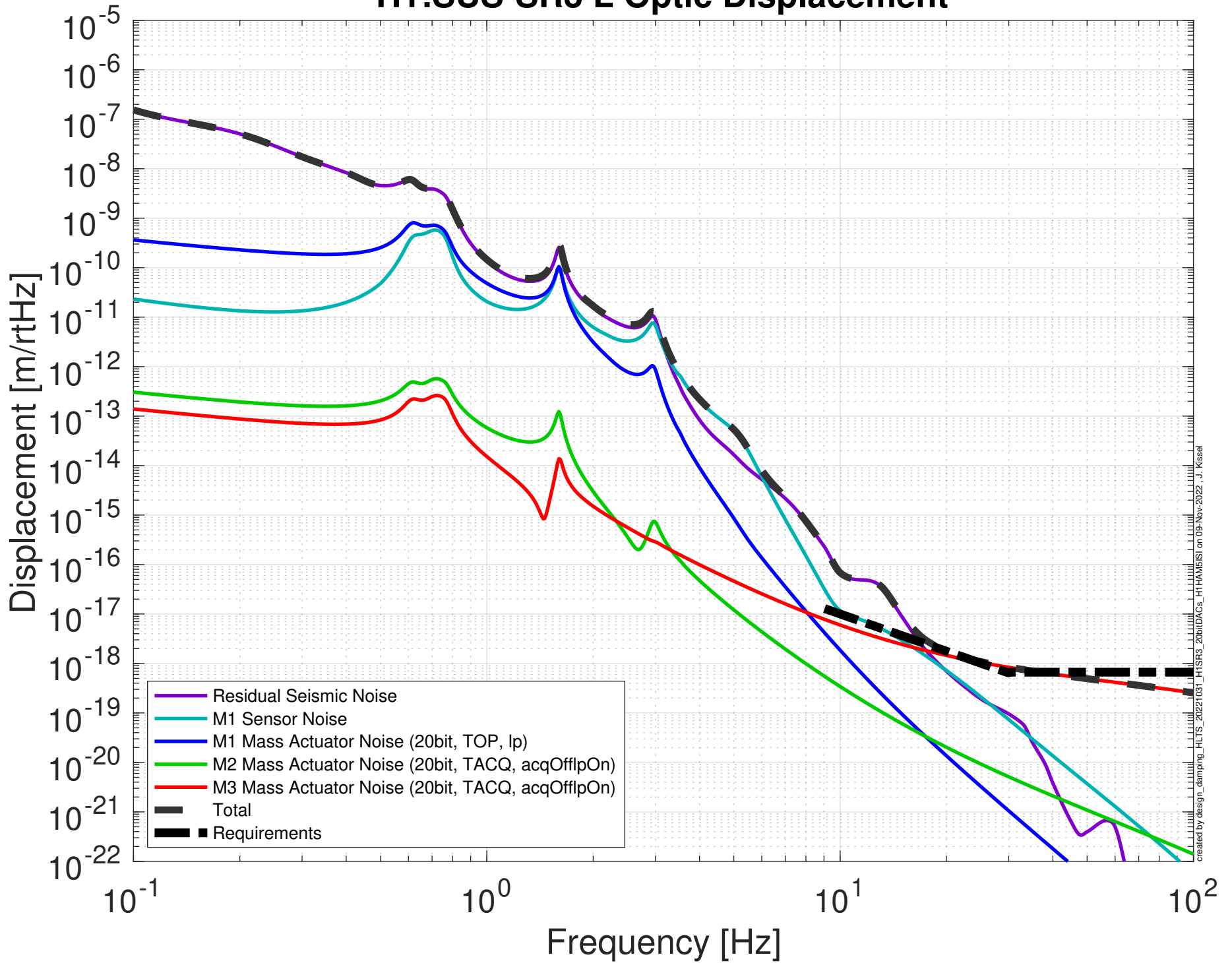


Projected M3 Mass Actuator > Optic Noise Budget H1:SUS-SR3, L Optic Displacement



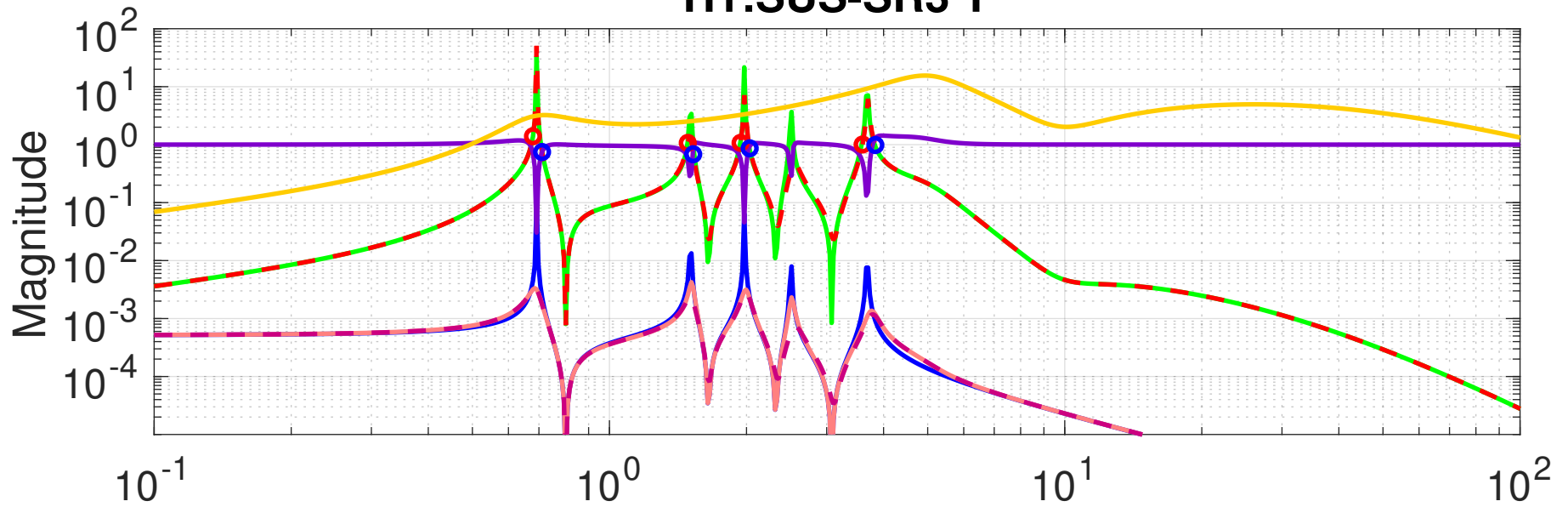
Damping Loop Performance

H1:SUS-SR3 L Optic Displacement



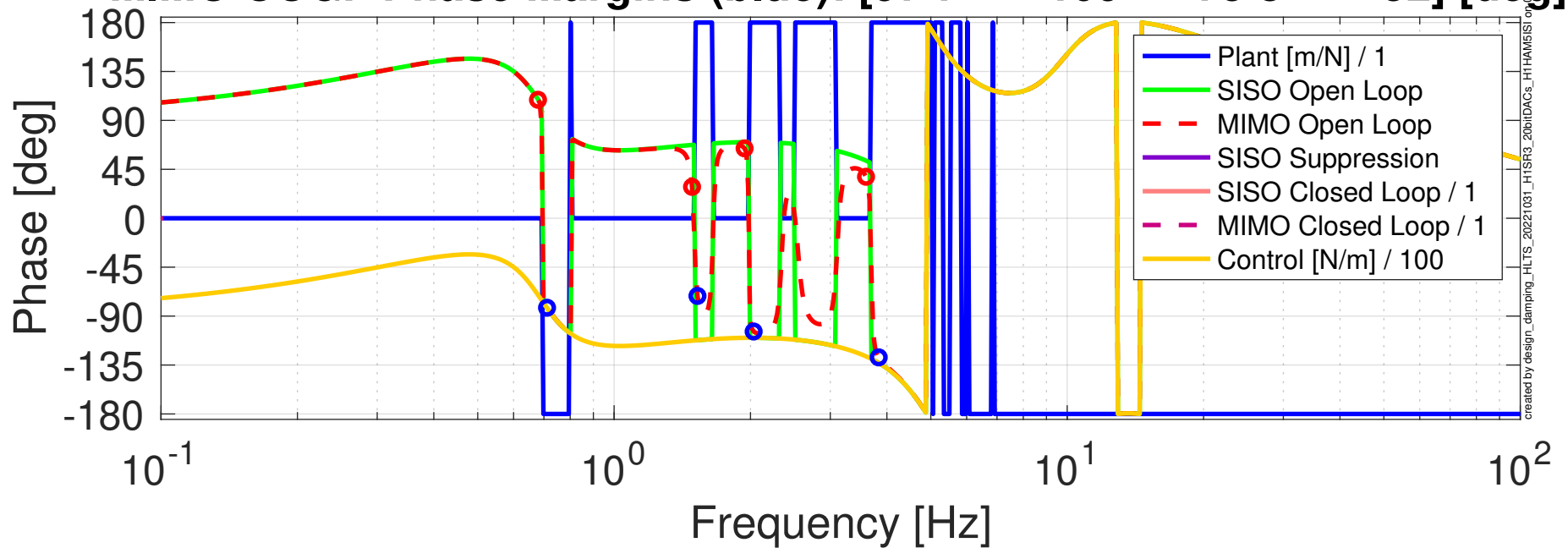
Damping Loop Design

H1:SUS-SR3 T



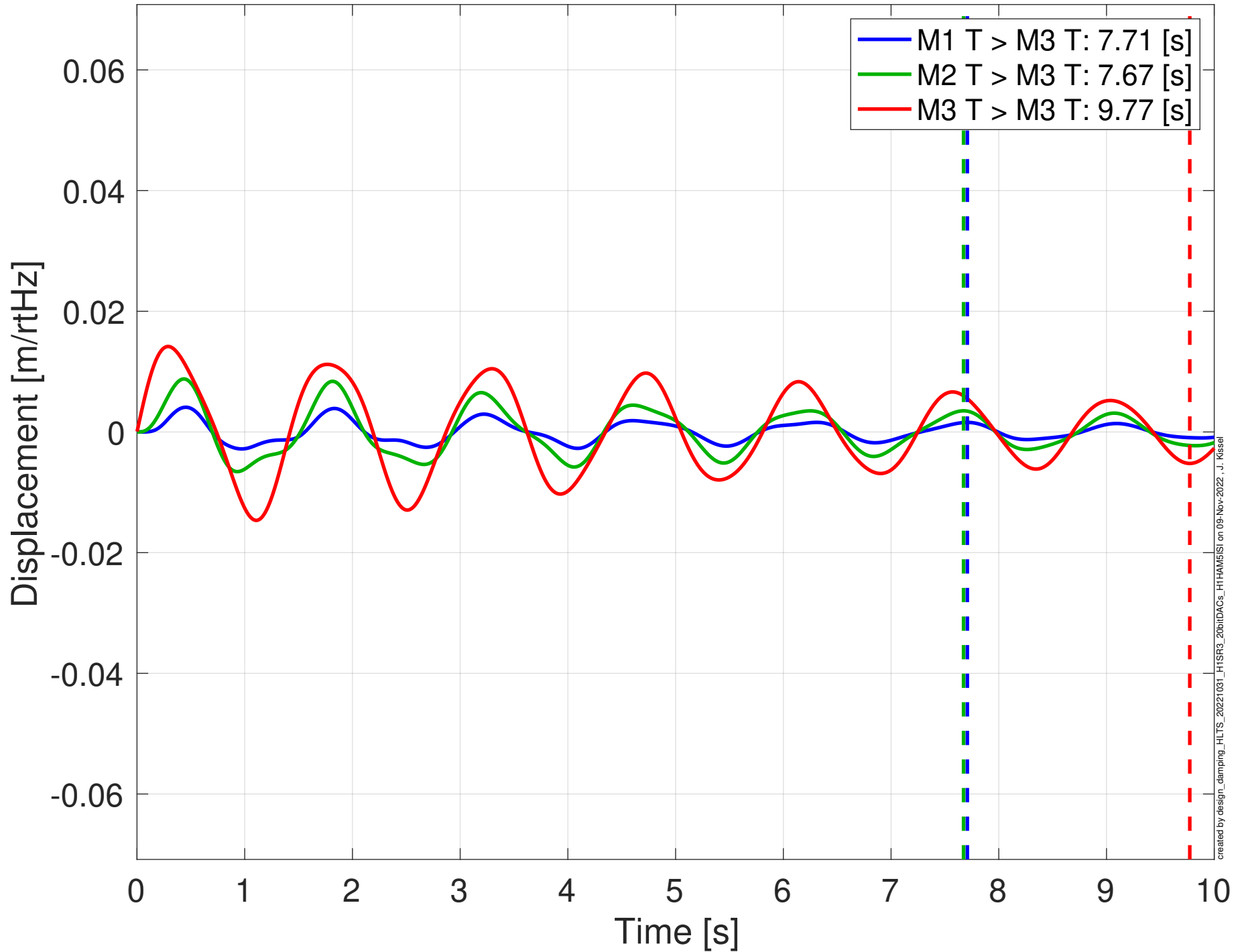
MIMO LUGF Phase Margins (red): [71 151 116 142] [deg]

MIMO UUGF Phase Margins (blue): [97.7 109 75.8 52] [deg]

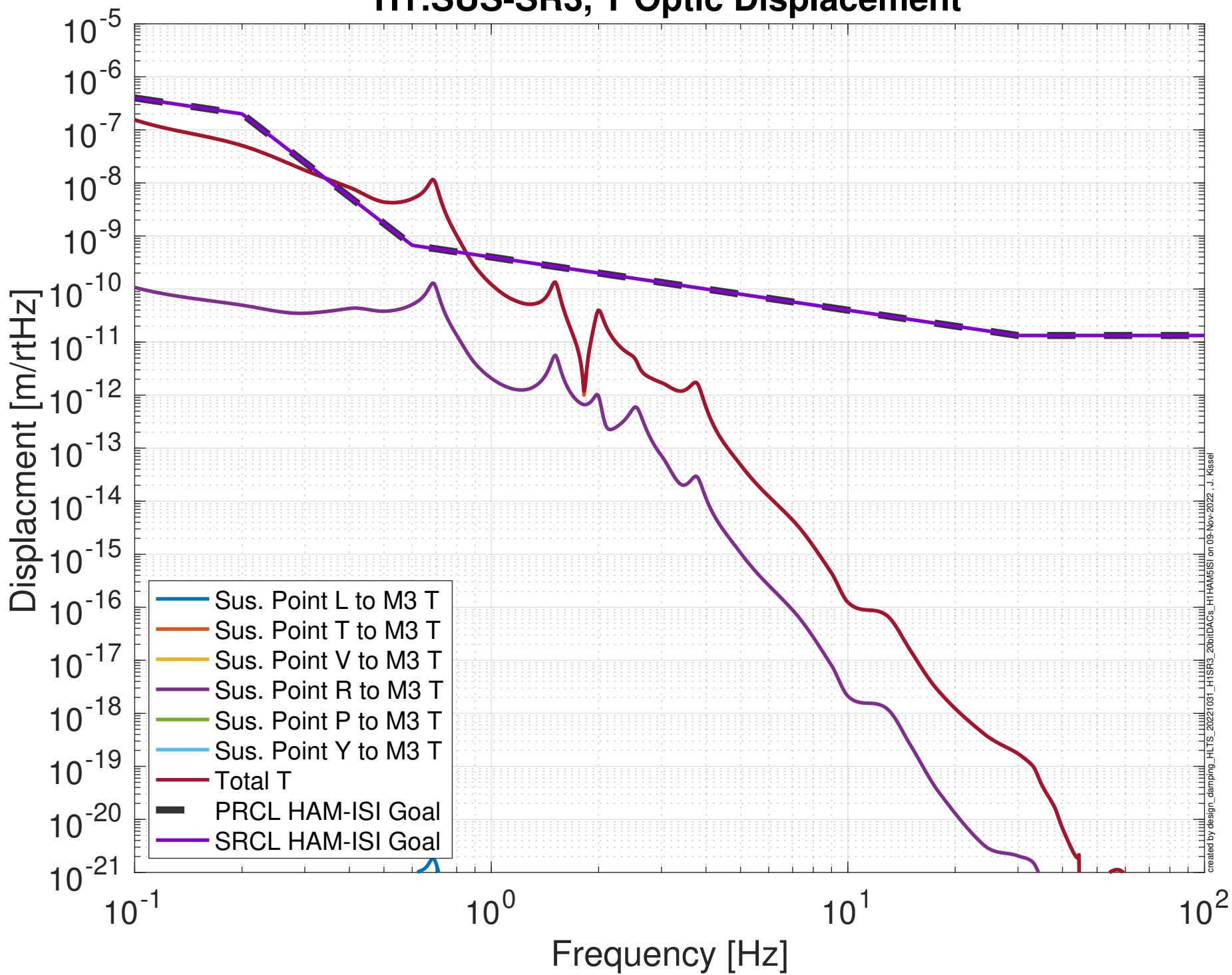


Damped Impulse Response

H1:SUS-SR3 T

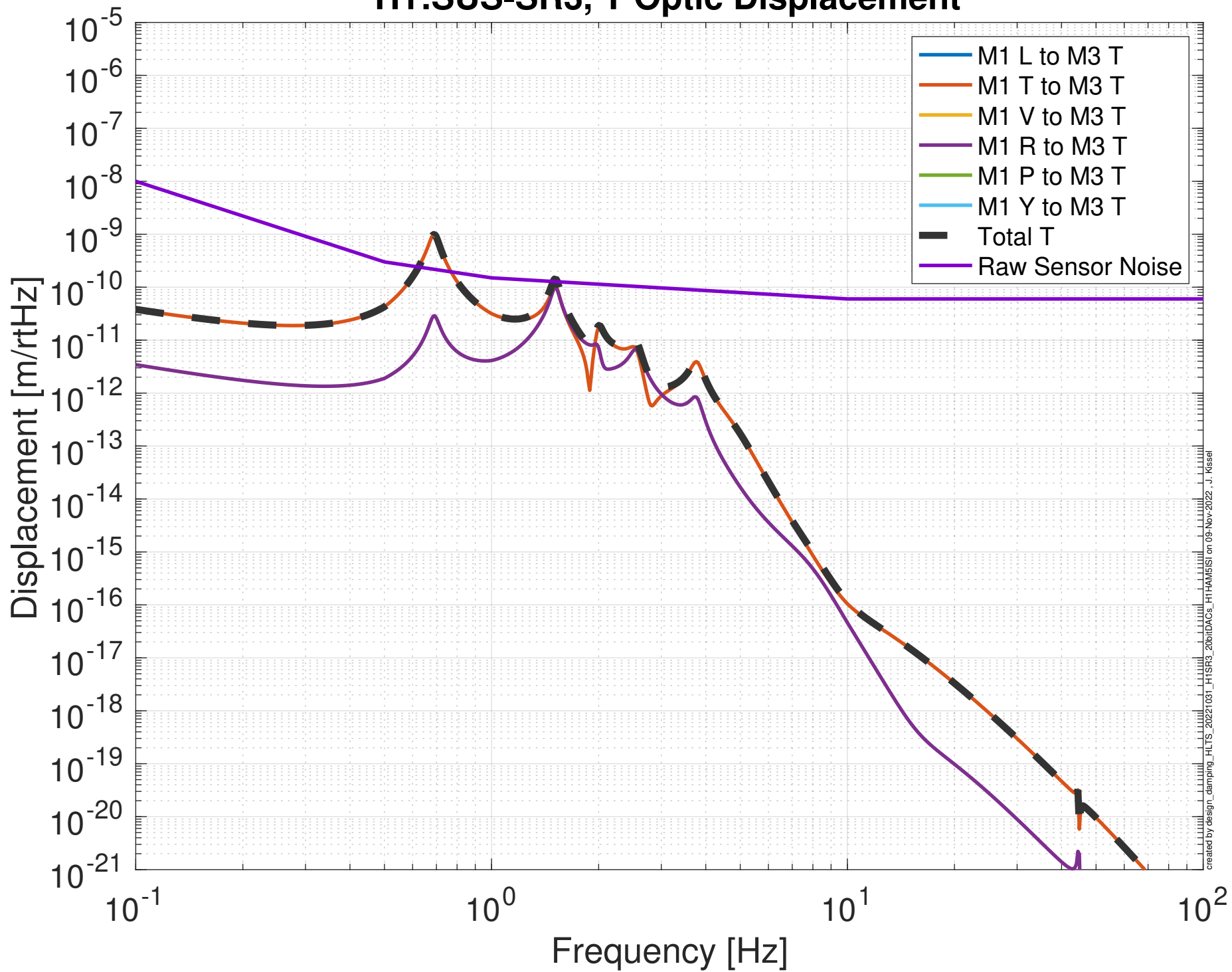


Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-SR3, T Optic Displacement



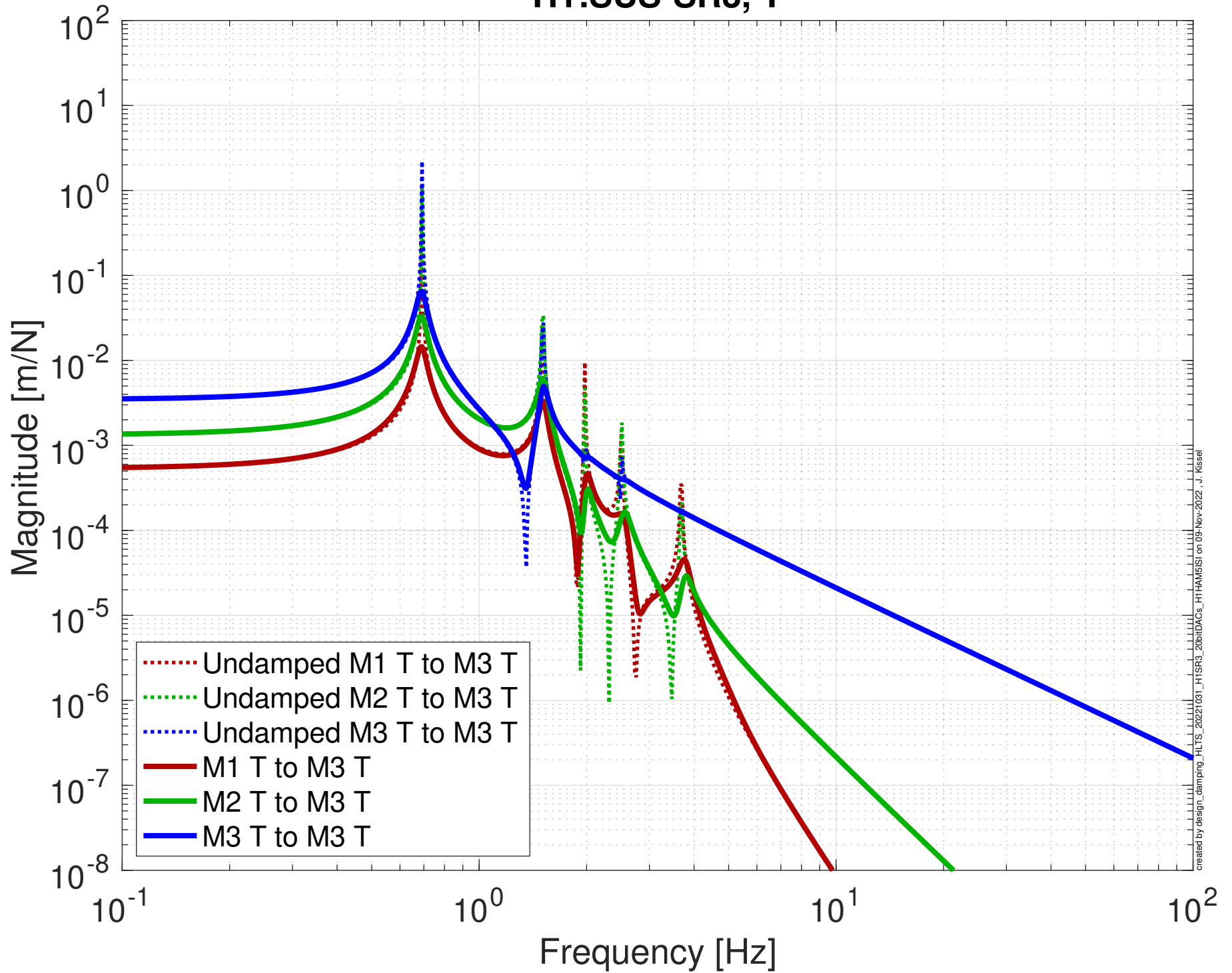
Projected Top Mass Sensor > Optic Noise Budget

