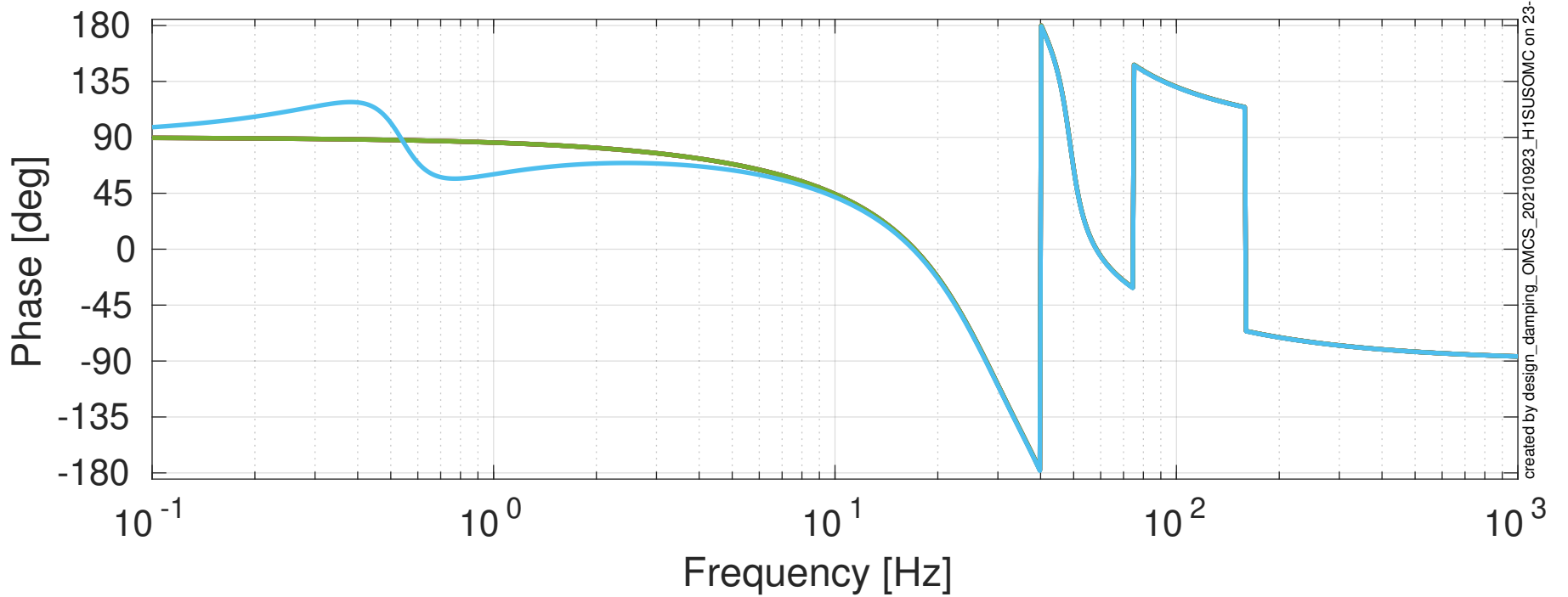
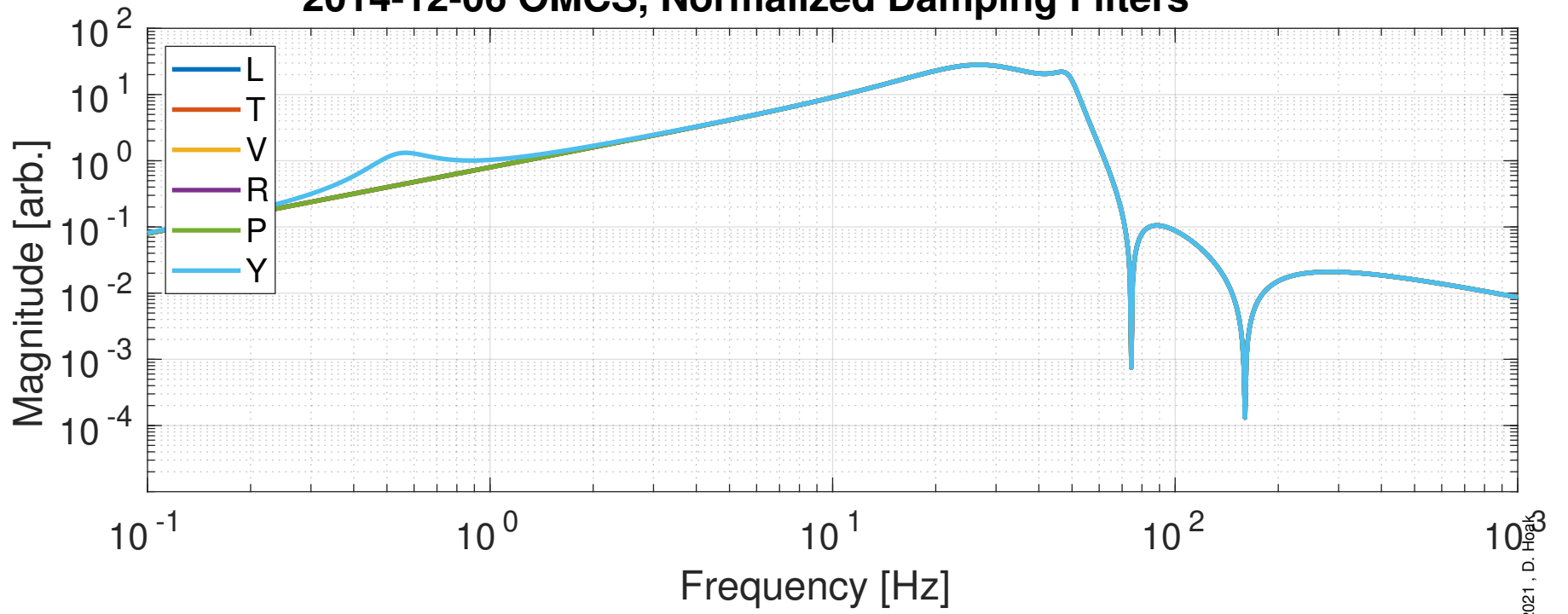