H1:SUS-SR3, T Optic Displacement

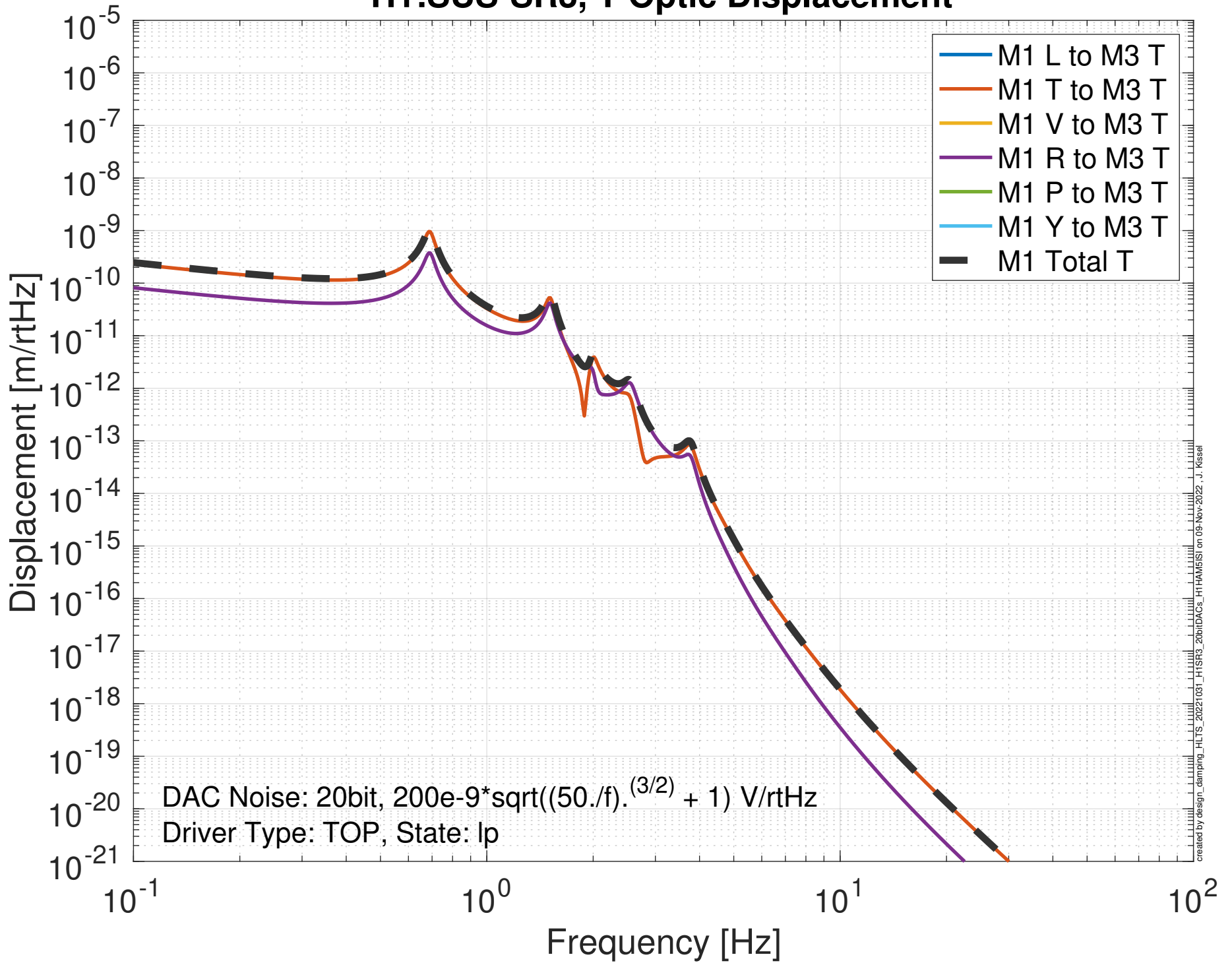


Global Control Transfer Functions to Optic

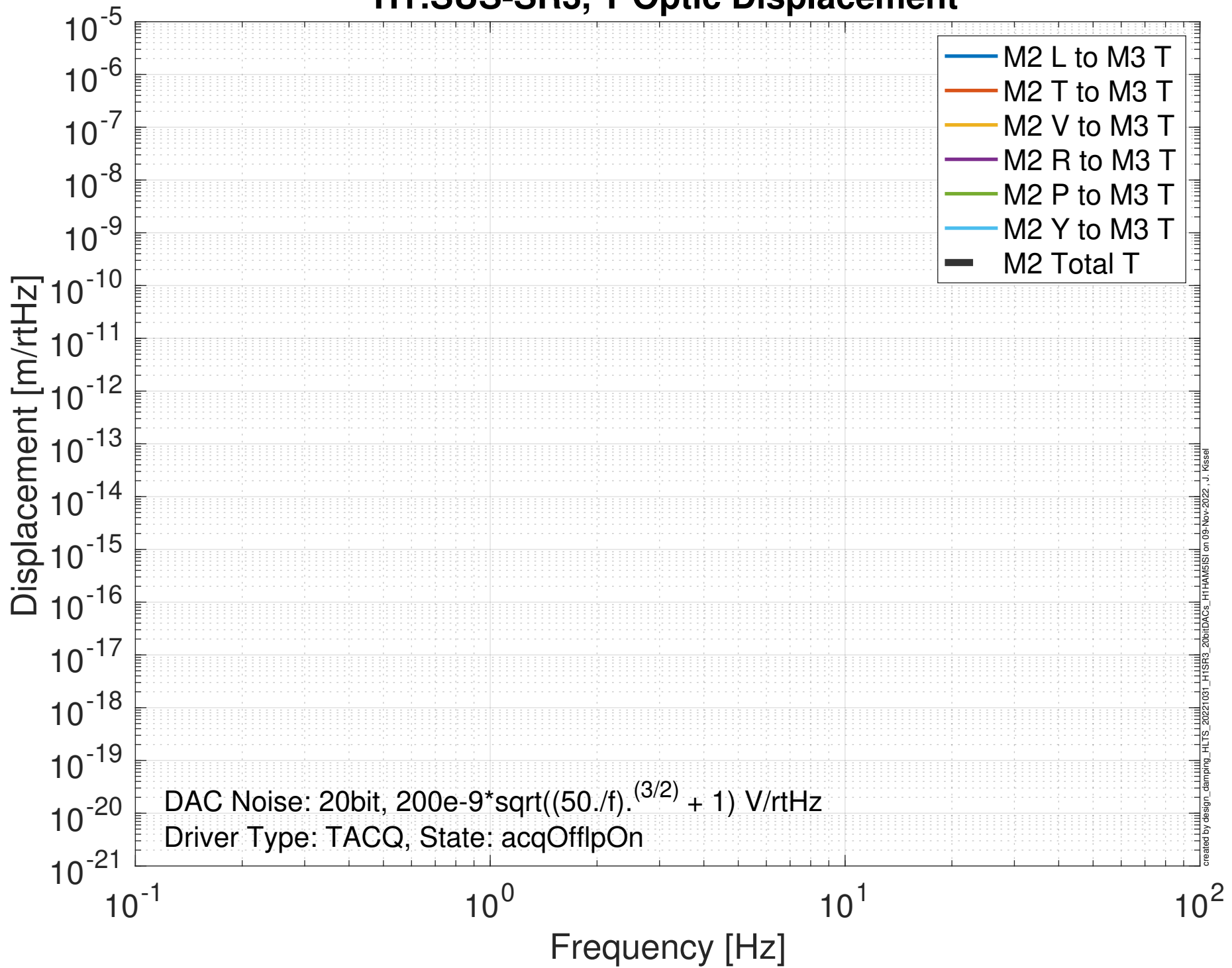
H1:SUS-SR3, T



Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-SR3, T Optic Displacement

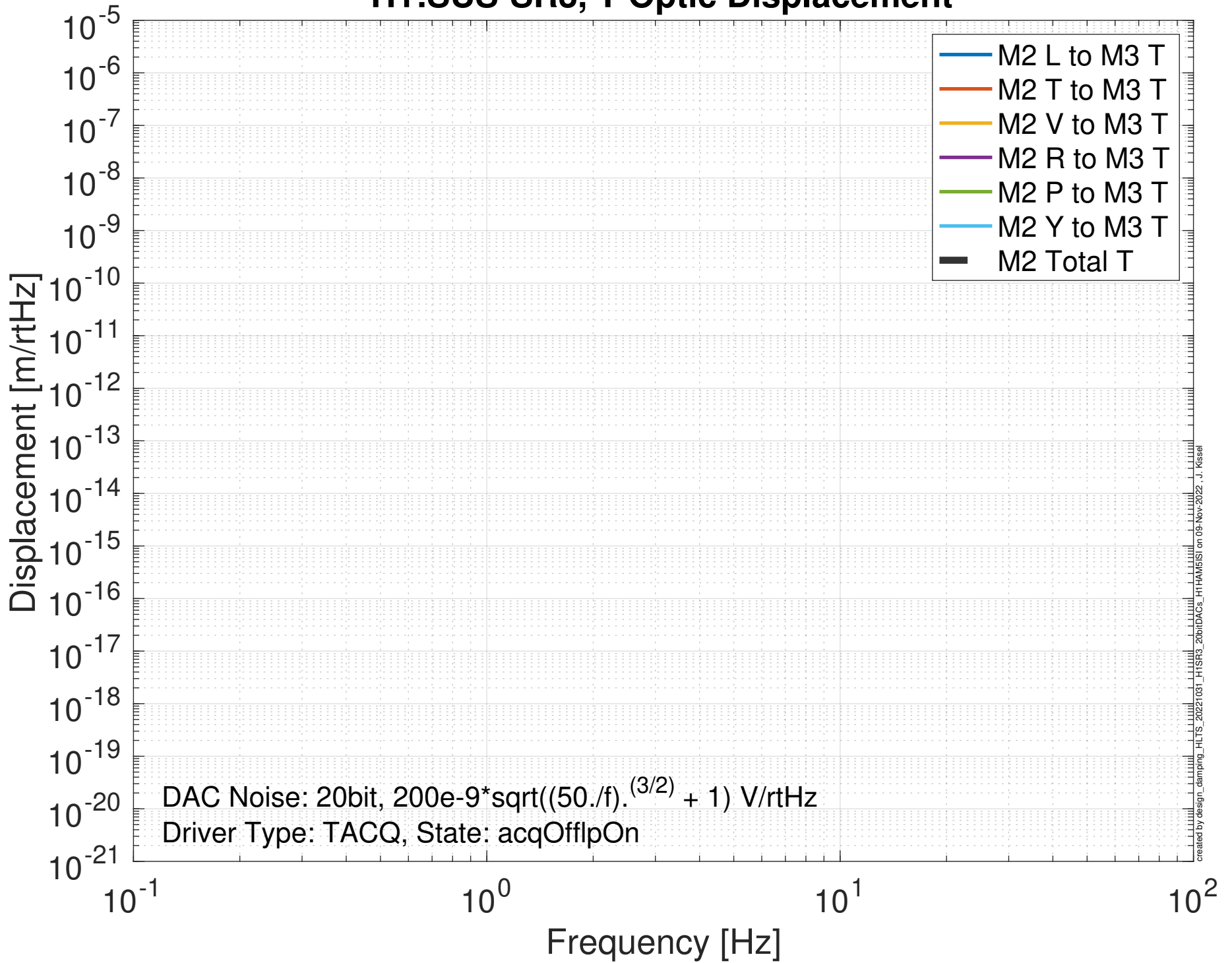


Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-SR3, T Optic Displacement



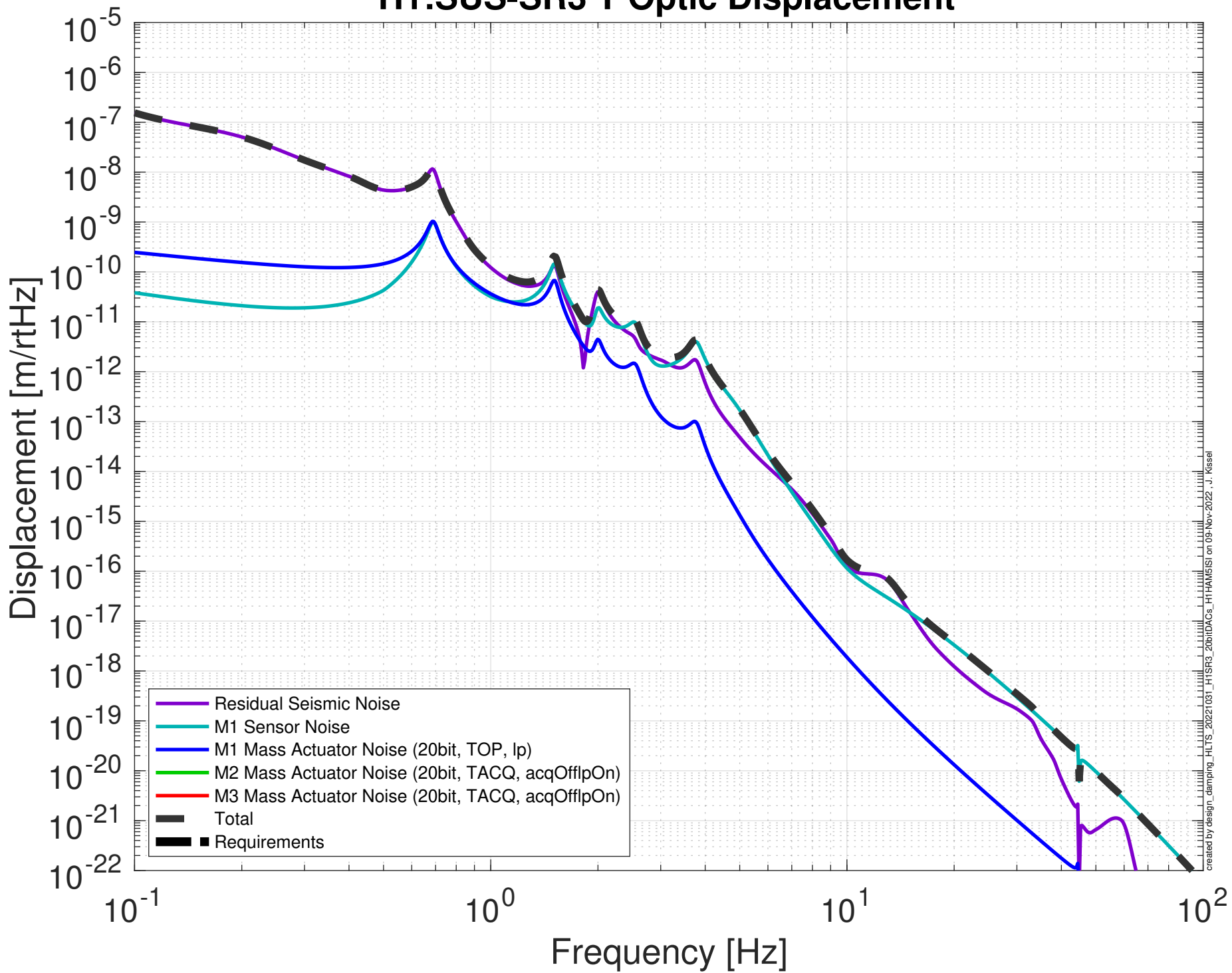
Projected M3 Mass Actuator > Optic Noise Budget

H1:SUS-SR3, T Optic Displacement



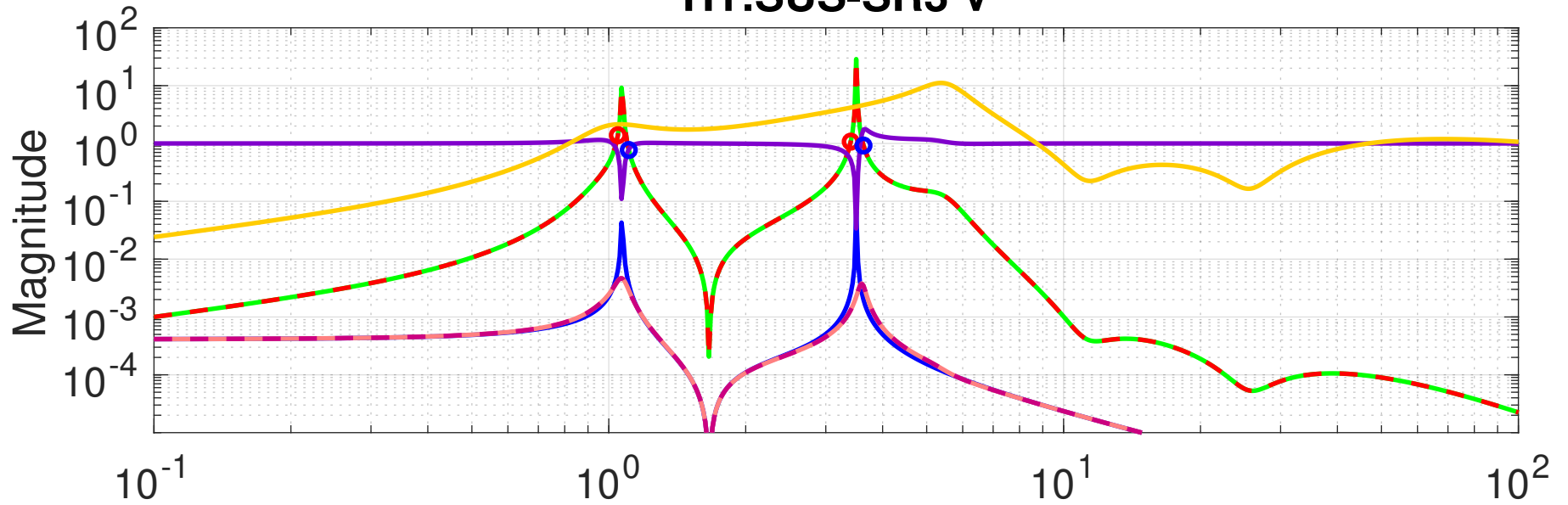
Damping Loop Performance

H1:SUS-SR3 T Optic Displacement

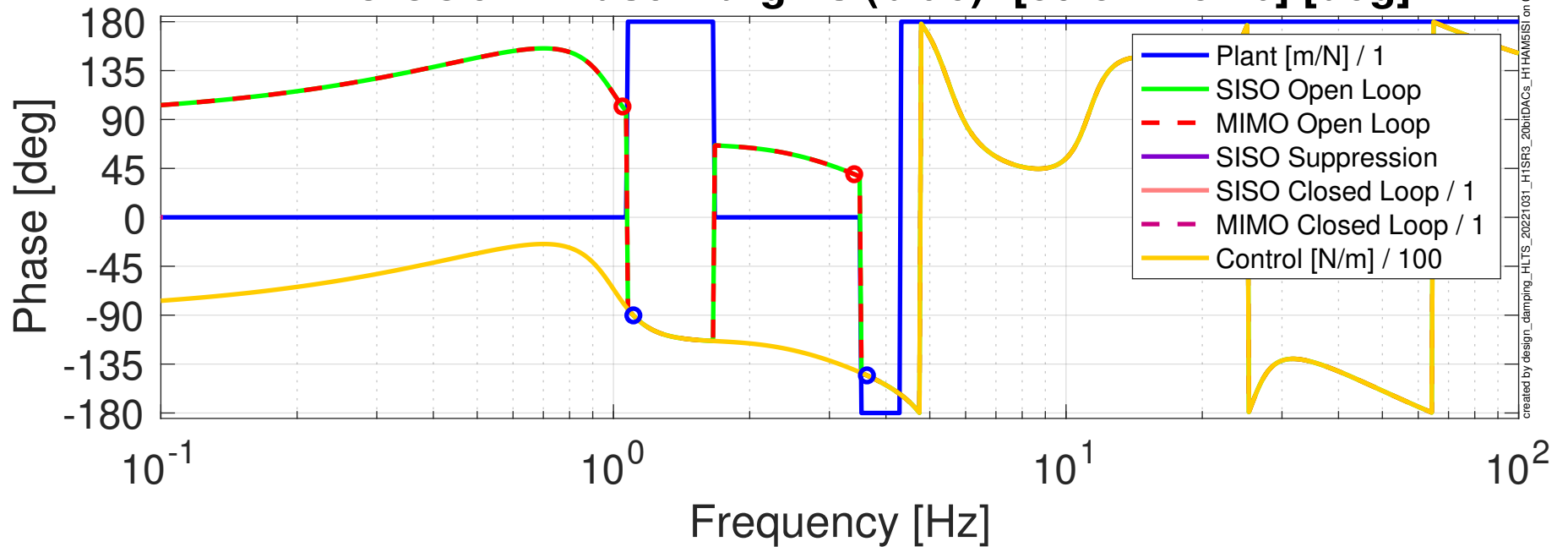


Damping Loop Design

H1:SUS-SR3 V

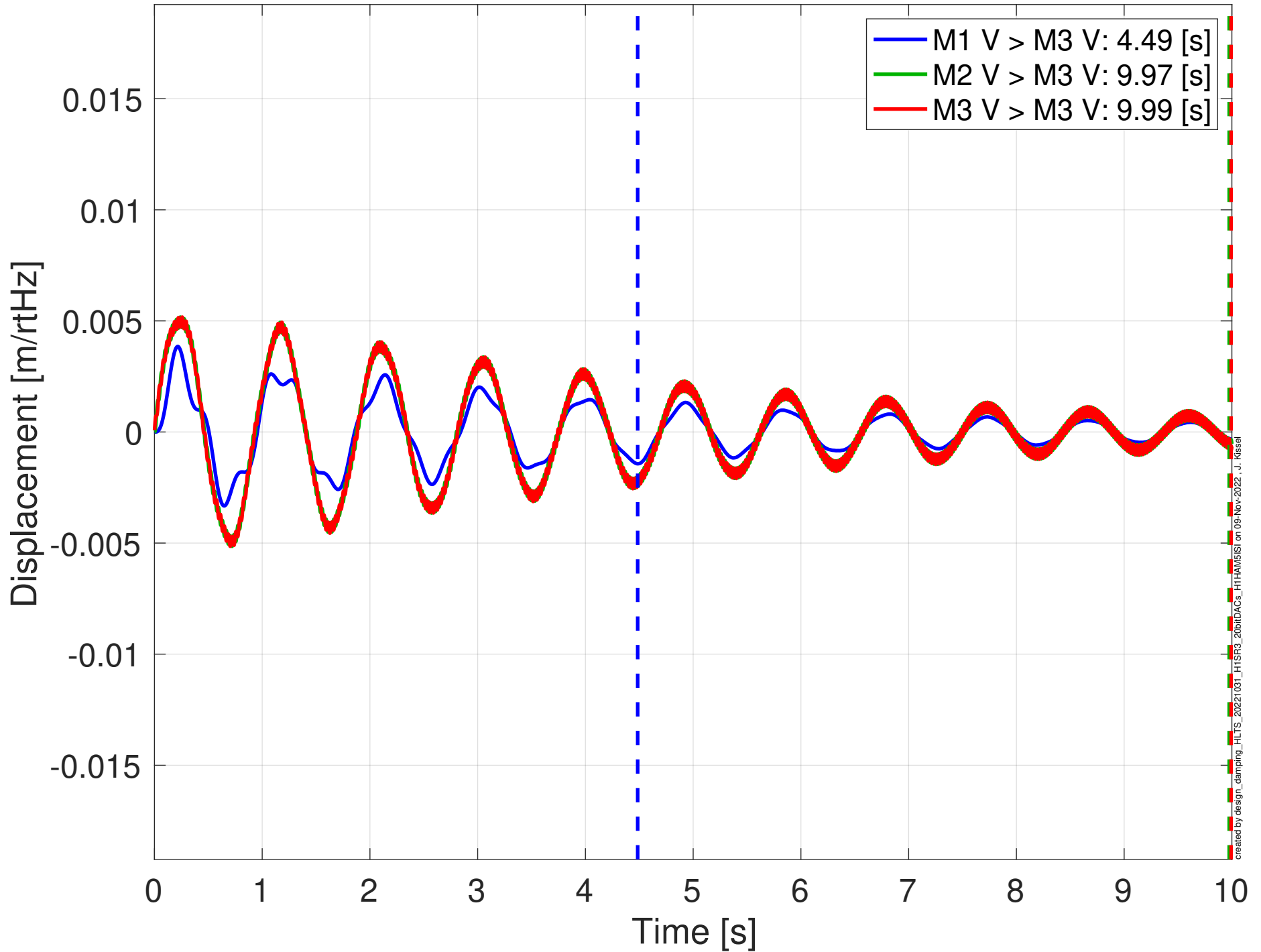


MIMO LUGF Phase Margins (red): [78 140] [deg]
MIMO UUGF Phase Margins (blue): [89.8 34.6] [deg]



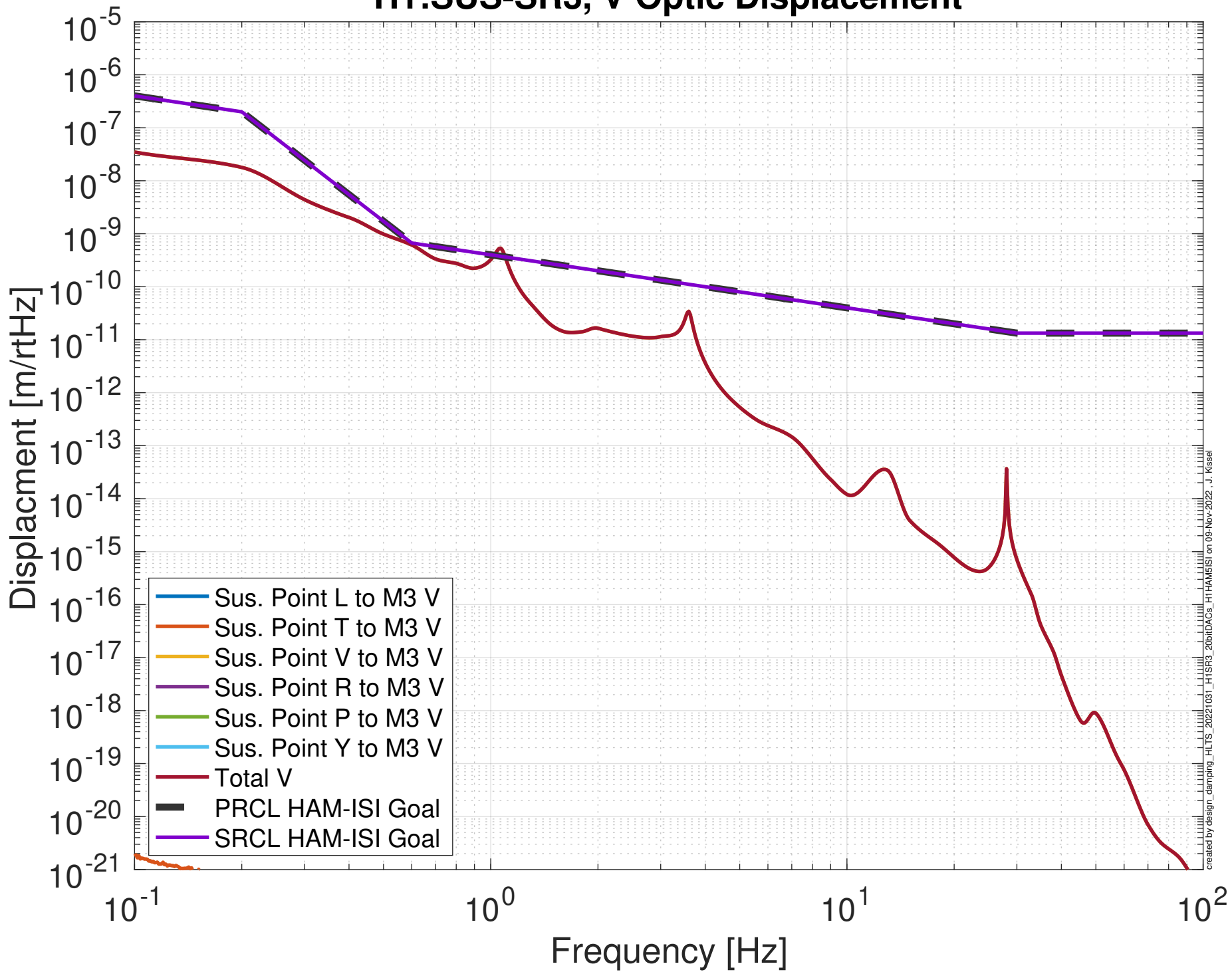
Damped Impulse Response

H1:SUS-SR3 V

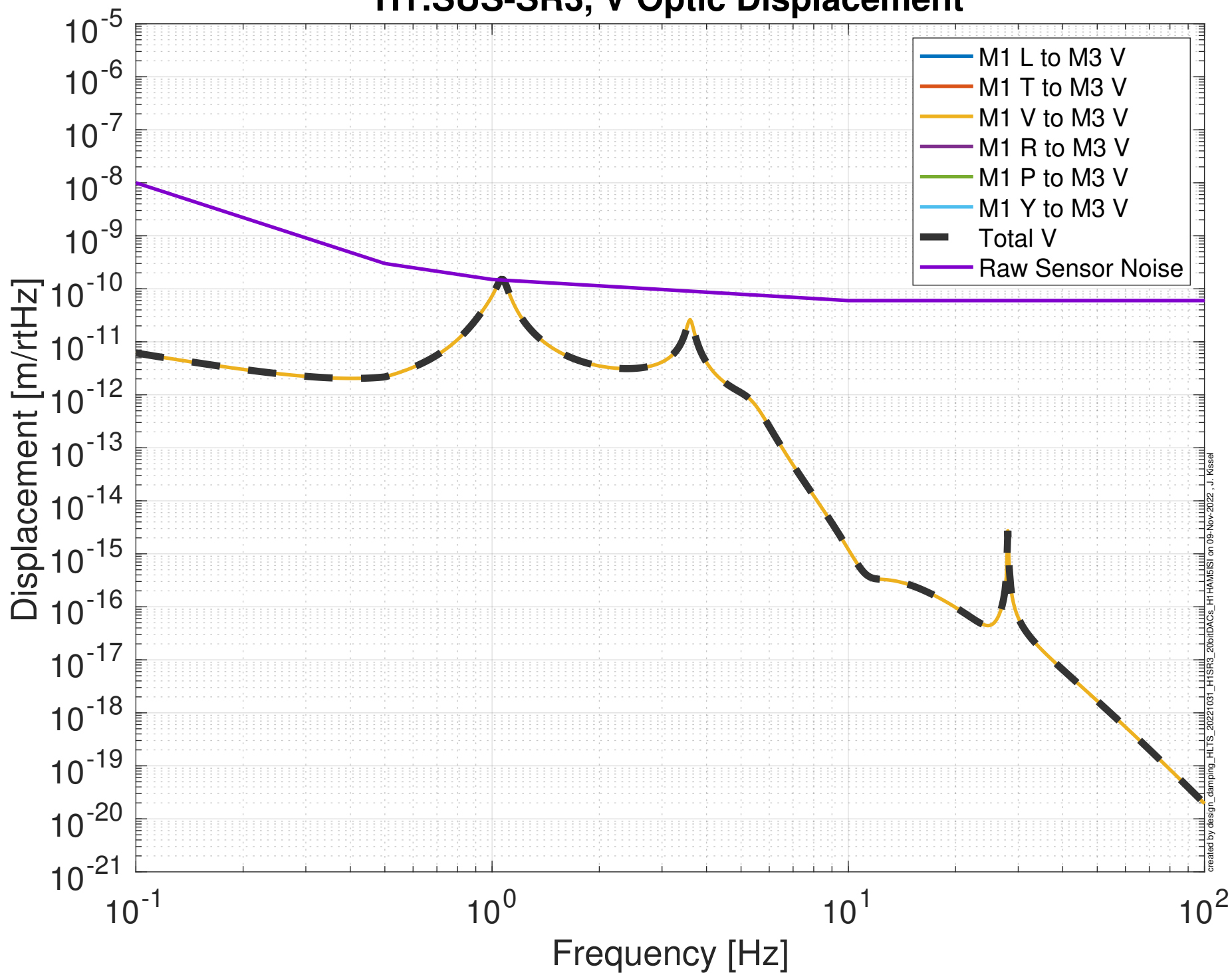


created by design_damping_H1TS_2021031_H1SR3_20bitDACs_H1HAMIS1 on 09-Nov-2022, J. Kissel

Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-SR3, V Optic Displacement

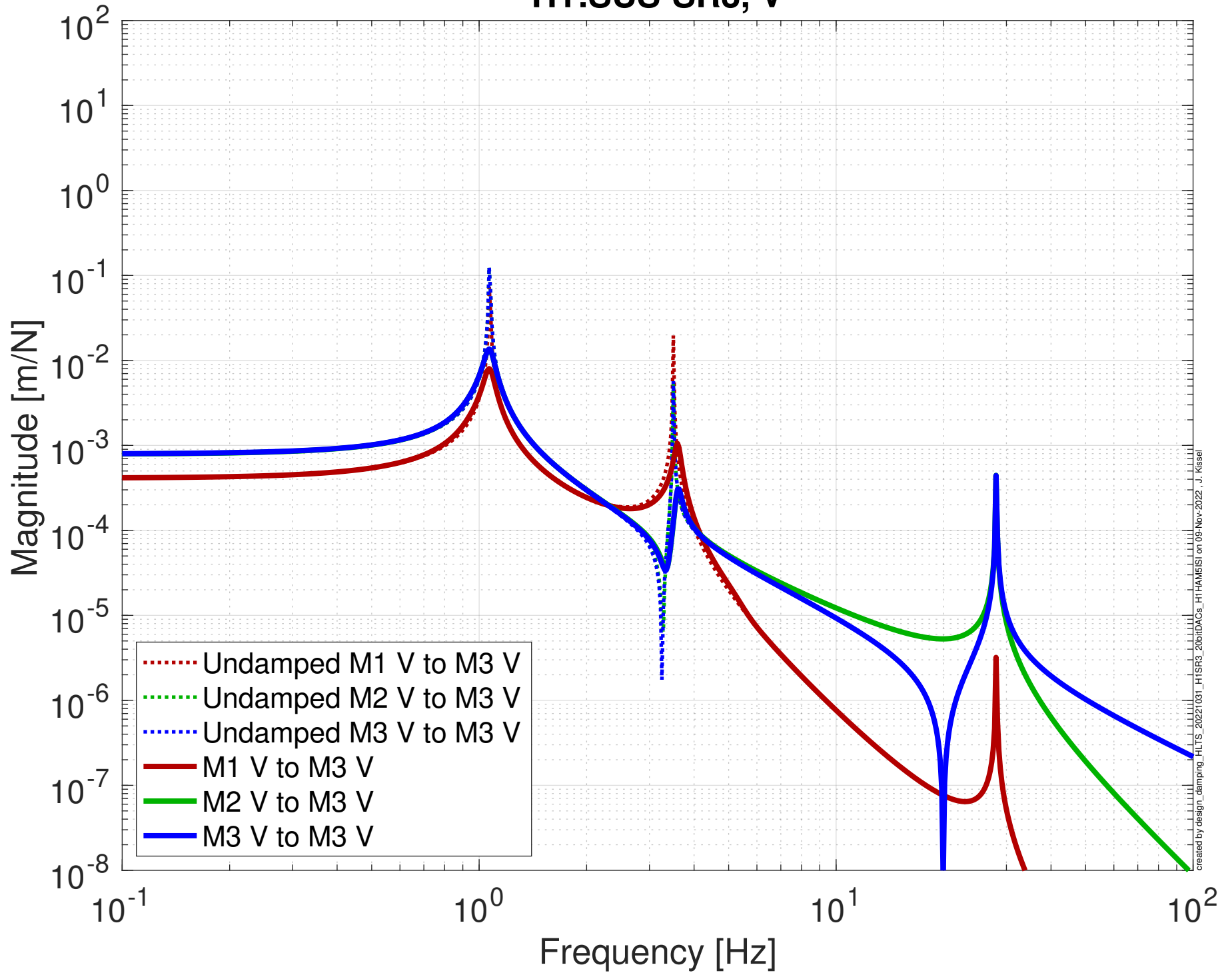


Projected Top Mass Sensor > Optic Noise Budget H1:SUS-SR3, V Optic Displacement

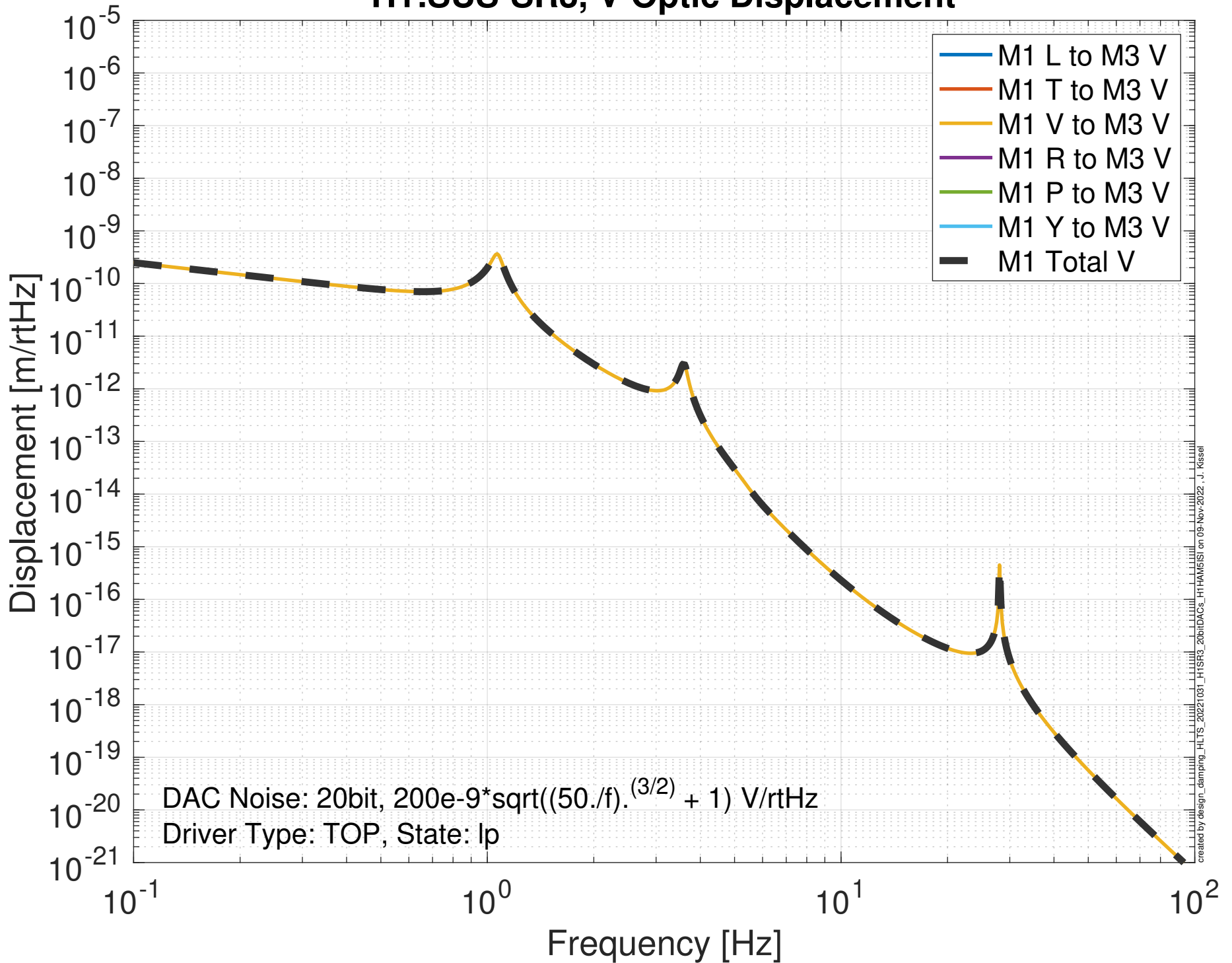


Global Control Transfer Functions to Optic

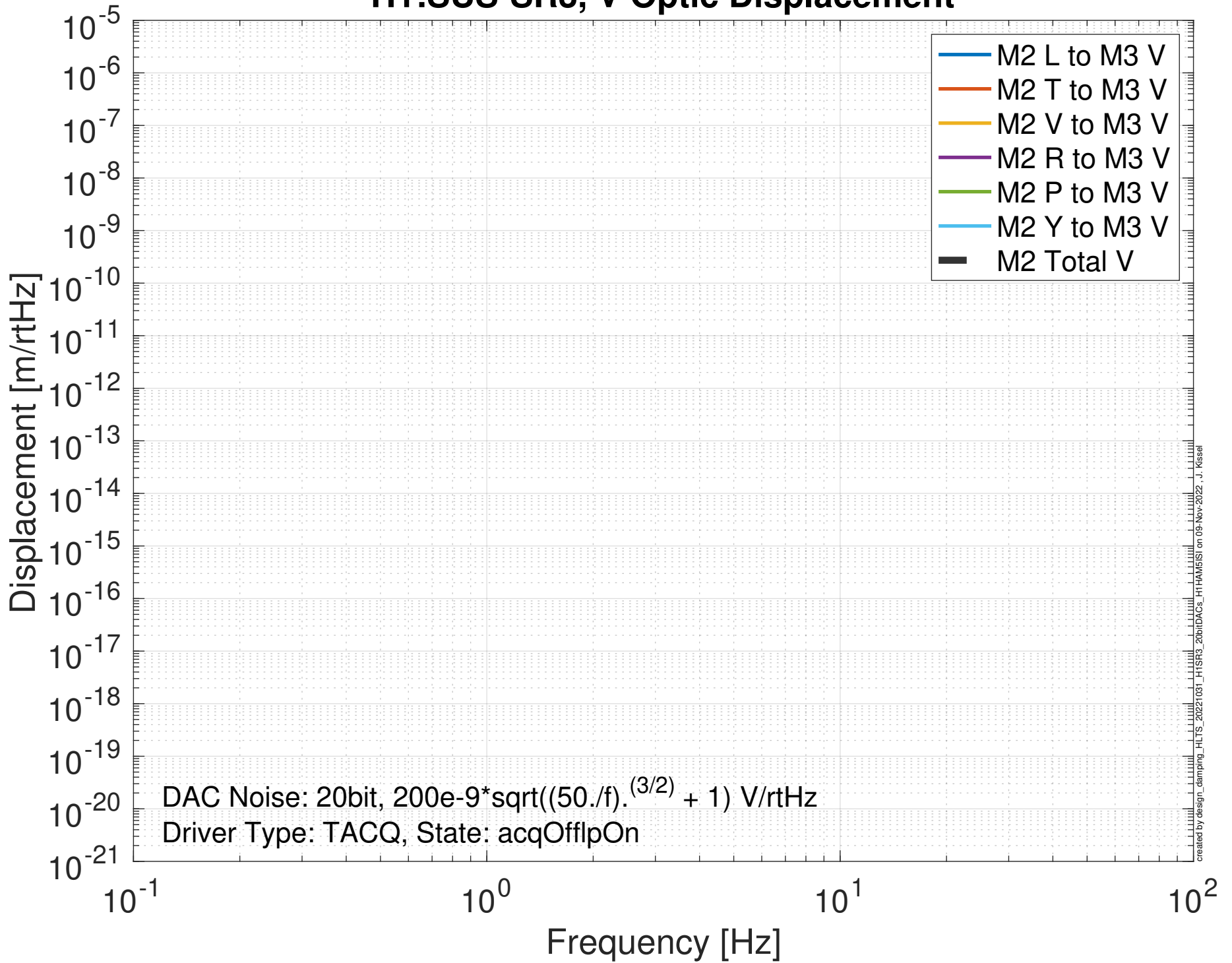
H1:SUS-SR3, V



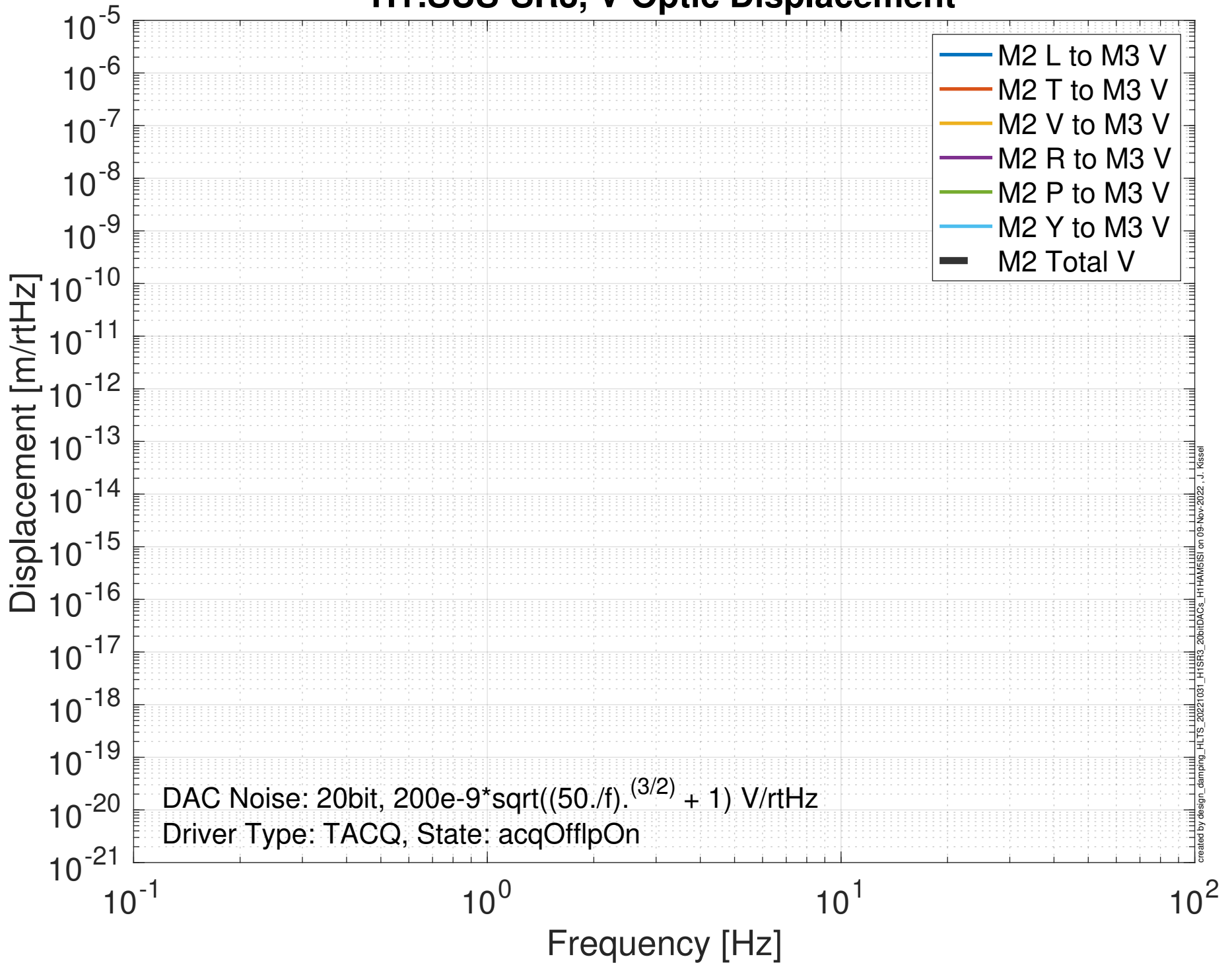
Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-SR3, V Optic Displacement



Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-SR3, V Optic Displacement

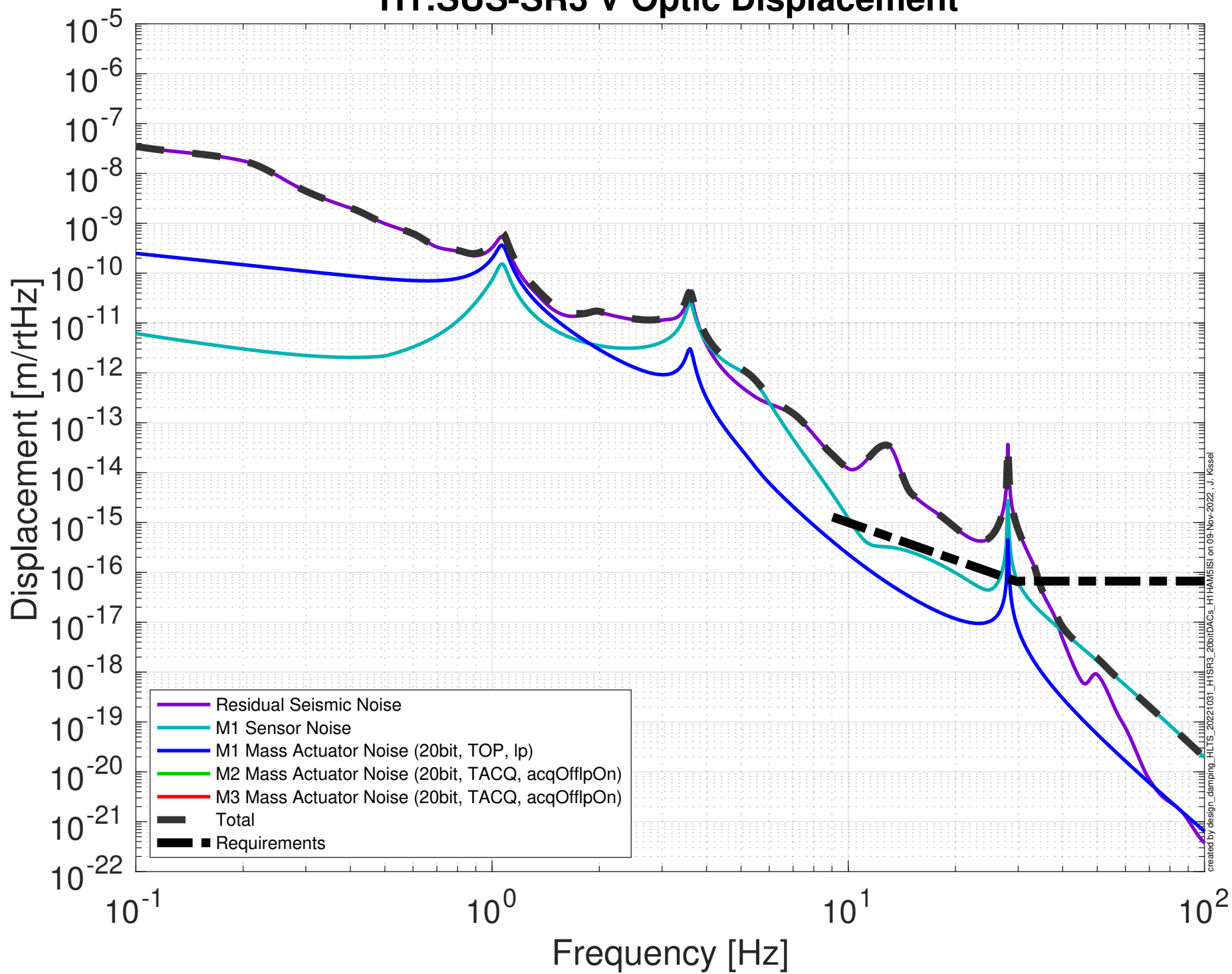


Projected M3 Mass Actuator > Optic Noise Budget H1:SUS-SR3, V Optic Displacement



Damping Loop Performance

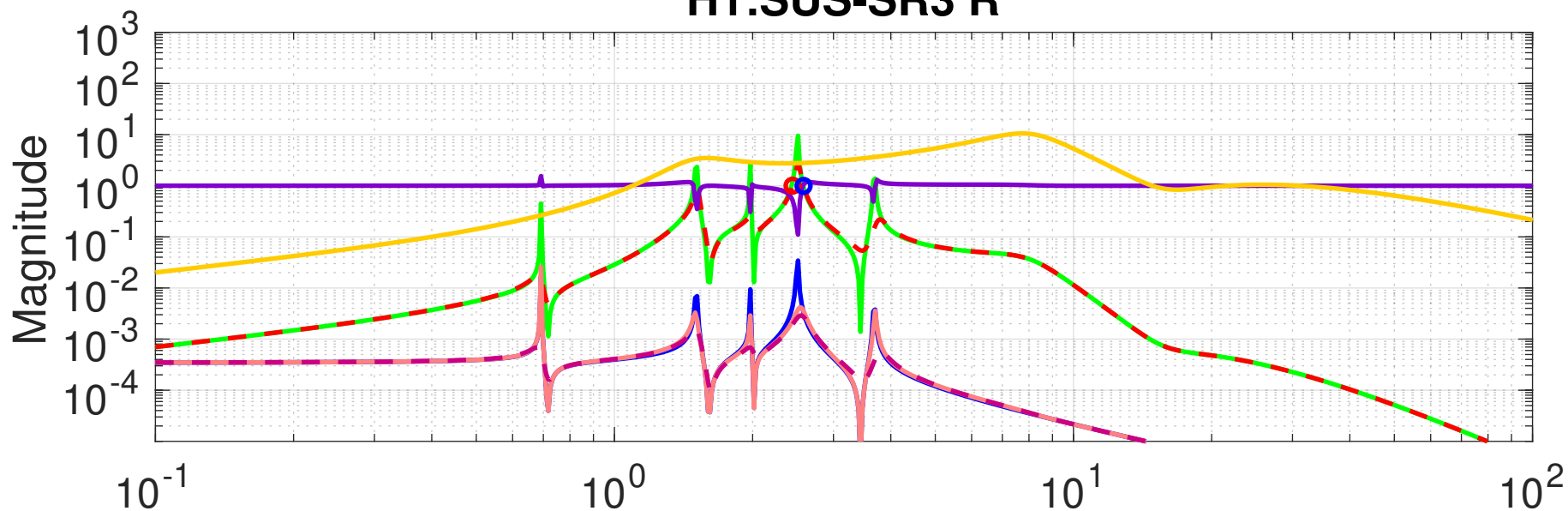
H1:SUS-SR3 V Optic Displacement



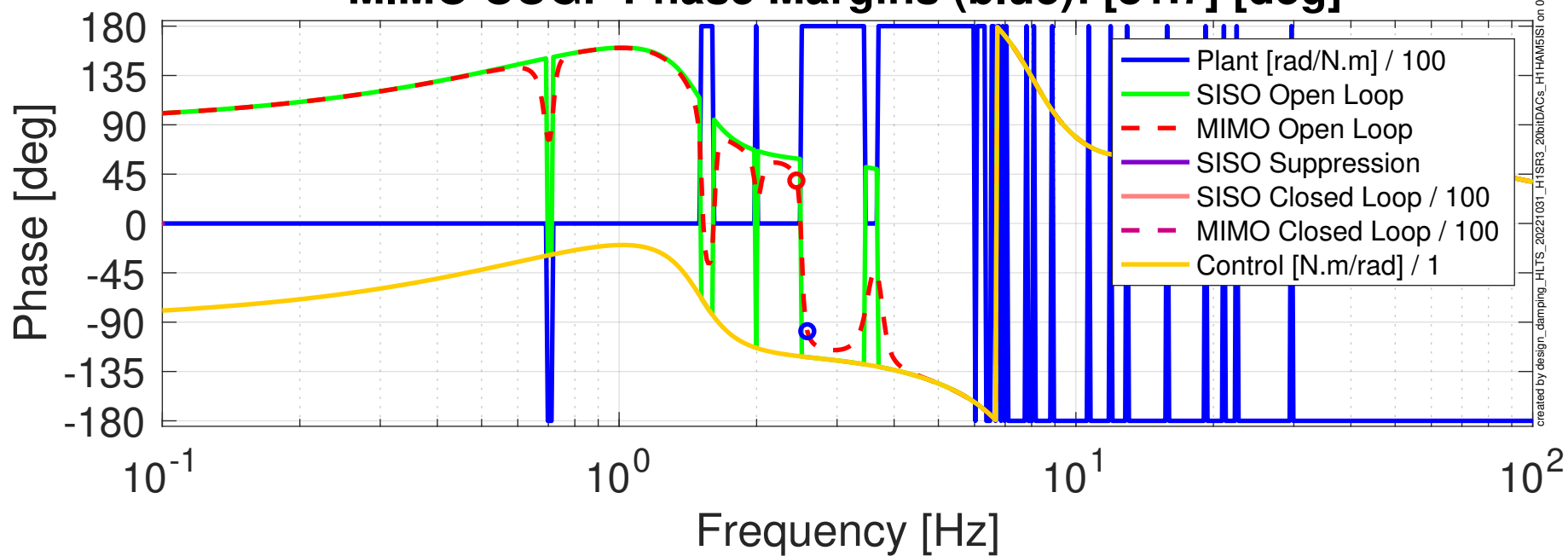
created by design_damping_HLTS_20221031_H1SR3_20bitDACs_H1HAMISISI on 09-Nov-2022, J. Kessel

Damping Loop Design

H1:SUS-SR3 R

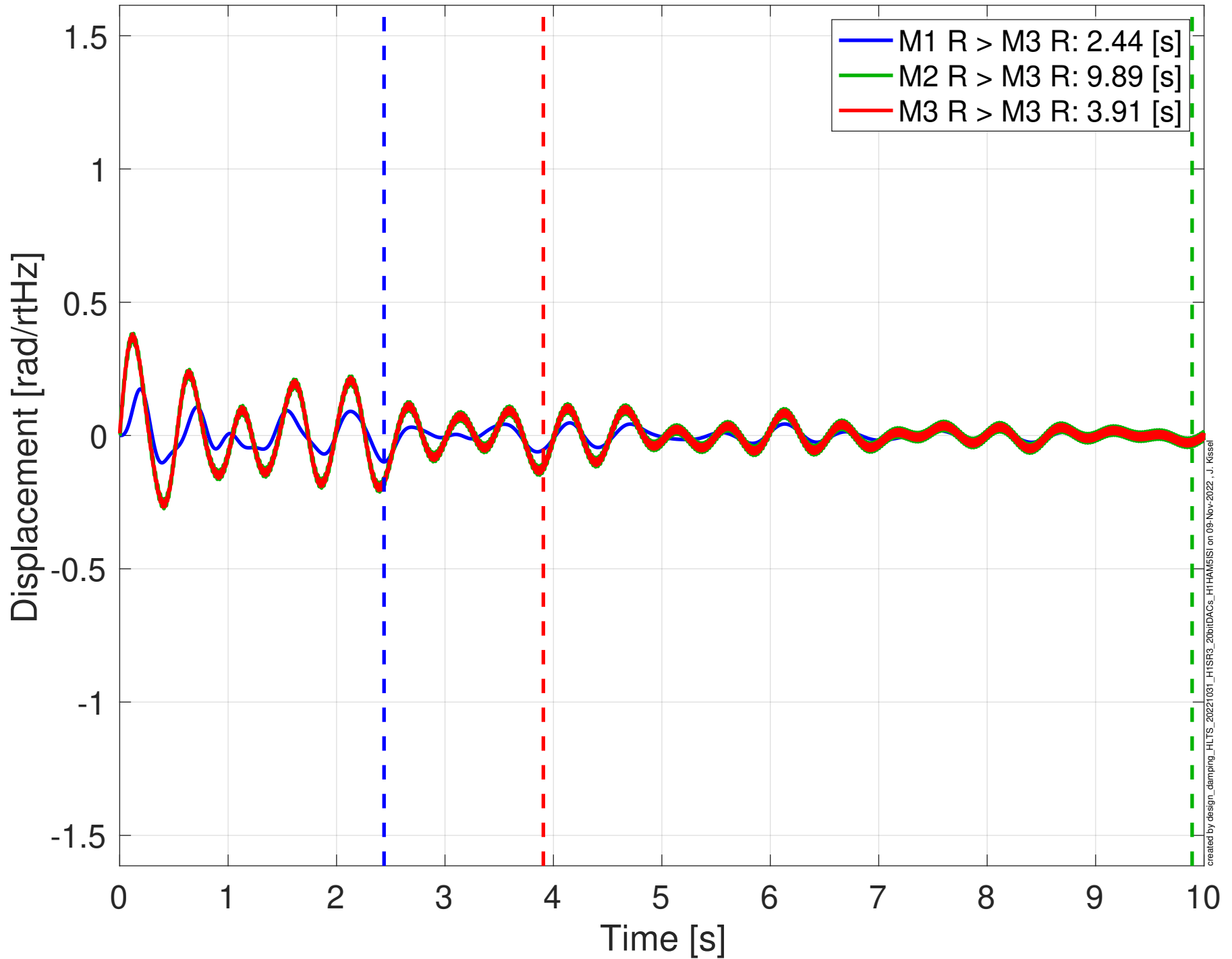


MIMO LUGF Phase Margins (red): [141] [deg]
MIMO UUGF Phase Margins (blue): [81.7] [deg]

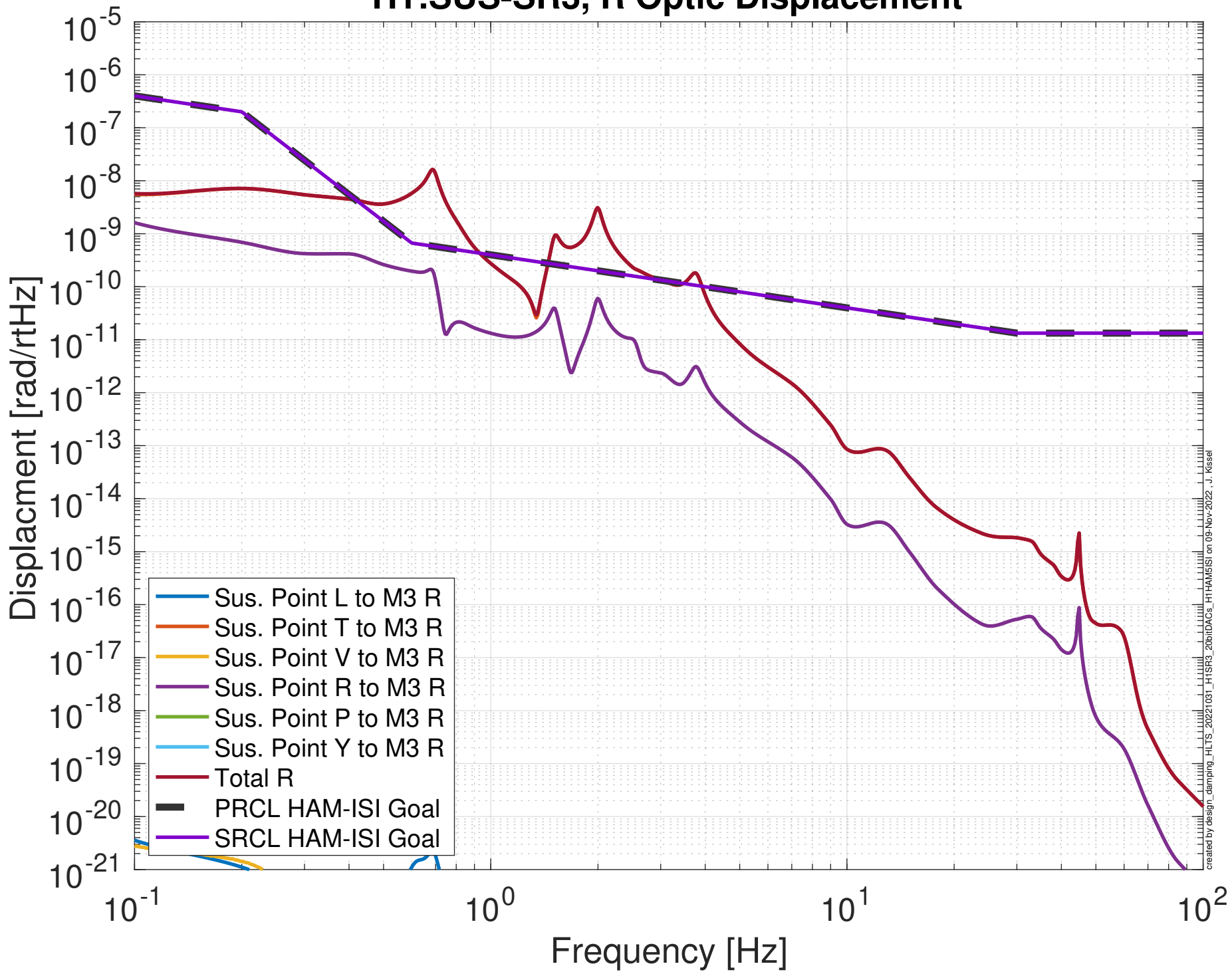


Damped Impulse Response

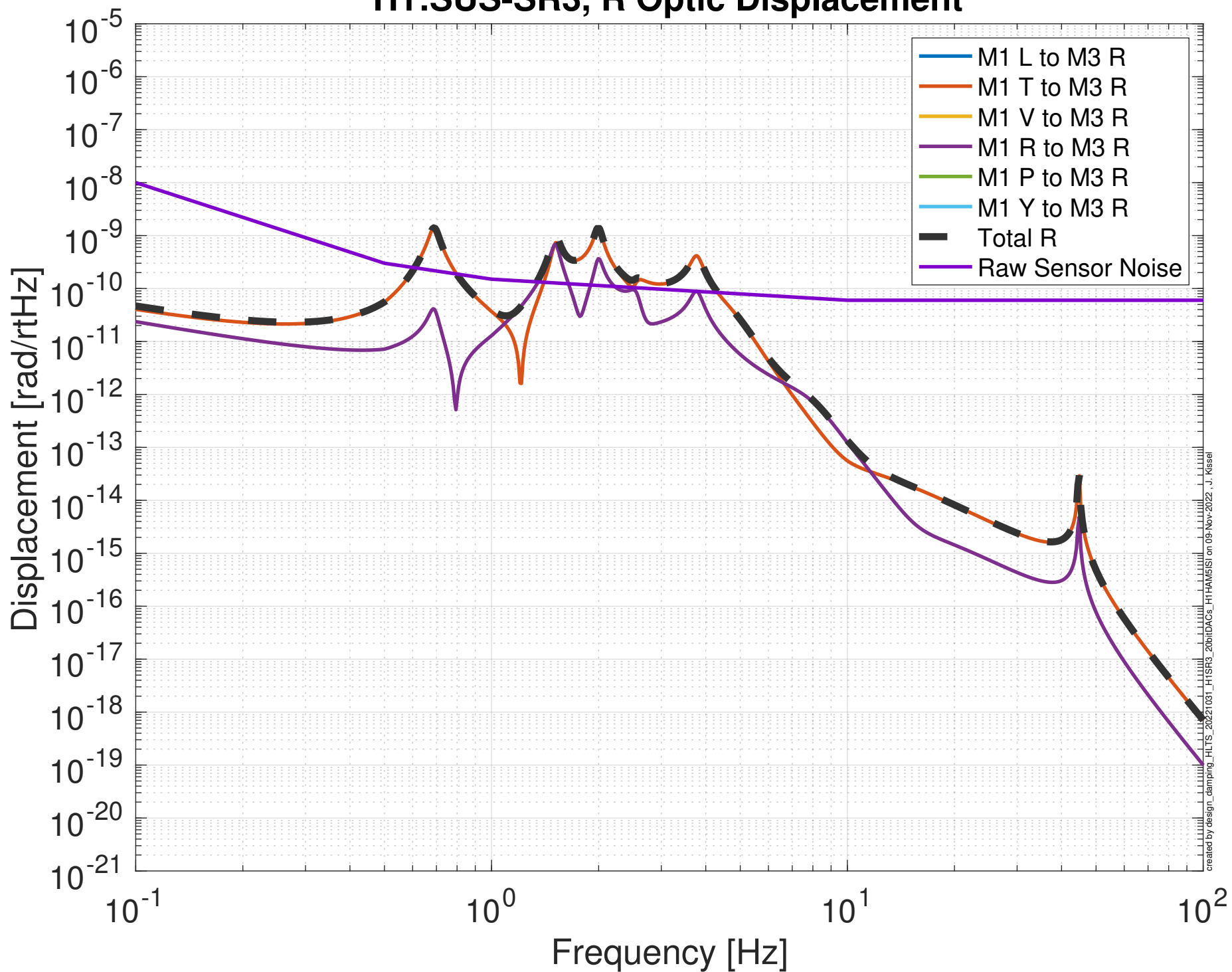
H1:SUS-SR3 R



Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-SR3, R Optic Displacement

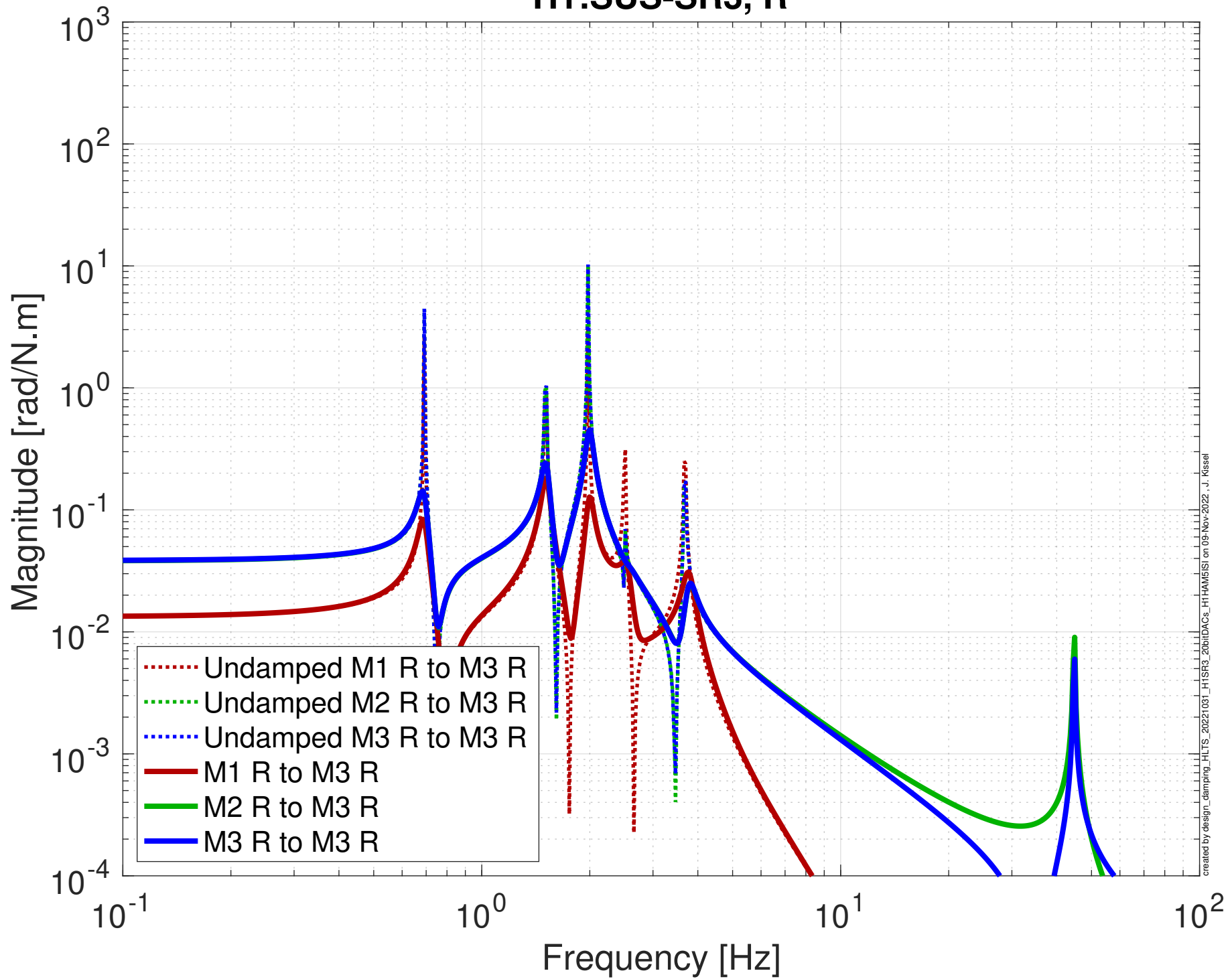


Projected Top Mass Sensor > Optic Noise Budget H1:SUS-SR3, R Optic Displacement

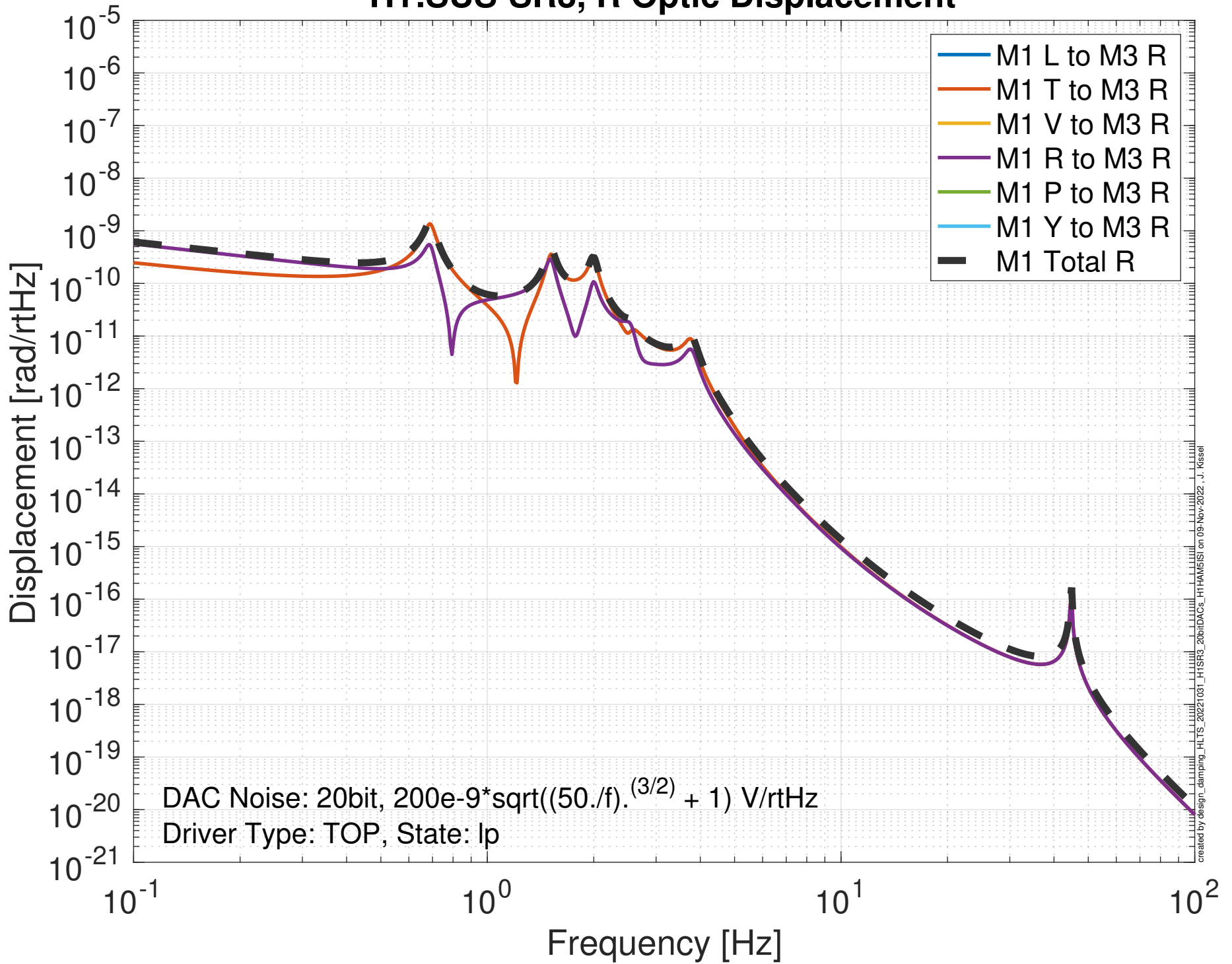


Global Control Transfer Functions to Optic

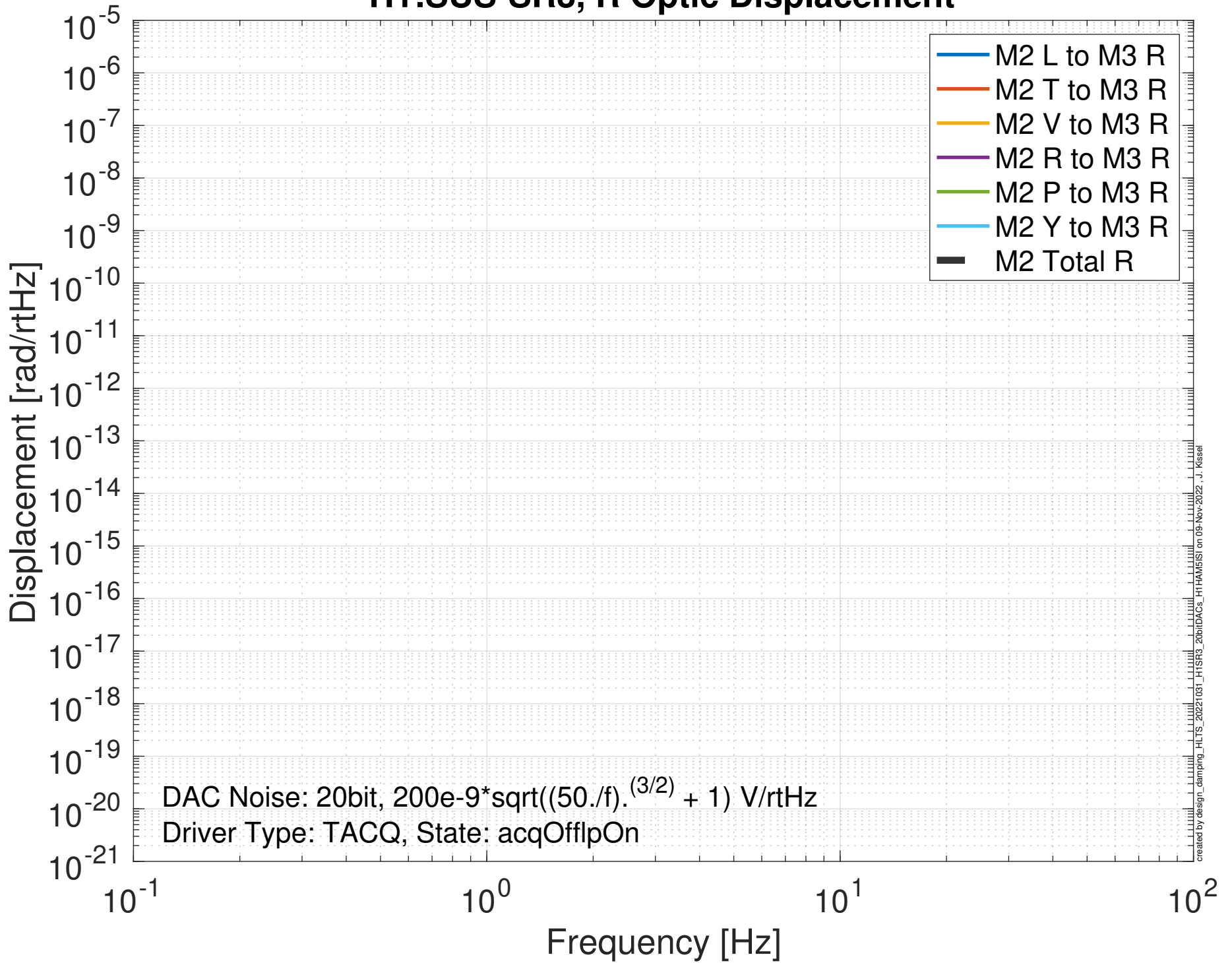
H1:SUS-SR3, R



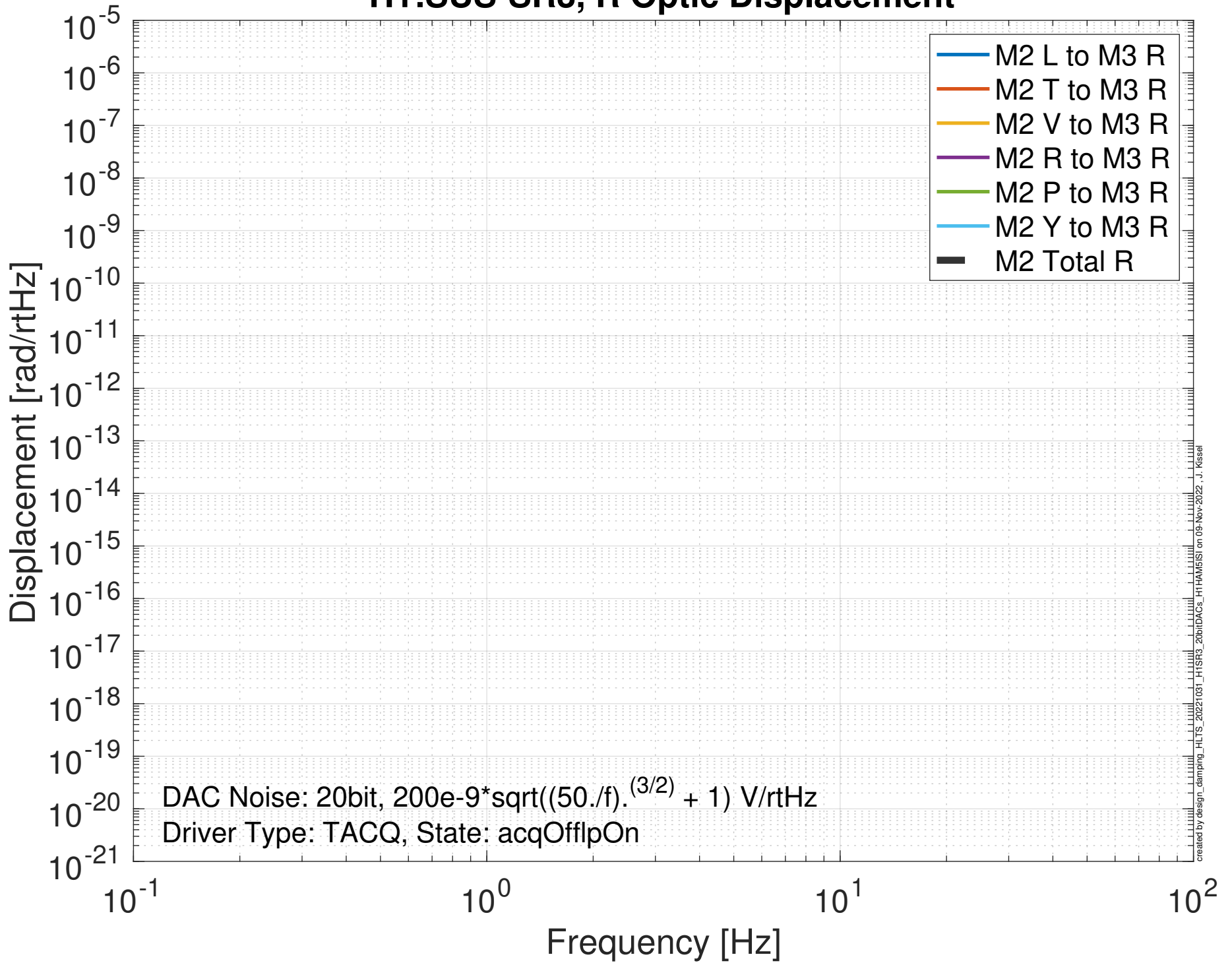
Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-SR3, R Optic Displacement



Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-SR3, R Optic Displacement

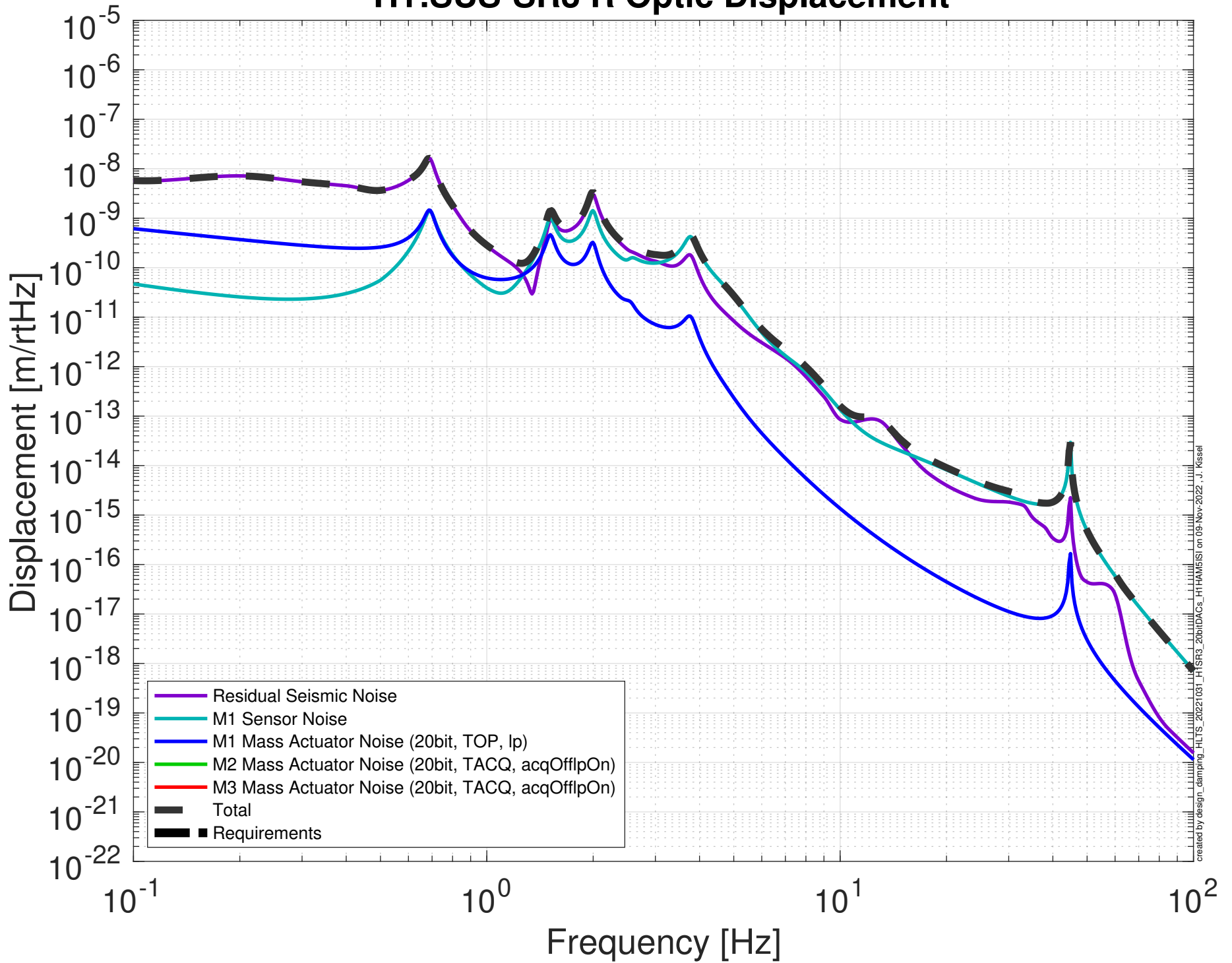


Projected M3 Mass Actuator > Optic Noise Budget H1:SUS-SR3, R Optic Displacement



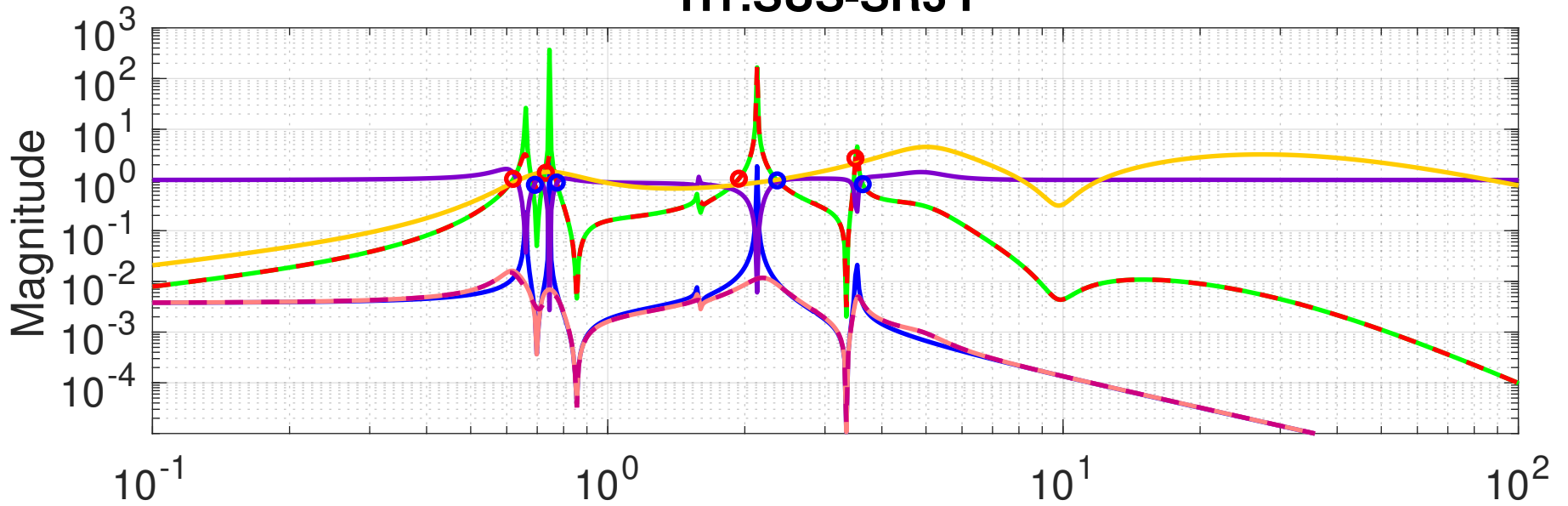
Damping Loop Performance

H1:SUS-SR3 R Optic Displacement

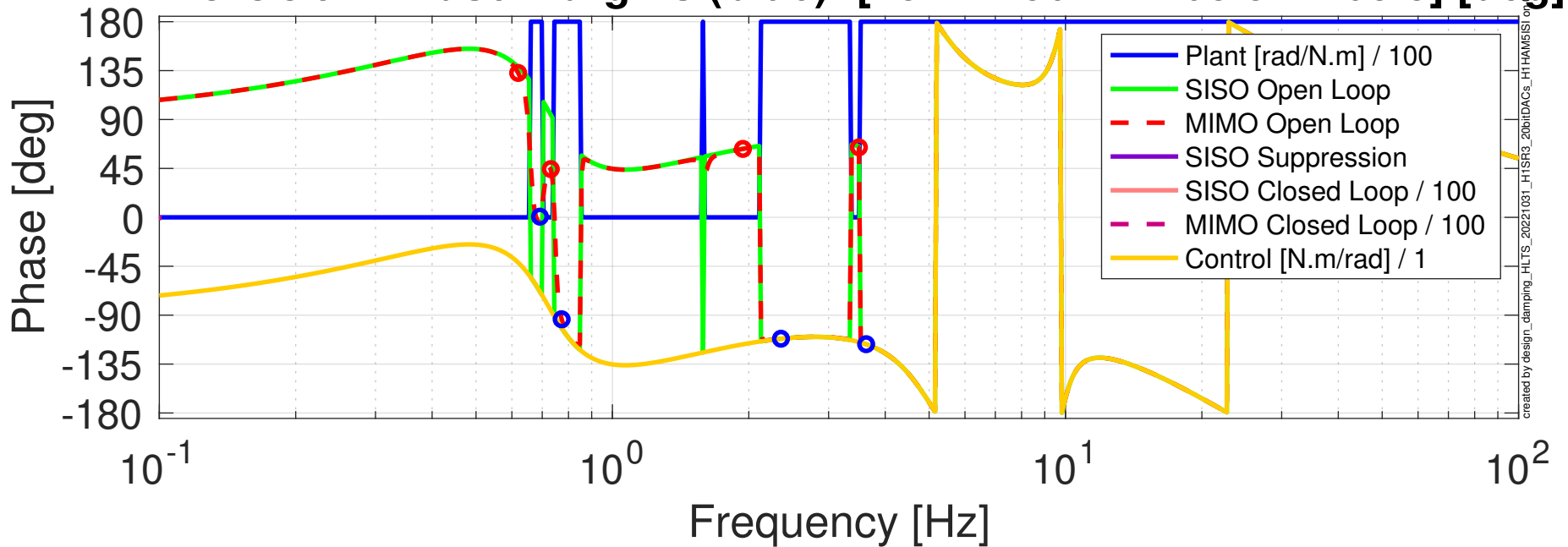


Damping Loop Design

H1:SUS-SR3 P

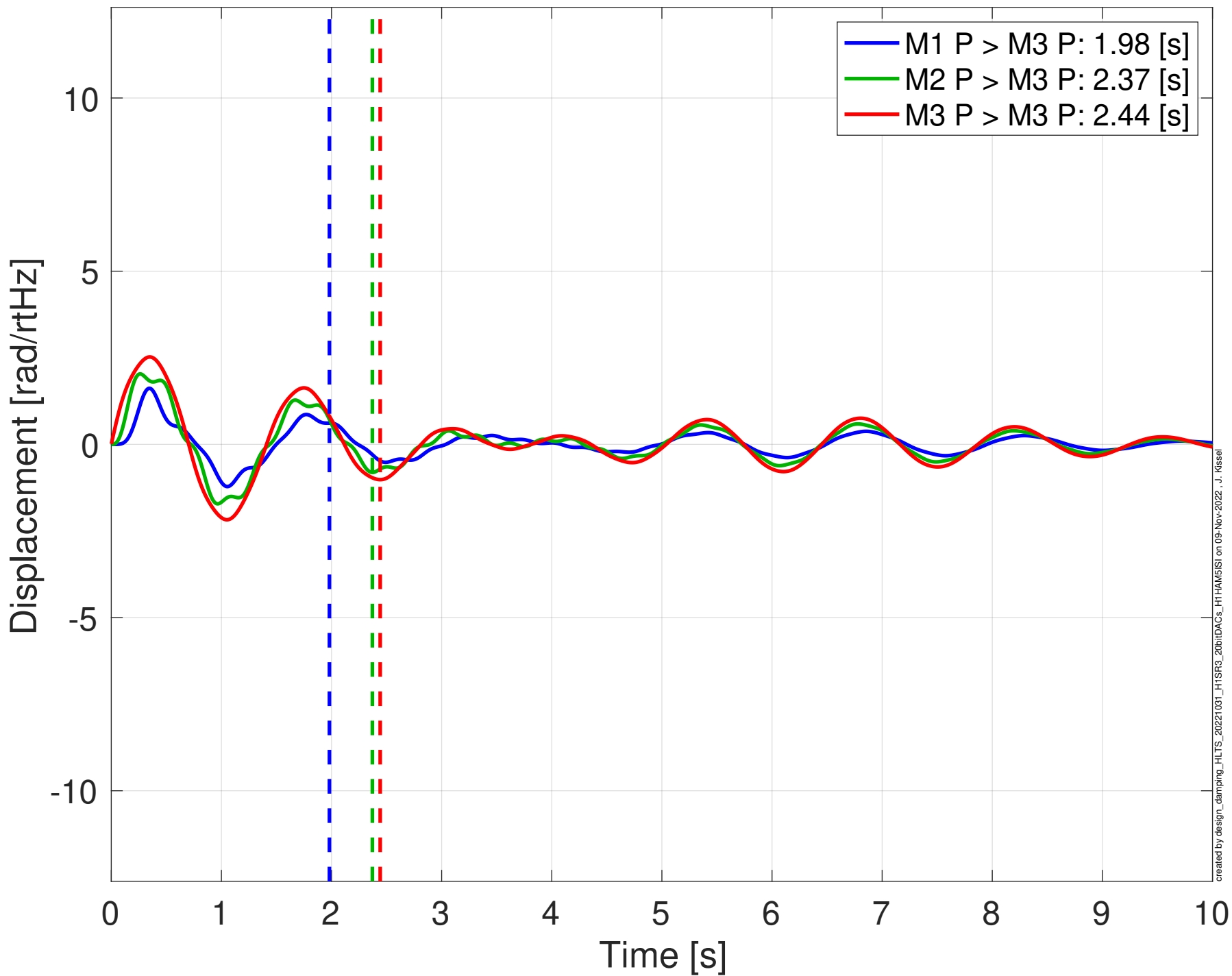


MIMO LUGF Phase Margins (red): [47.2 136 117 116] [deg]
MIMO UUGF Phase Margins (blue): [181 86.2 68.3 63.3] [deg]

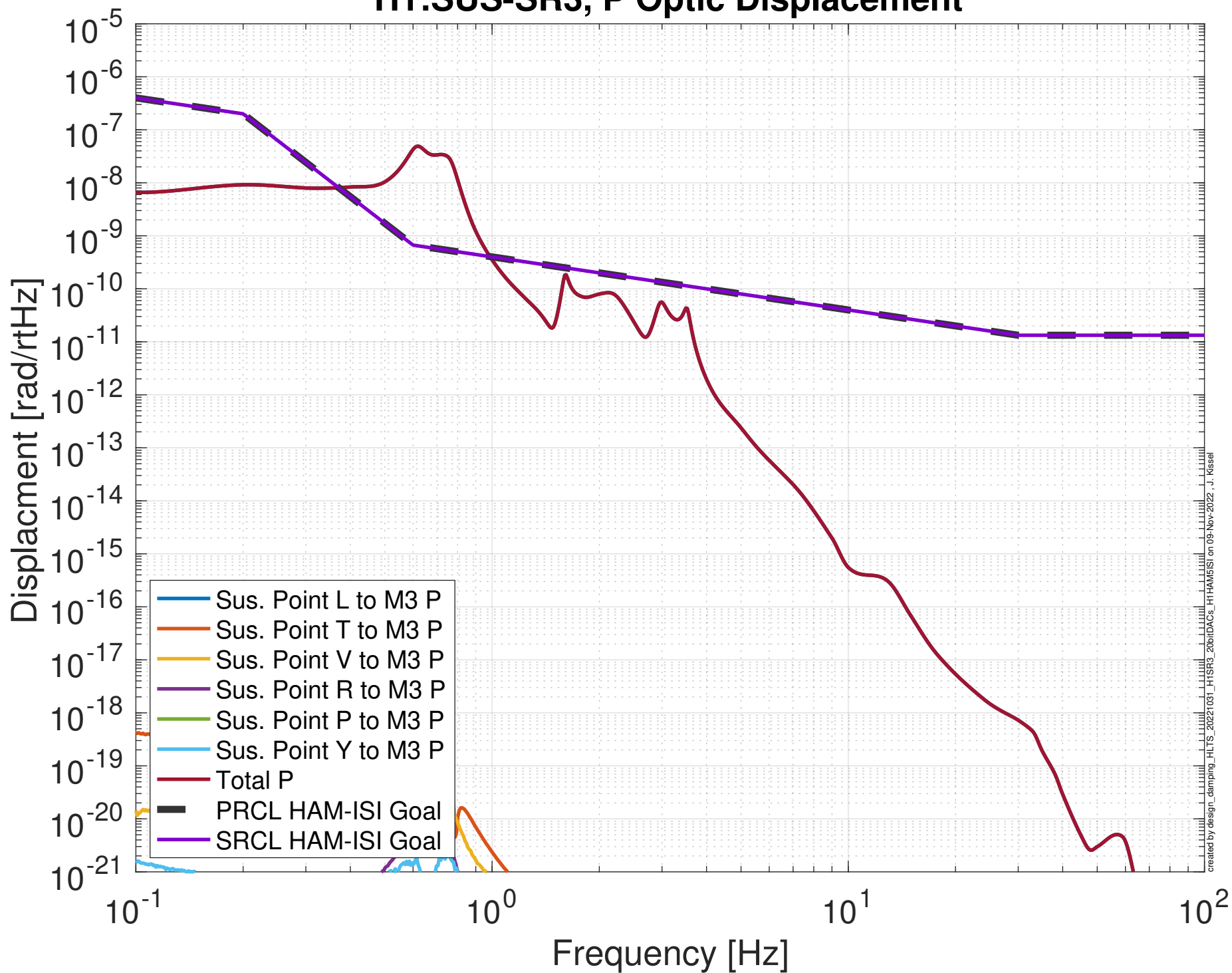


Damped Impulse Response

H1:SUS-SR3 P

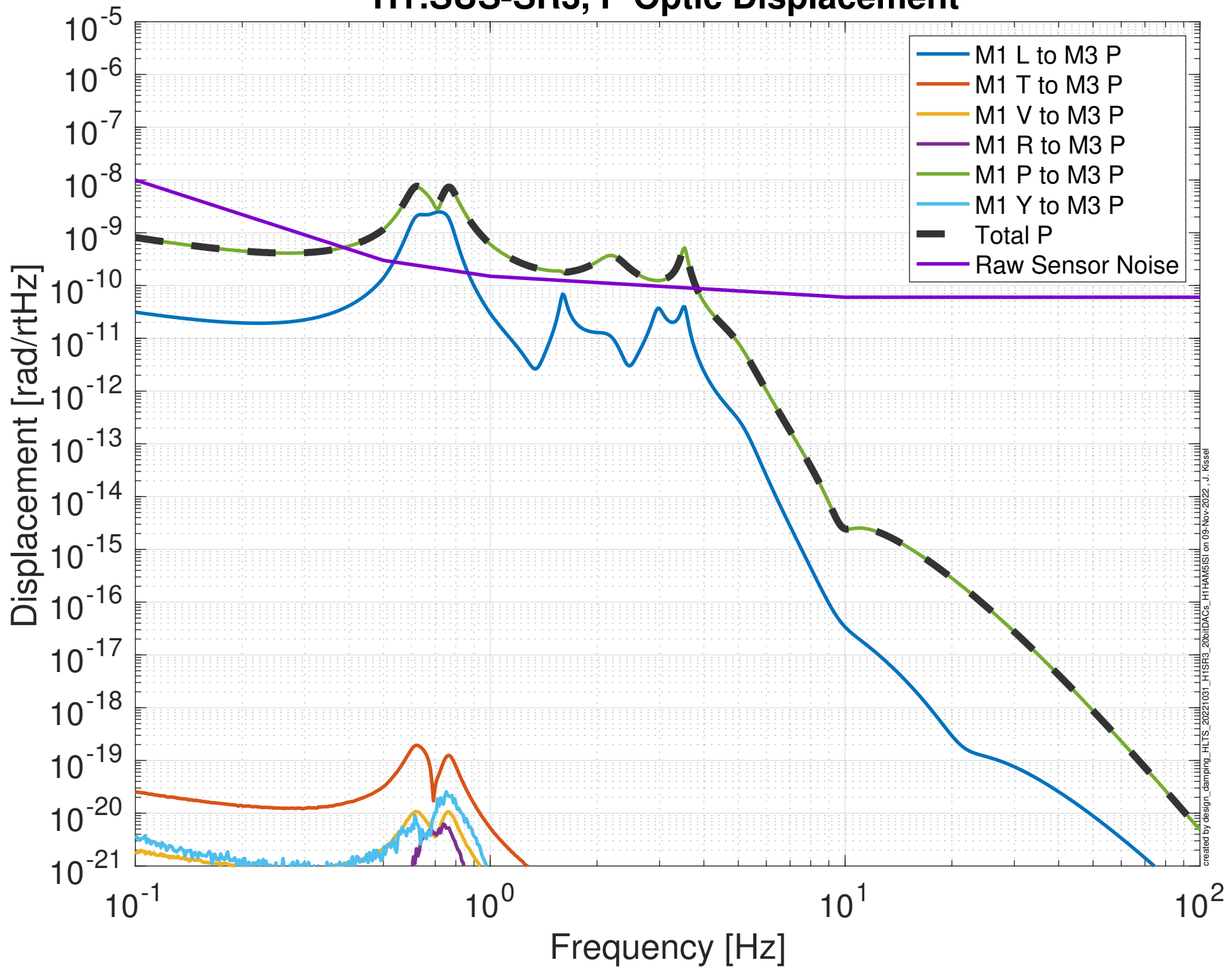


Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-SR3, P Optic Displacement



created by design_damping_H1TS_20221031_H1SR3_20bitDACs_H1HAMISI on 09-Nov-2022, J. Kissel

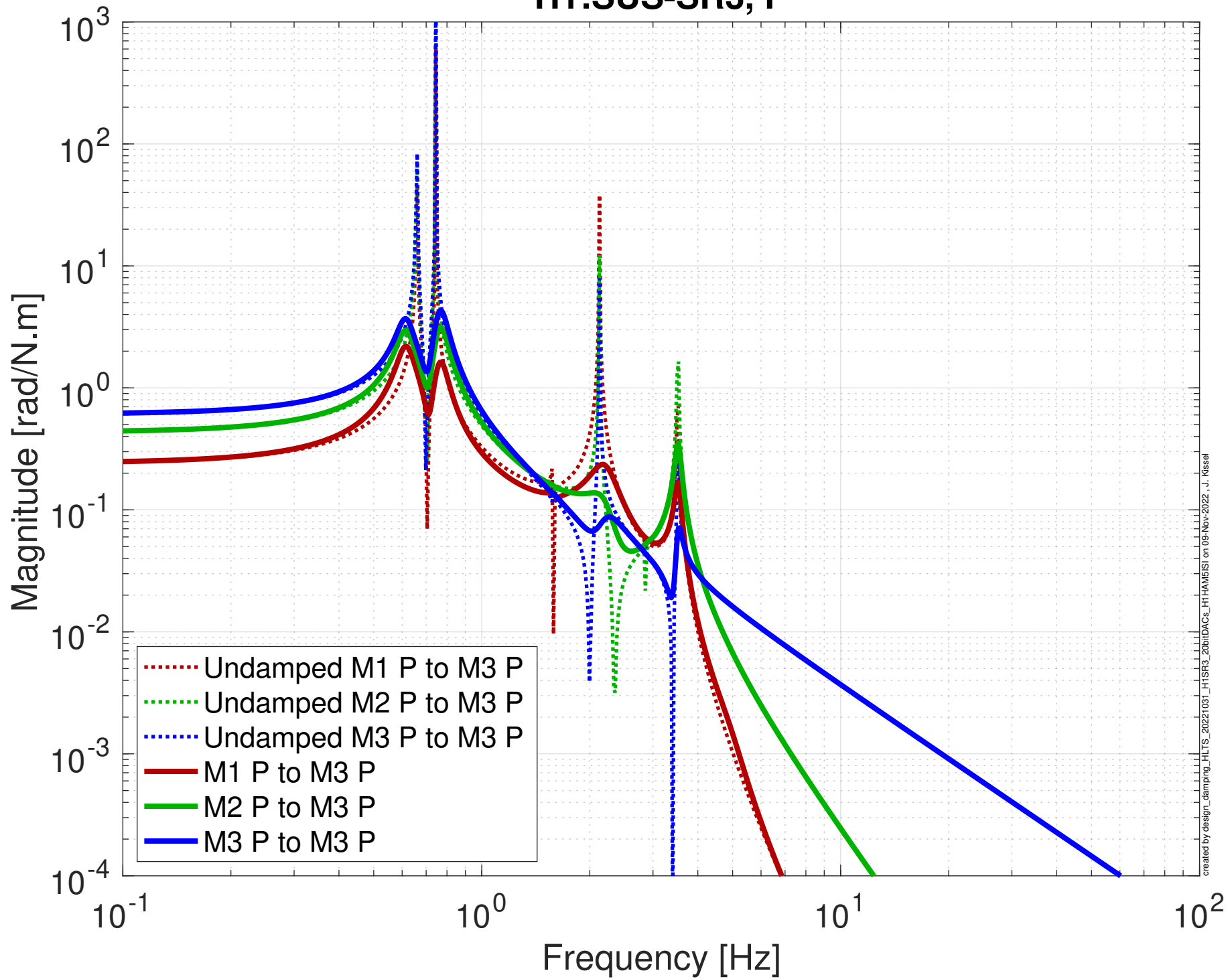
Projected Top Mass Sensor > Optic Noise Budget H1:SUS-SR3, P Optic Displacement



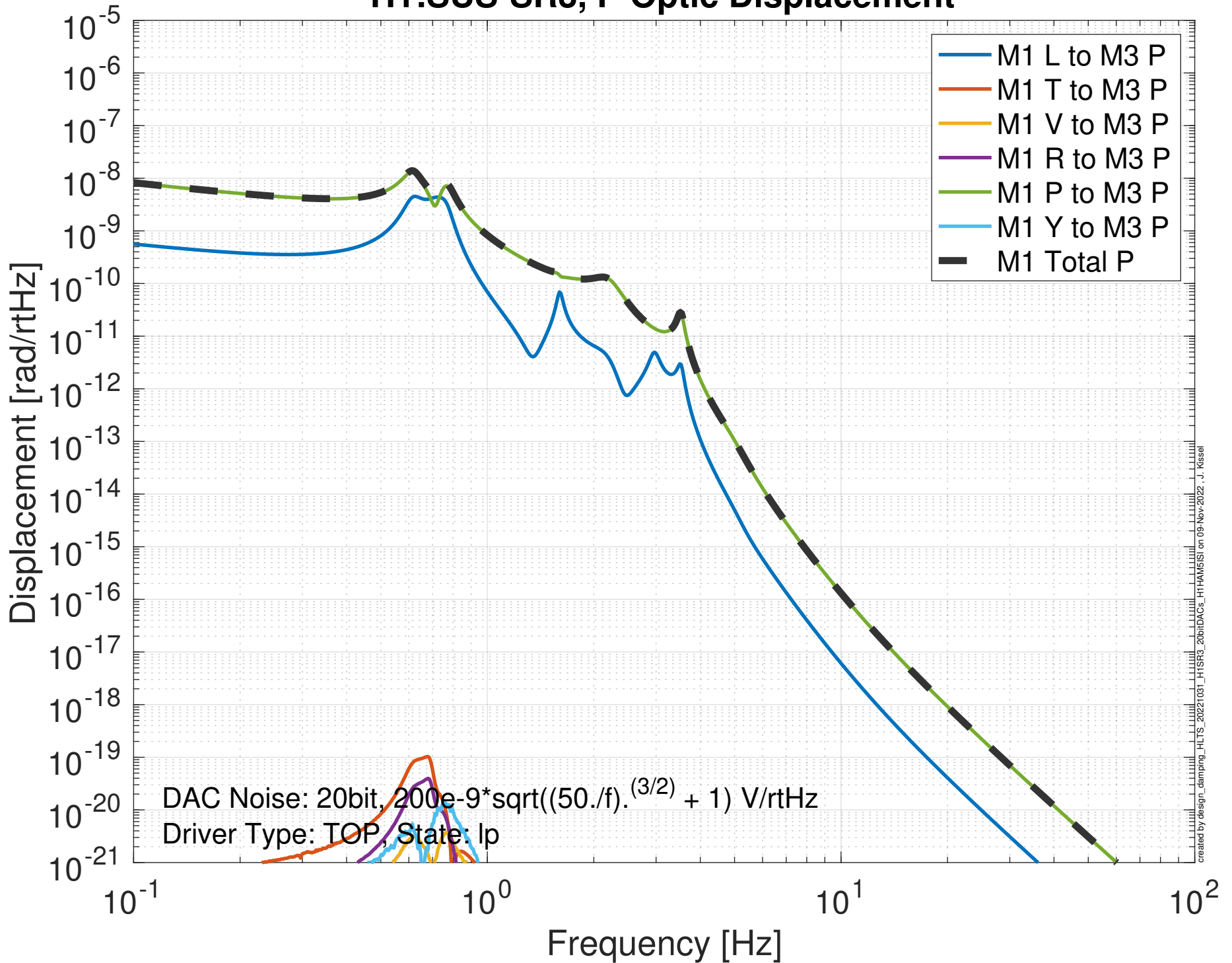
created by design_campmg_HLTS_20221031_H1SR3_20bitDACs_H1HAMIS1 on 09-Nov-2022, J. Kissel

Global Control Transfer Functions to Optic

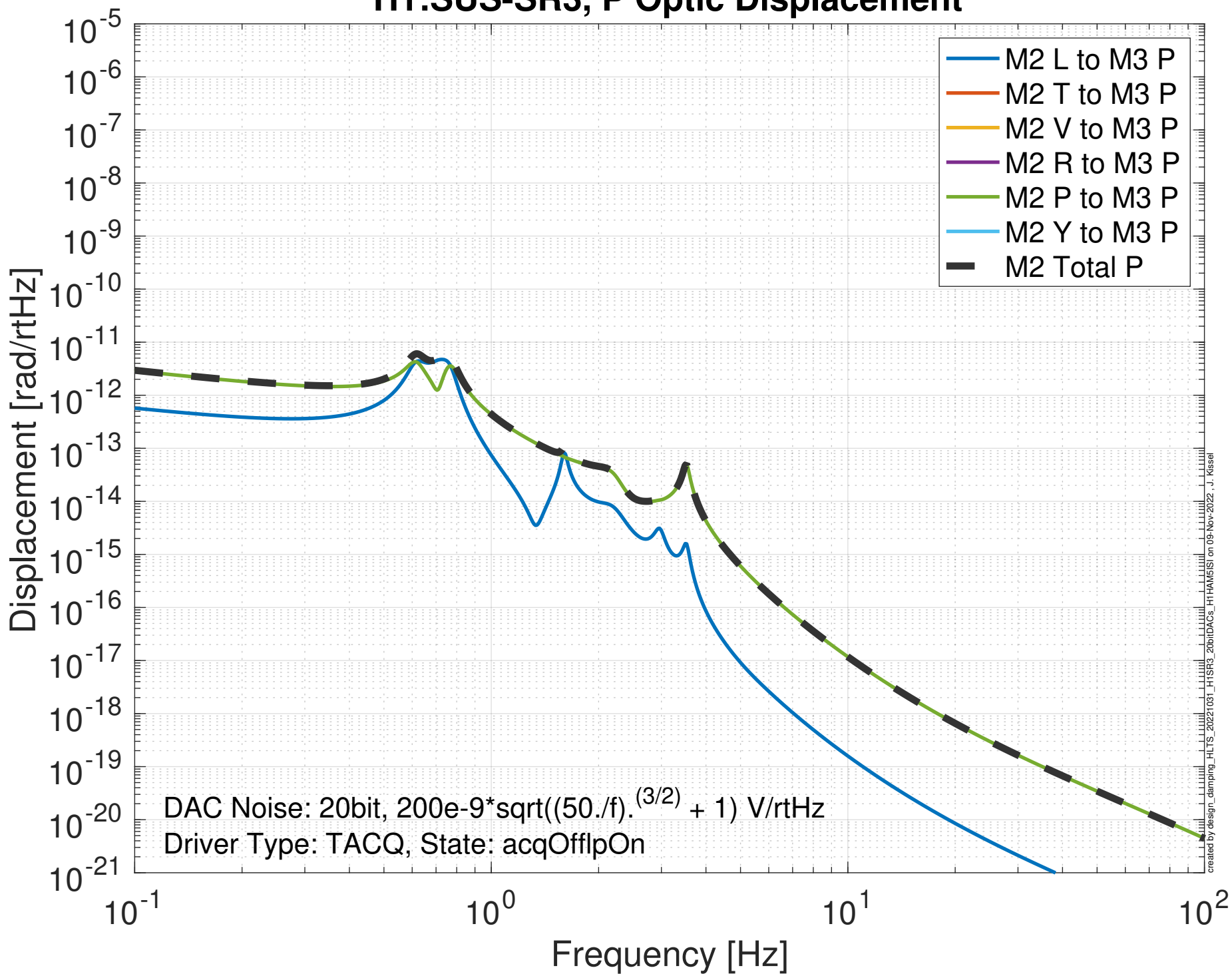
H1:SUS-SR3, P



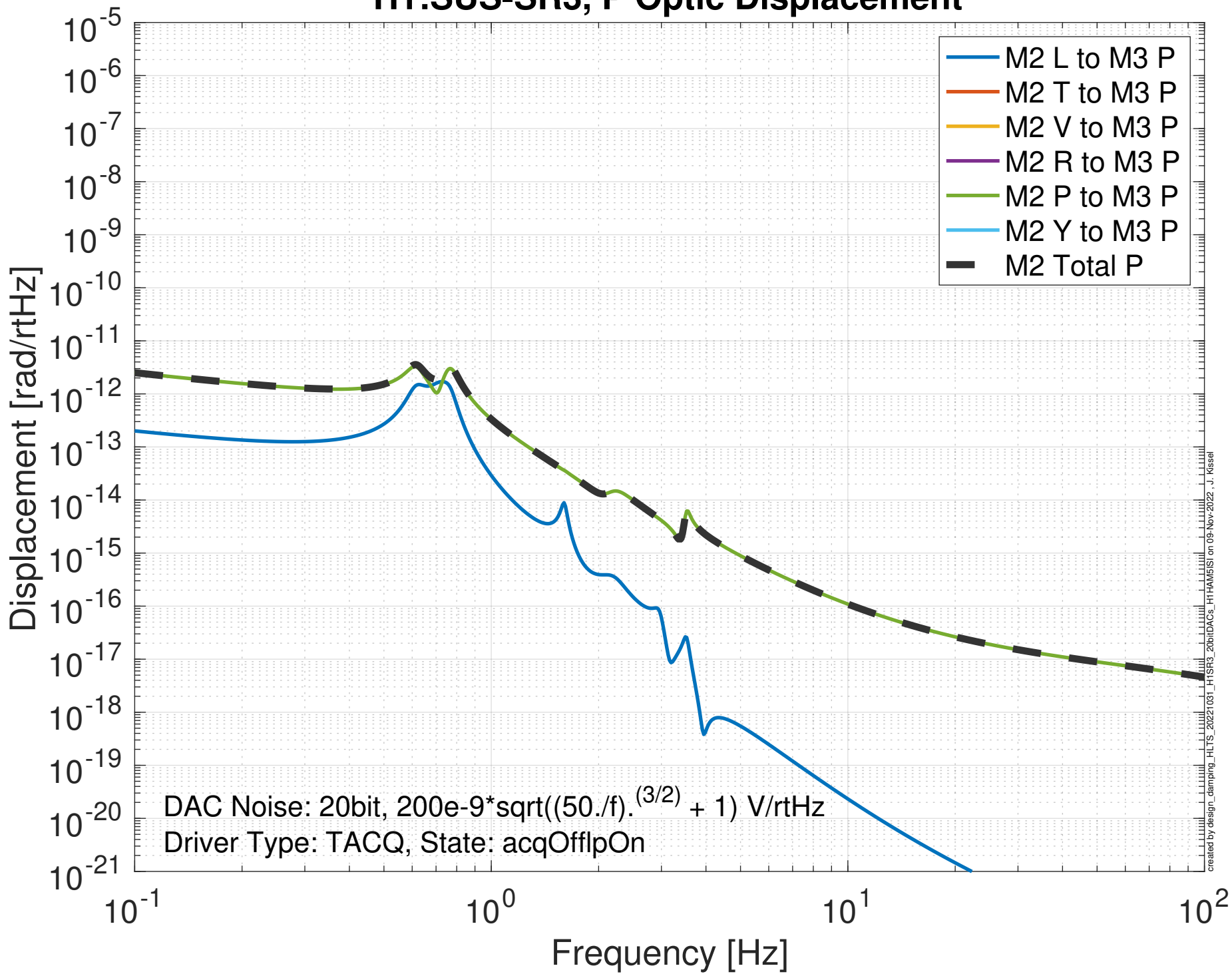
Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-SR3, P Optic Displacement



Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-SR3, P Optic Displacement



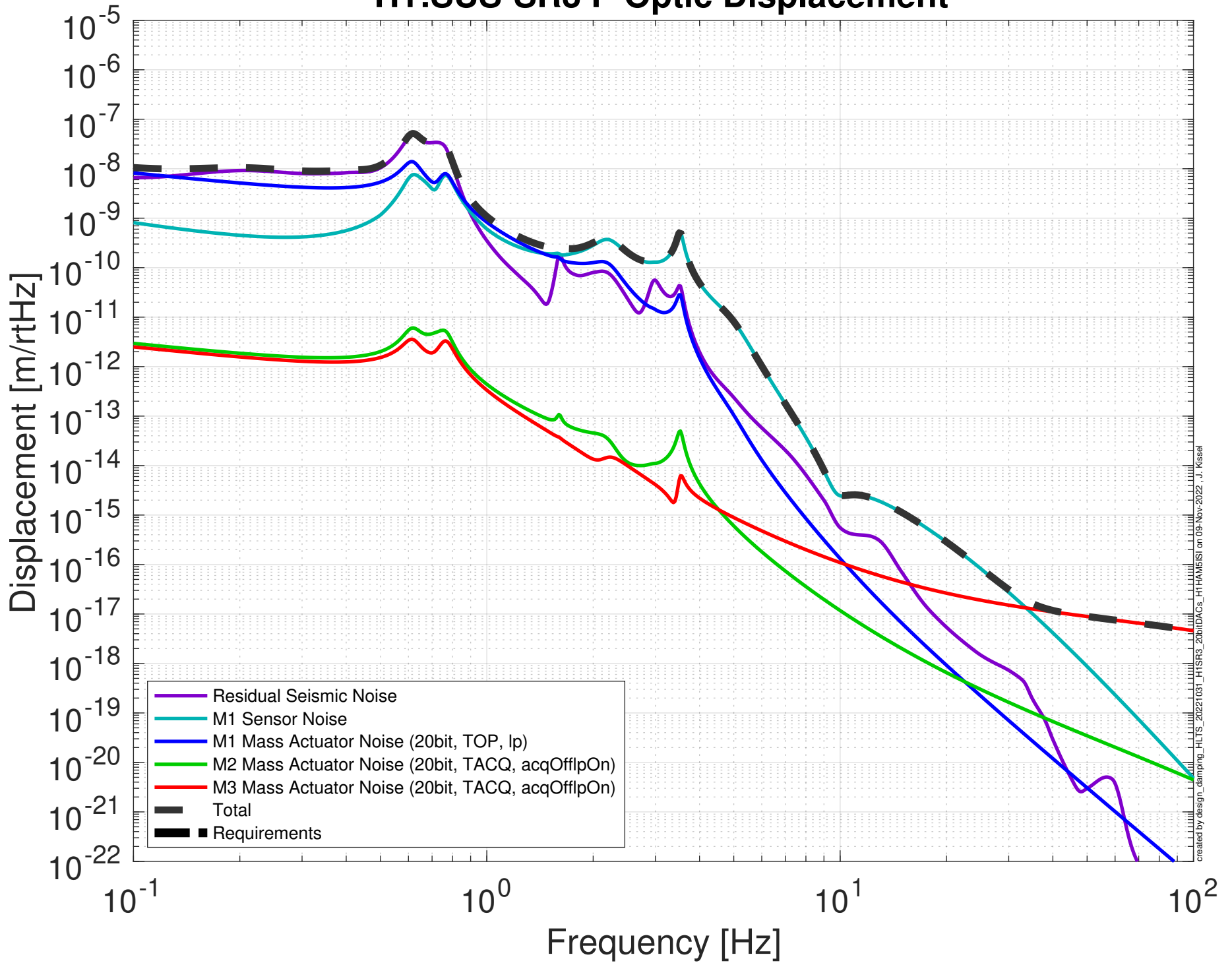
Projected M3 Mass Actuator > Optic Noise Budget H1:SUS-SR3, P Optic Displacement



created by design_campng_HLTS_2021031_H1SR3_20bitDACs_H1HAM5IS1 on 09-Nov-2022, J. Kissel

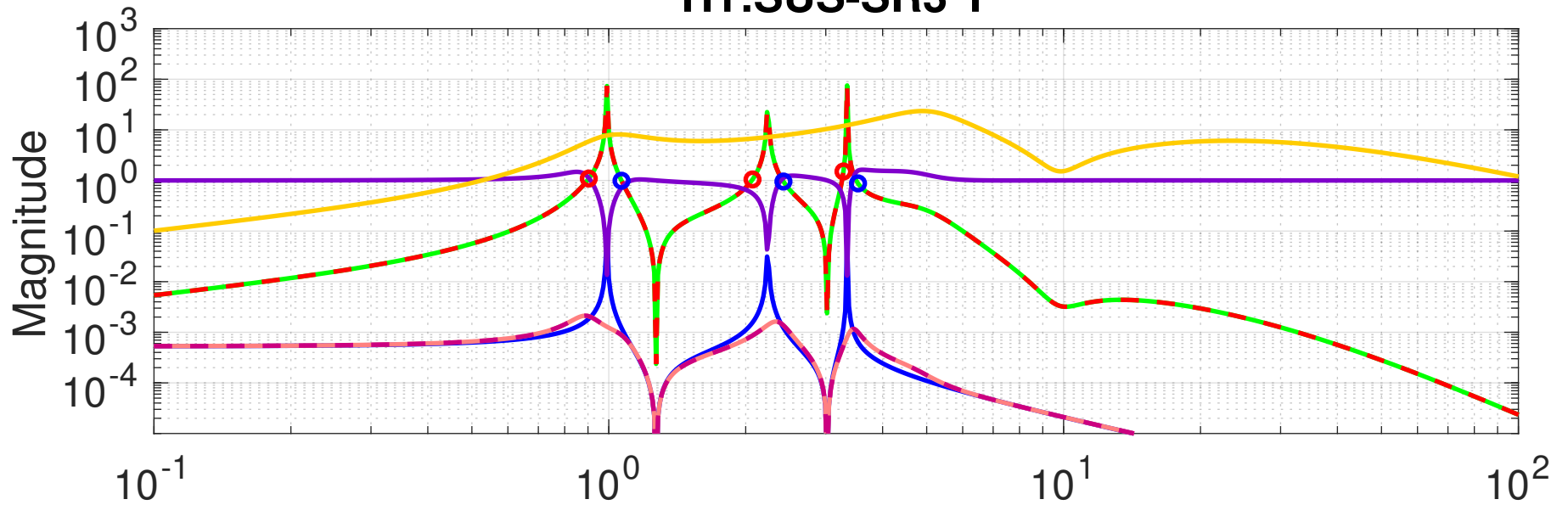
Damping Loop Performance

H1:SUS-SR3 P Optic Displacement

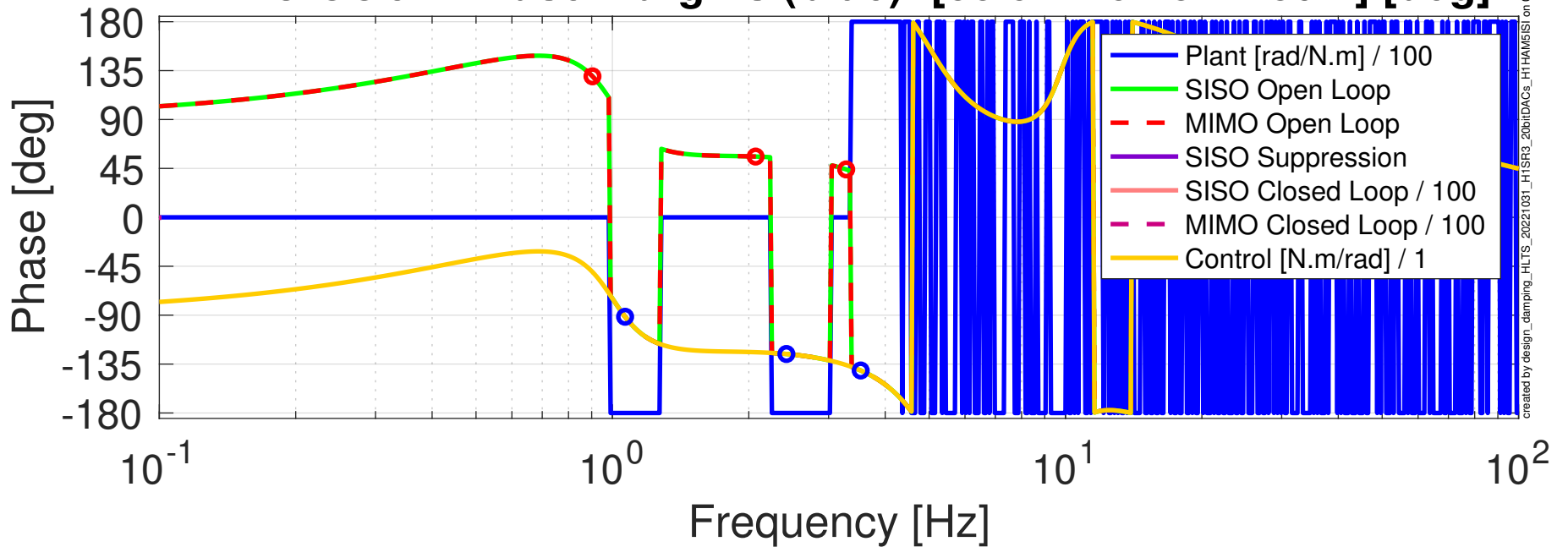


Damping Loop Design

H1:SUS-SR3 Y

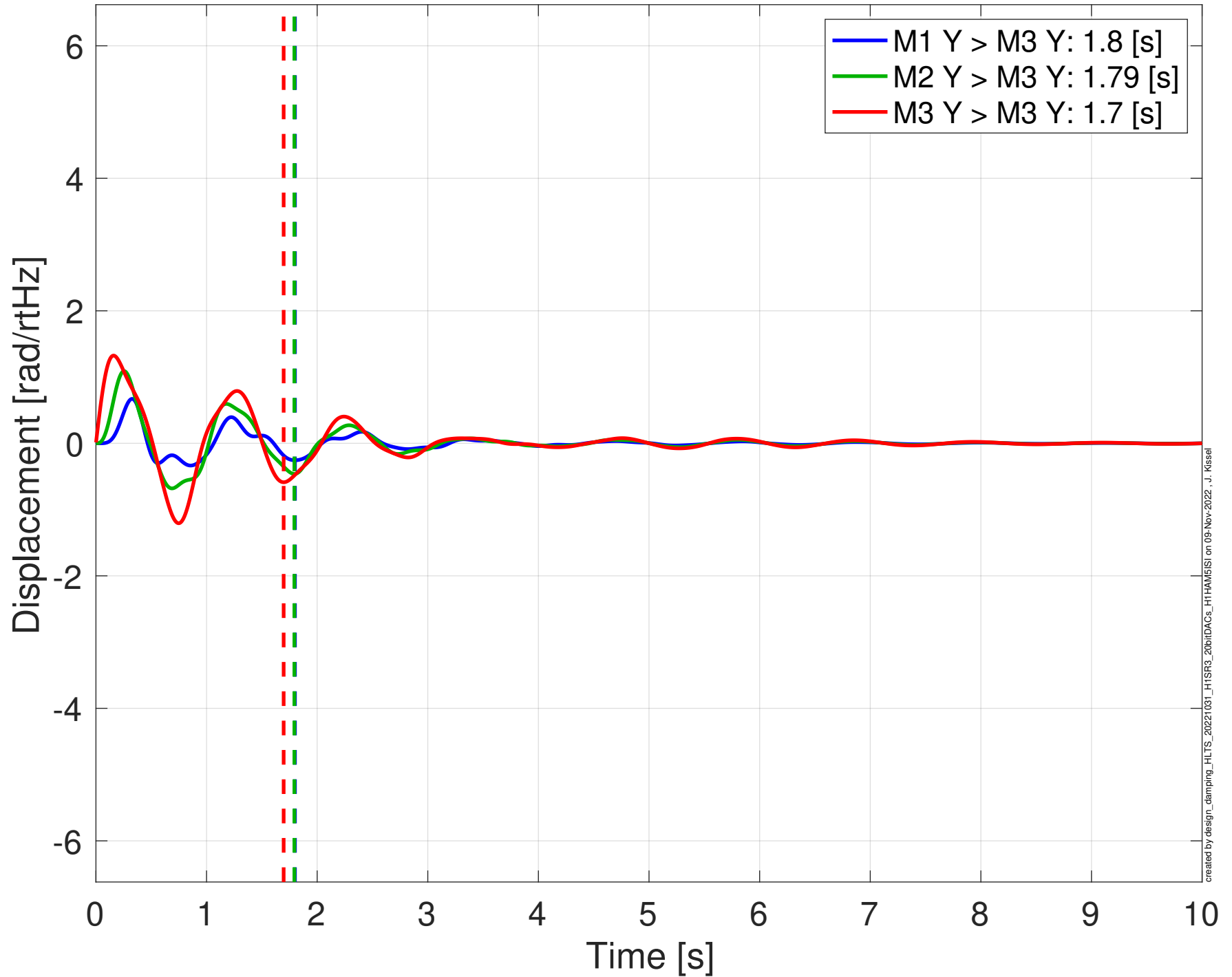


MIMO LUGF Phase Margins (red): [50.3 124 136] [deg]
MIMO UUGF Phase Margins (blue): [88.5 54.3 39.1] [deg]

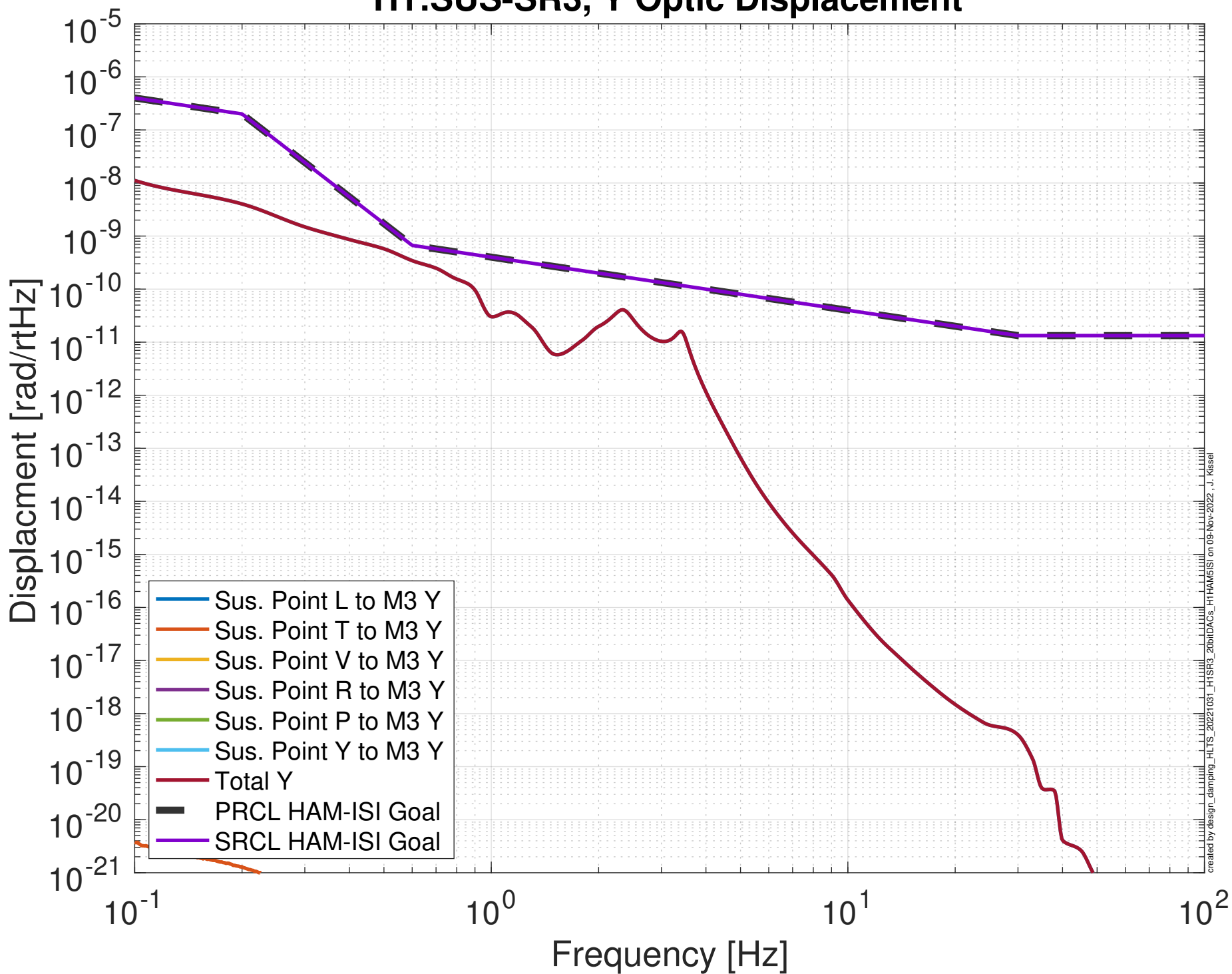


Damped Impulse Response

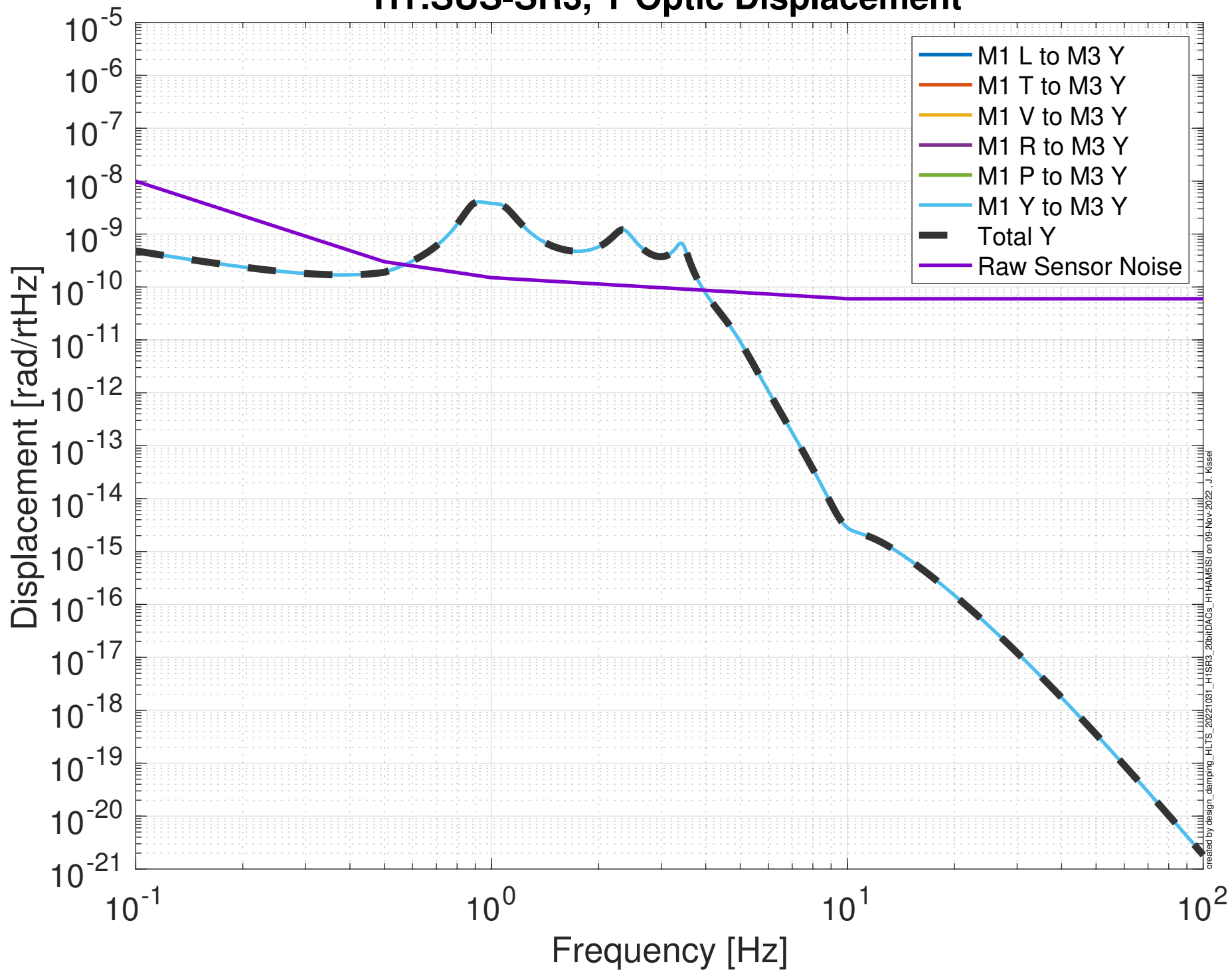
H1:SUS-SR3 Y



Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-SR3, Y Optic Displacement



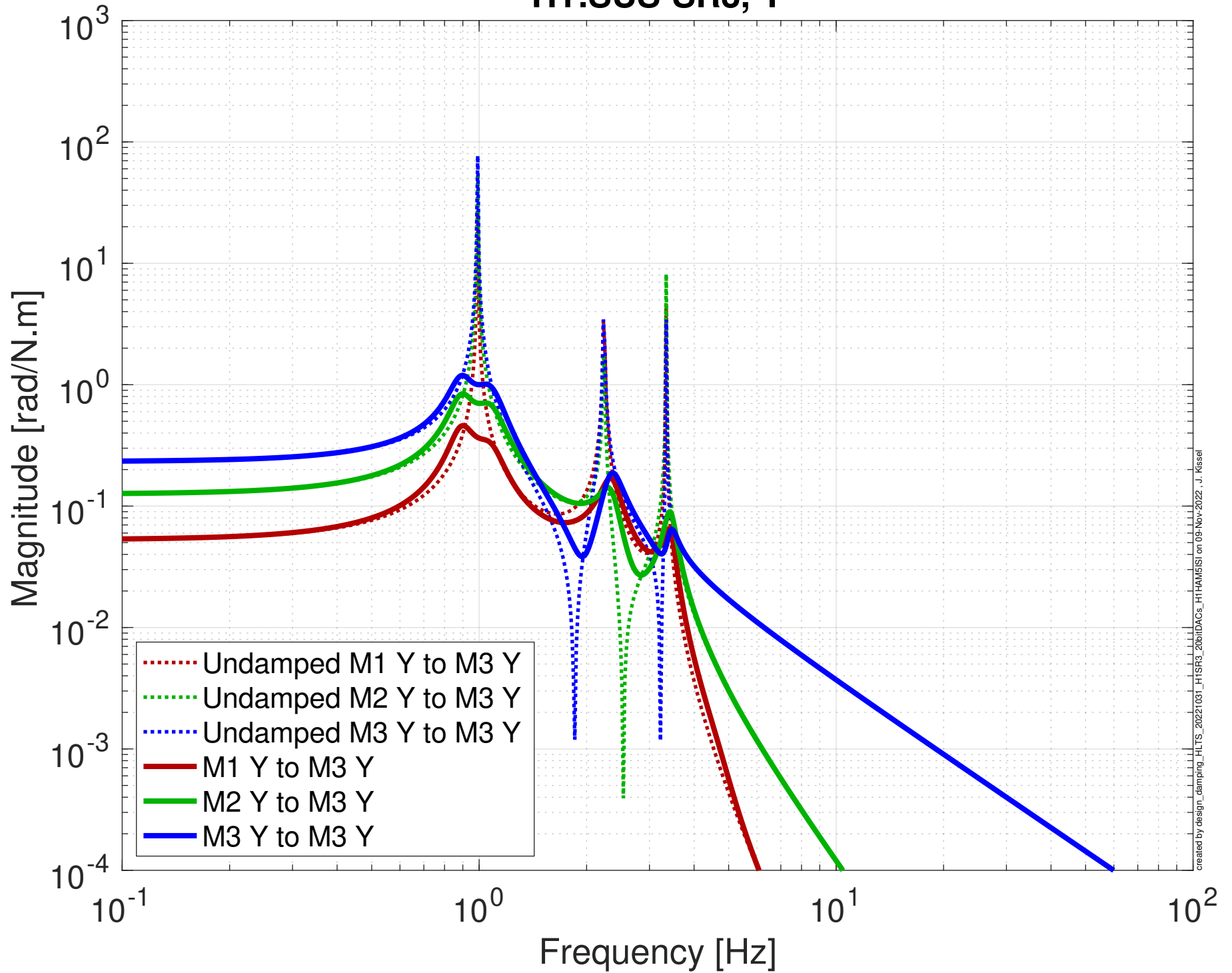
Projected Top Mass Sensor > Optic Noise Budget H1:SUS-SR3, Y Optic Displacement



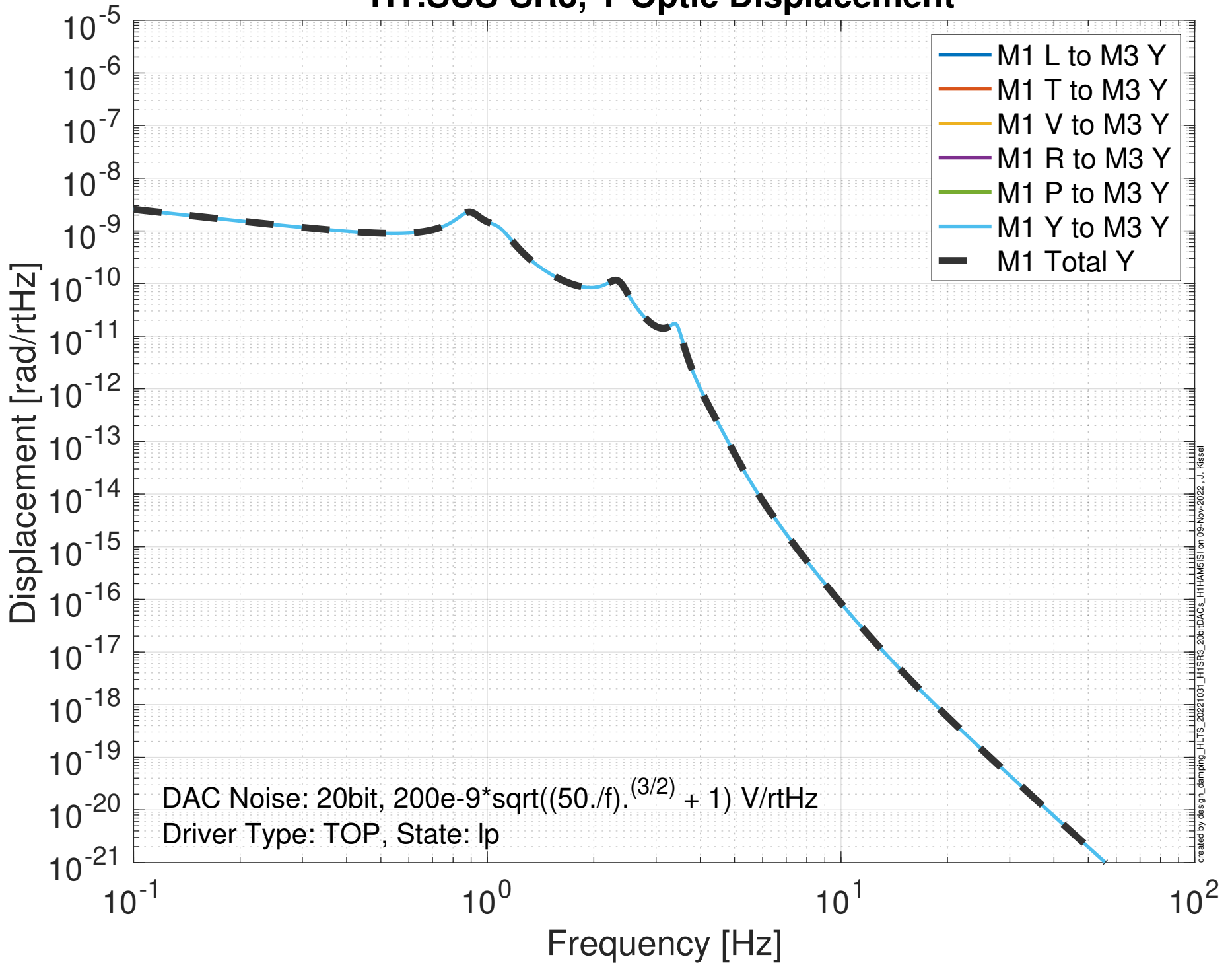
created by design_campmg_HLTS_20221031_H1SR3_20bitDACs_H1HAMIS1 on 09-Nov-2022, J. Kissel

Global Control Transfer Functions to Optic

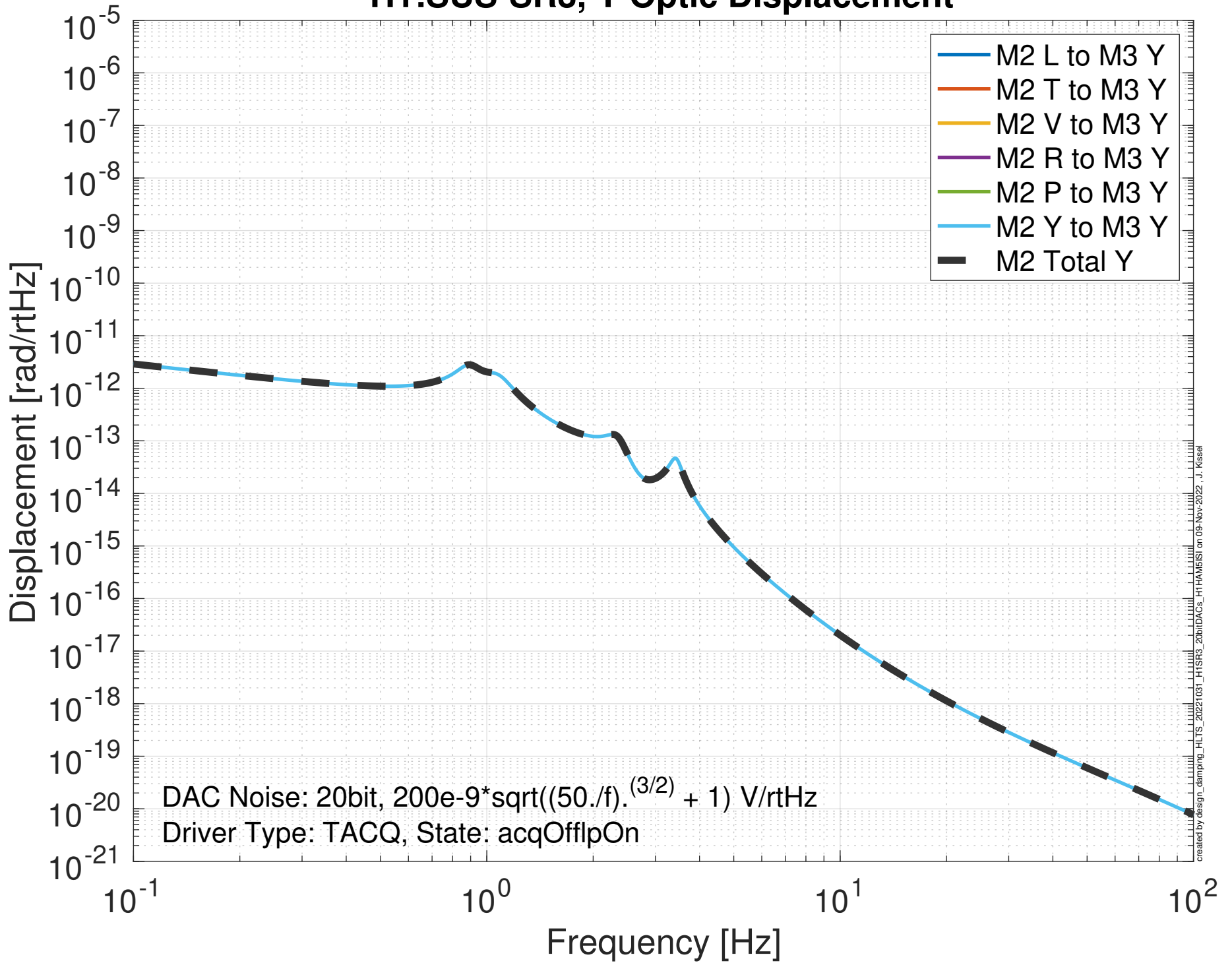
H1:SUS-SR3, Y



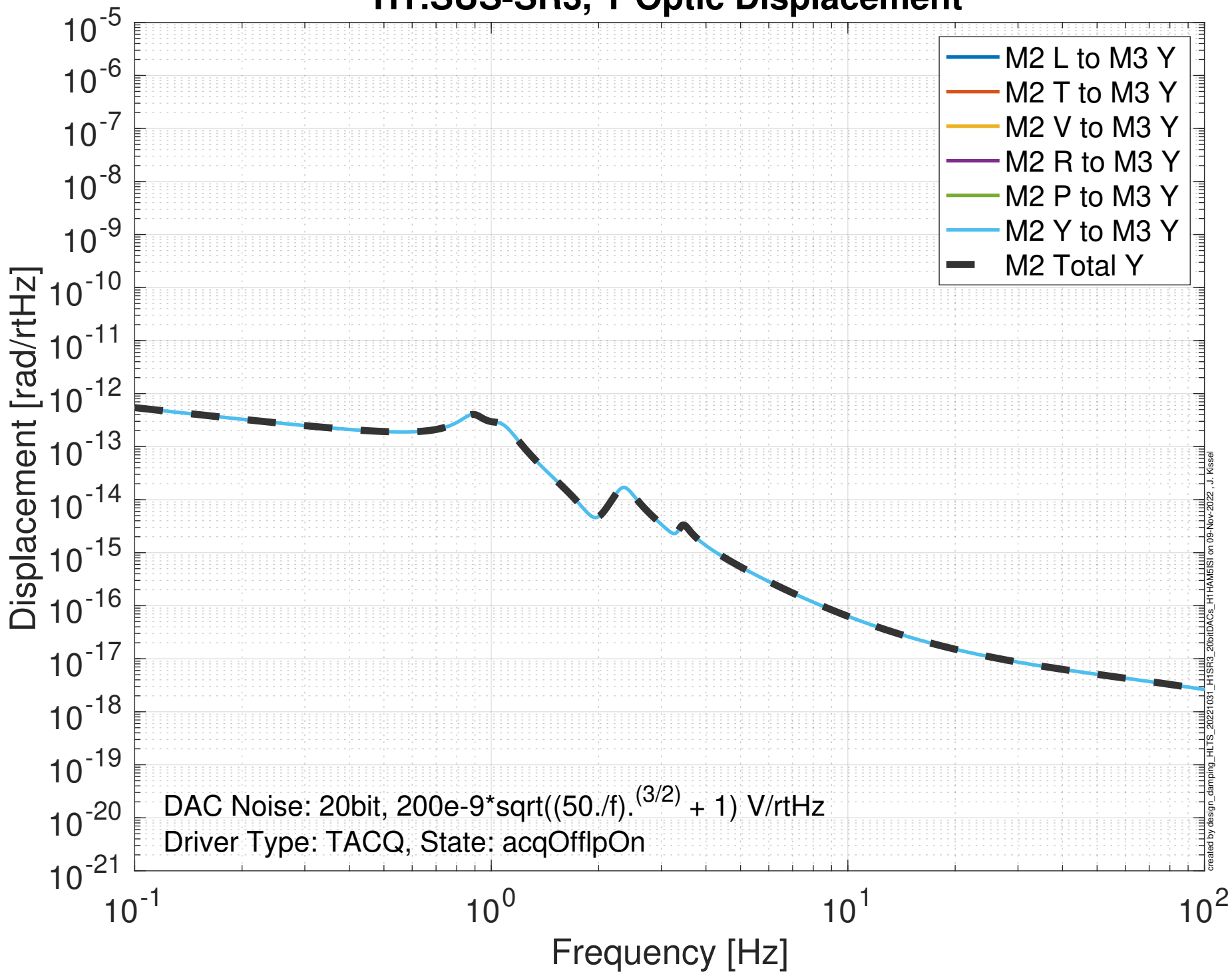
Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-SR3, Y Optic Displacement



Projected M2 Mass Actuator > Optic Noise Budget H1:SUS-SR3, Y Optic Displacement

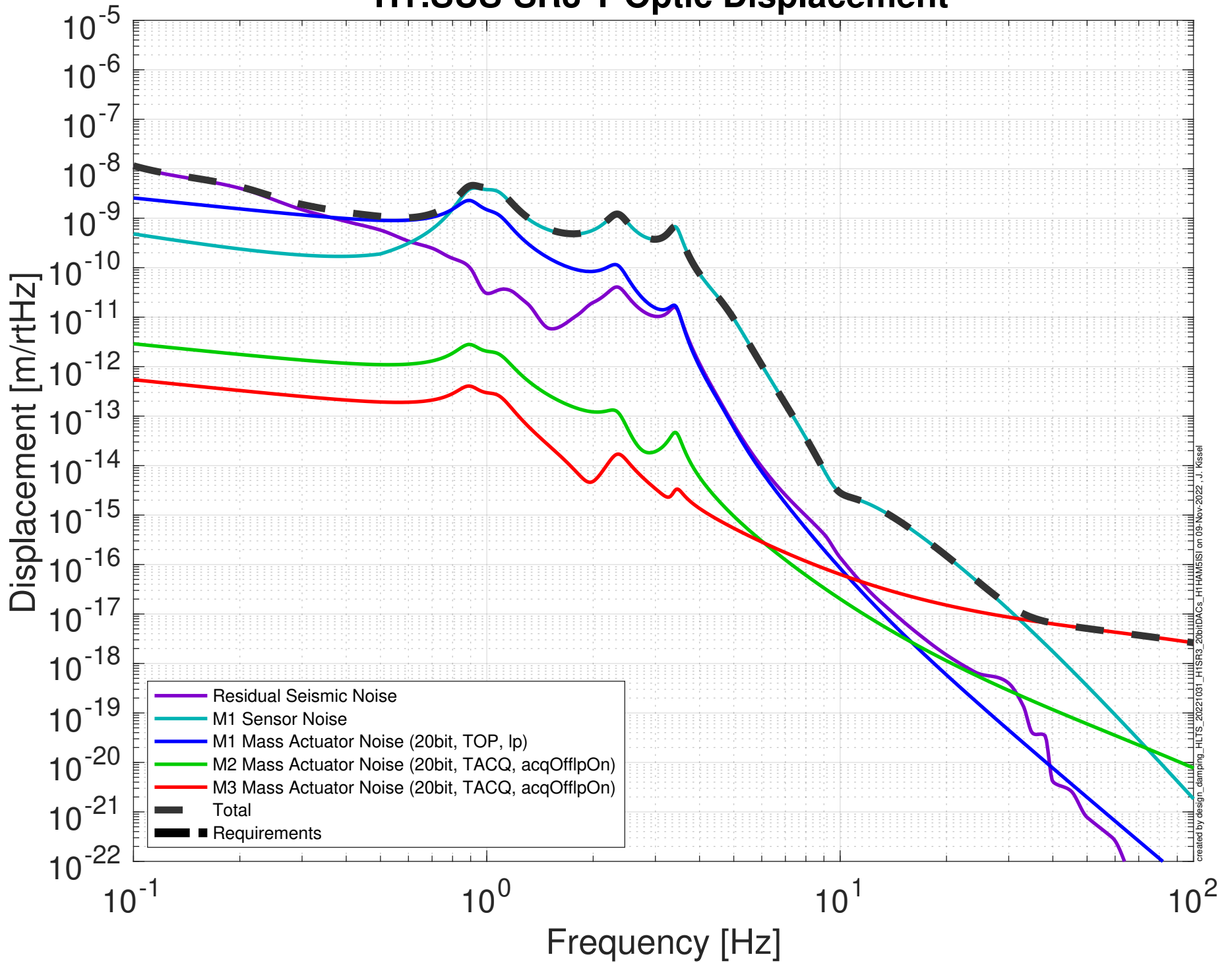


Projected M3 Mass Actuator > Optic Noise Budget H1:SUS-SR3, Y Optic Displacement



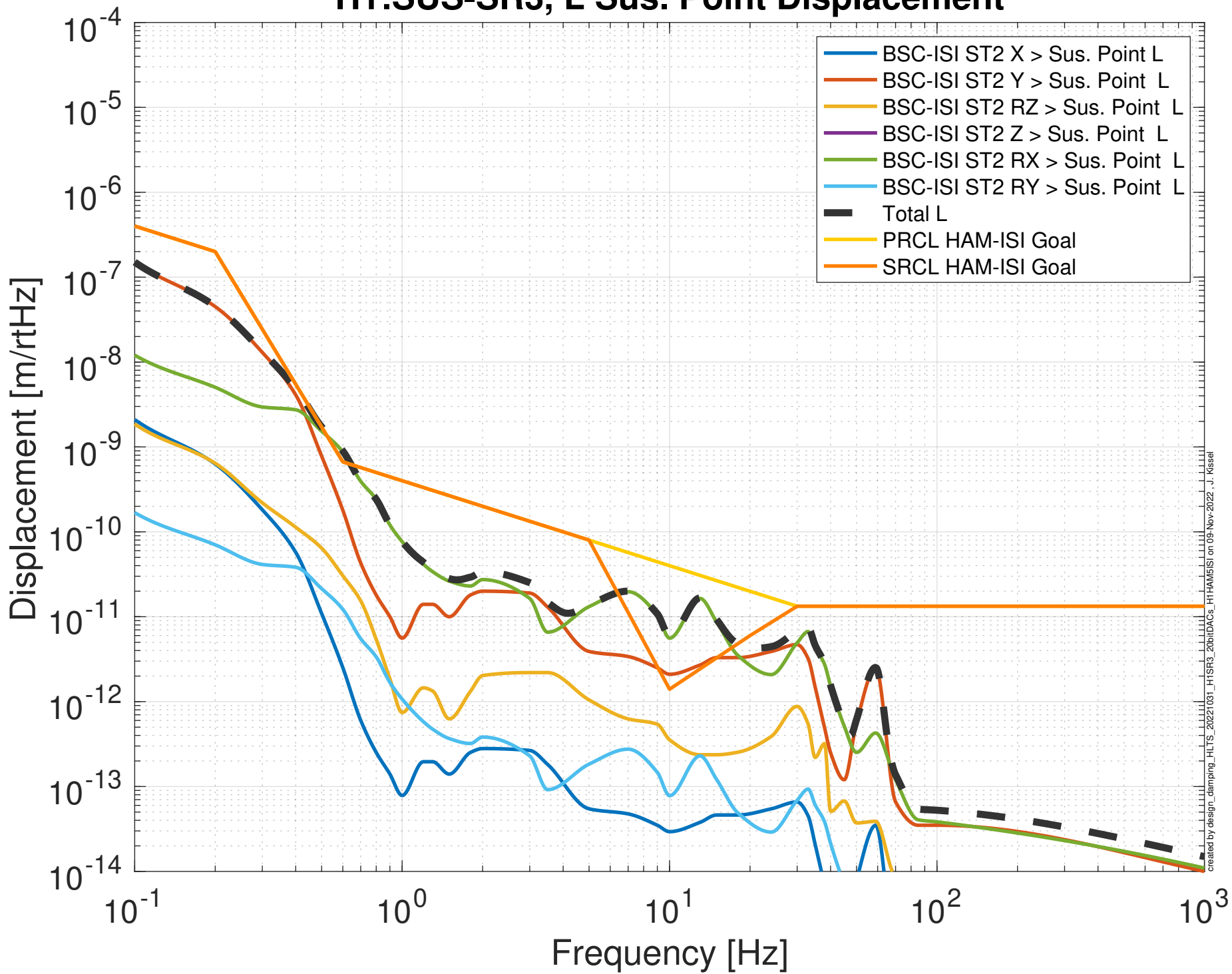
Damping Loop Performance

H1:SUS-SR3 Y Optic Displacement



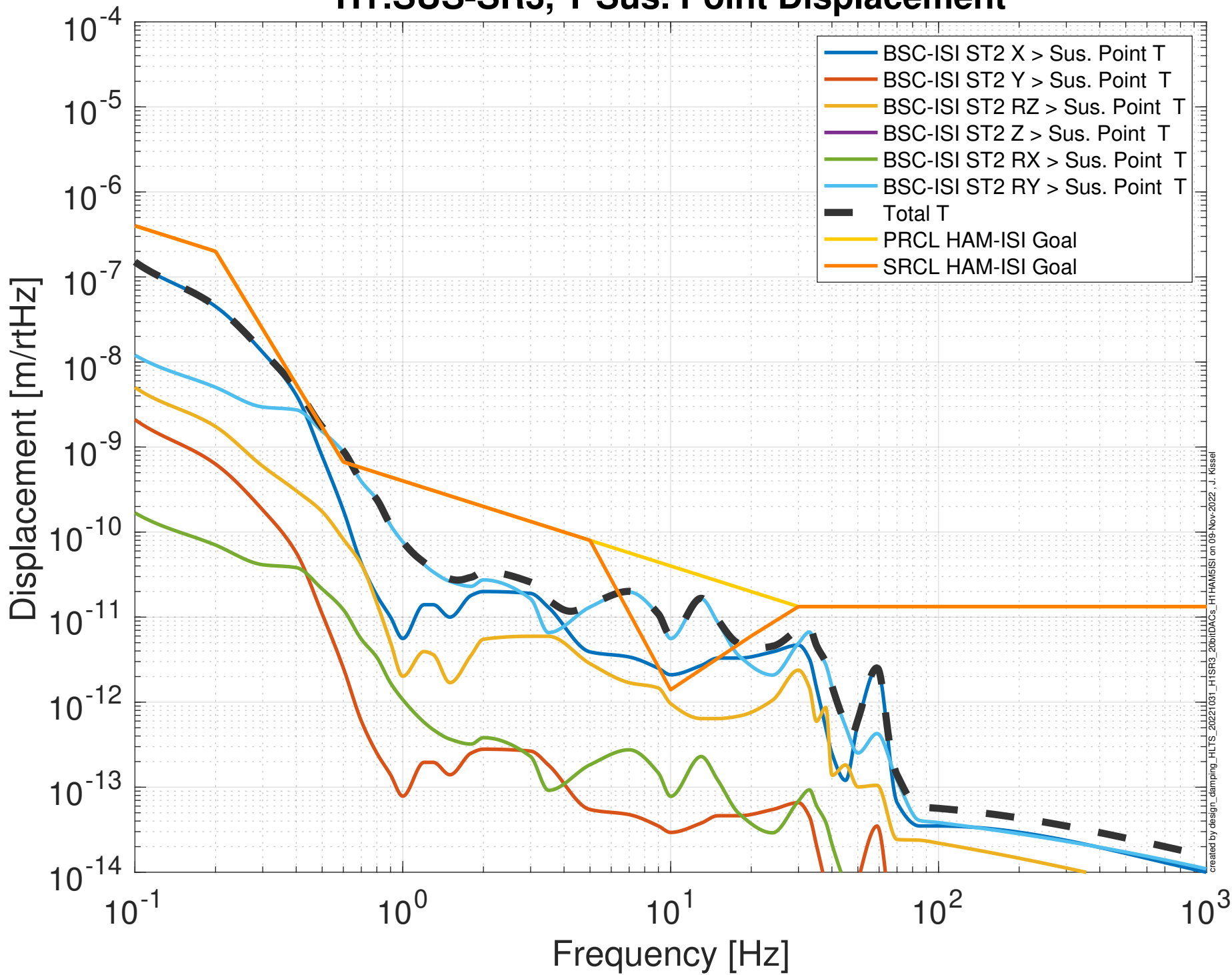
Projected ISI Seismic Noise Budget

H1:SUS-SR3, L Sus. Point Displacement



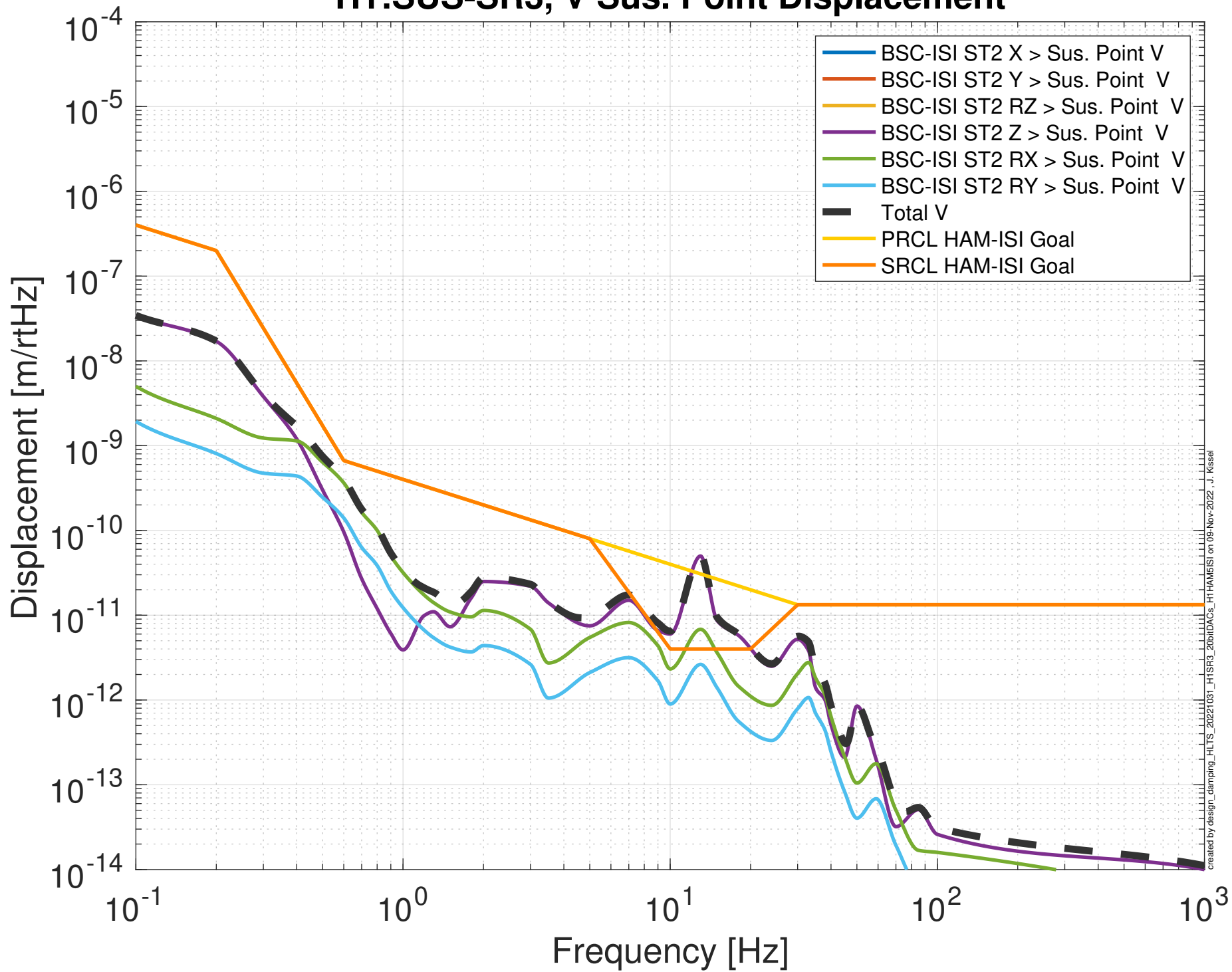
created by design_camping_HLTS_20221031_H1SR3_20bitDAQs_H1HAMISISI on 09-Nov-2022, J. Kissel

Projected ISI Seismic Noise Budget H1:SUS-SR3, T Sus. Point Displacement



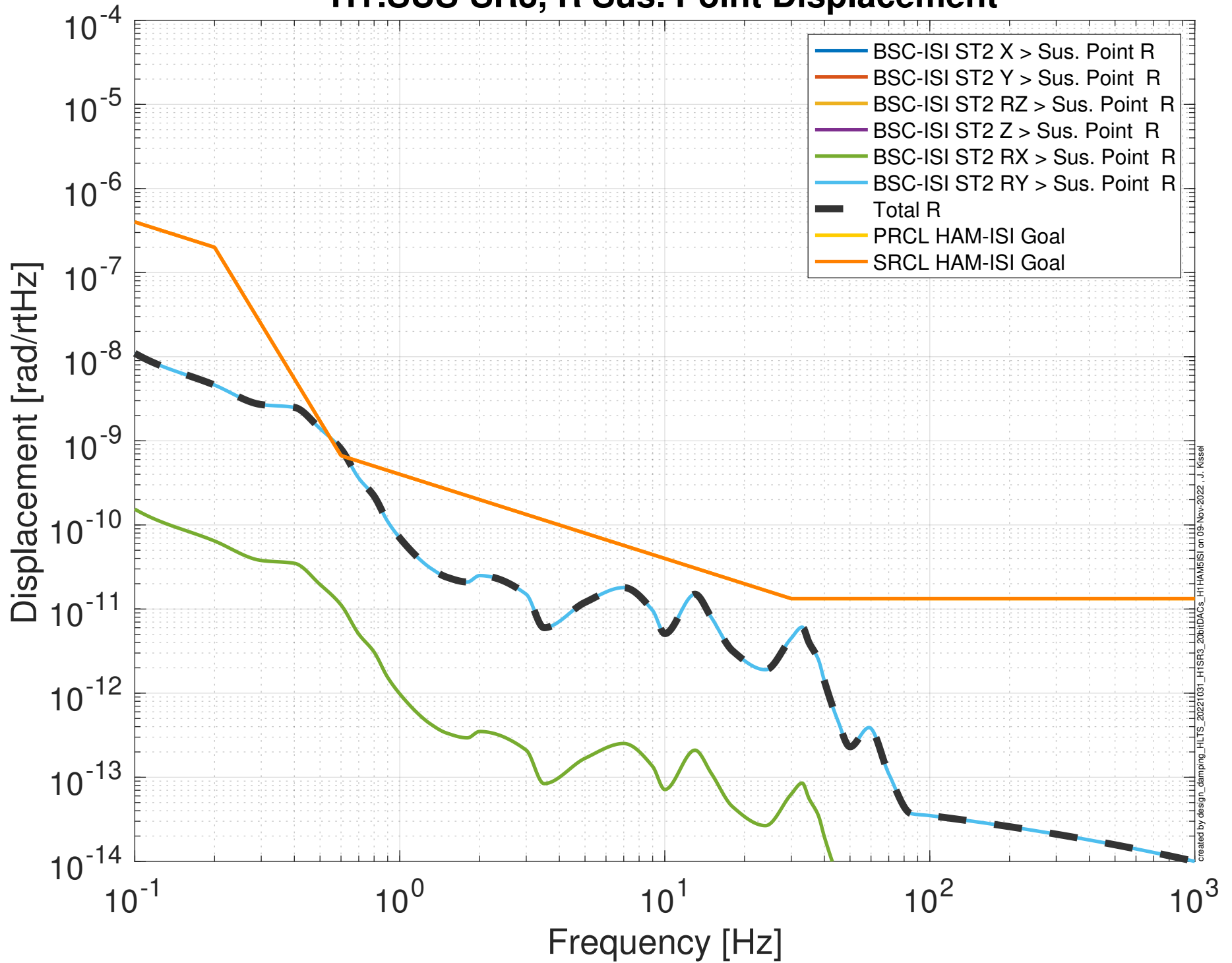
created by design_camping_HLTS_20221031_H1SR3_20bitDAQs_H1HAMISISI on 09-Nov-2022, J. Kissel

Projected ISI Seismic Noise Budget H1:SUS-SR3, V Sus. Point Displacement

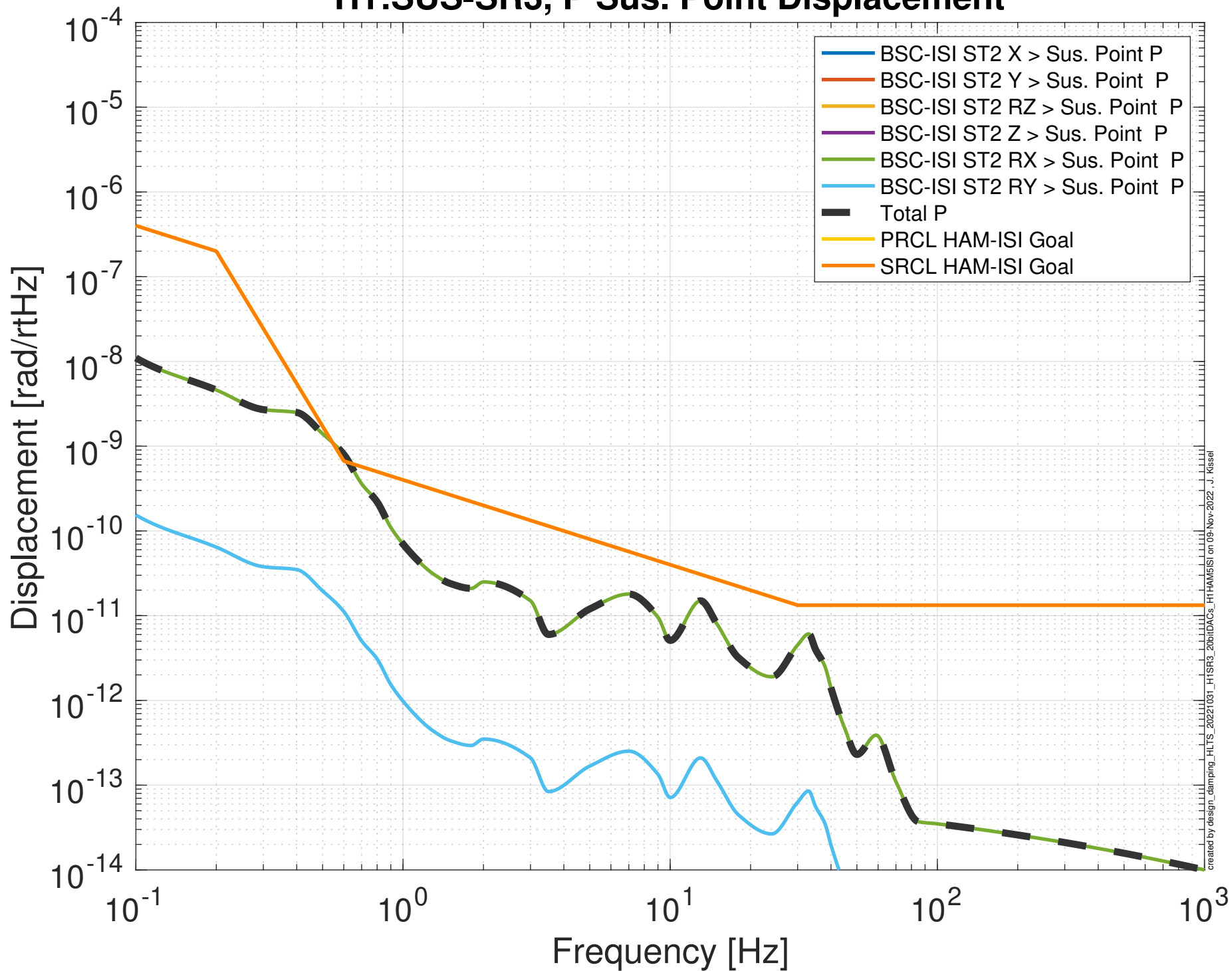


created by design_camping_HLTS_20221031_H1SR3_20bitDAQs_H1HAMISISI on 09-Nov-2022, J. Kissel

Projected ISI Seismic Noise Budget H1:SUS-SR3, R Sus. Point Displacement

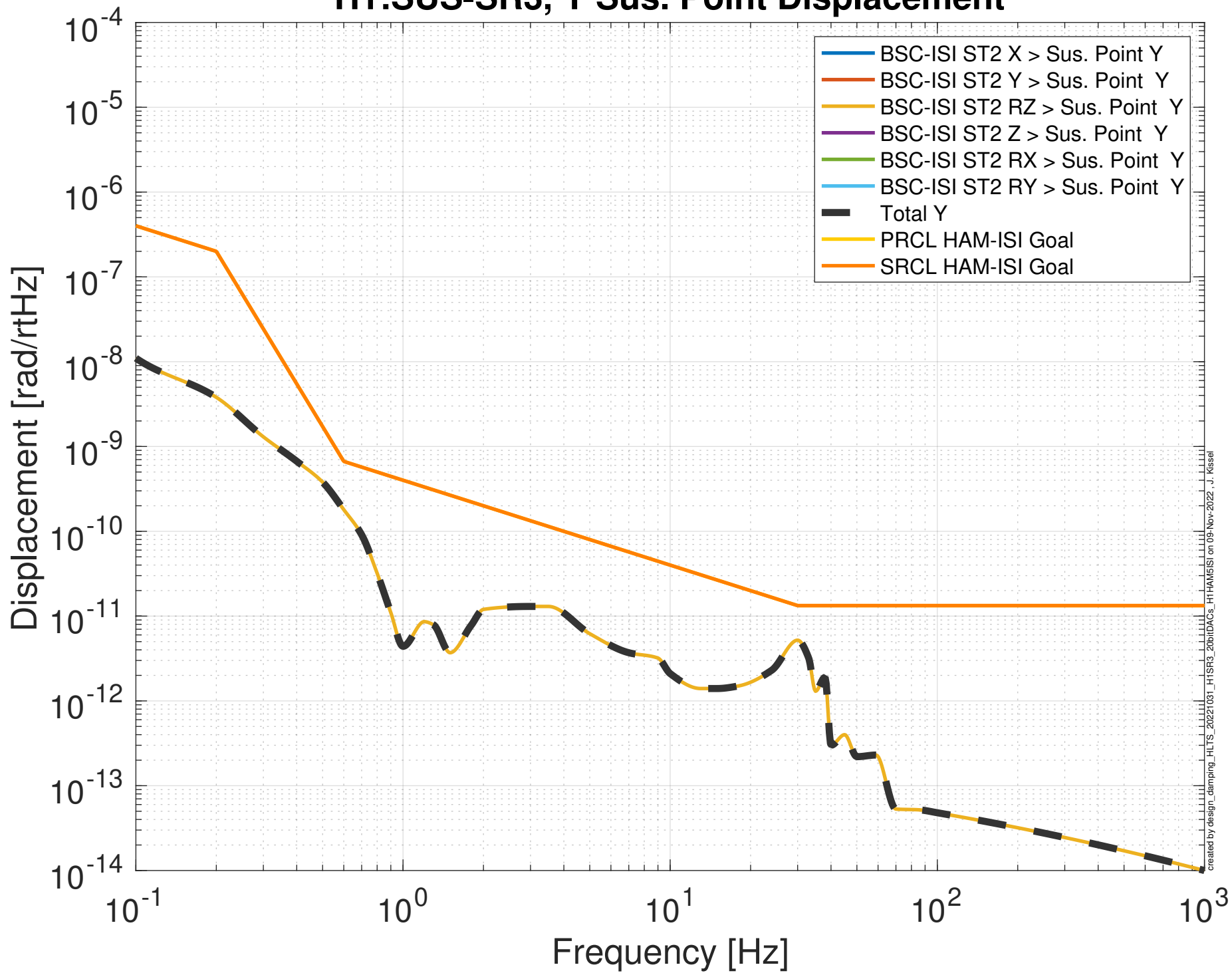


Projected ISI Seismic Noise Budget H1:SUS-SR3, P Sus. Point Displacement



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Projected ISI Seismic Noise Budget H1:SUS-SR3, Y Sus. Point Displacement



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Projected Input Top Mass Sensor Noise Budget

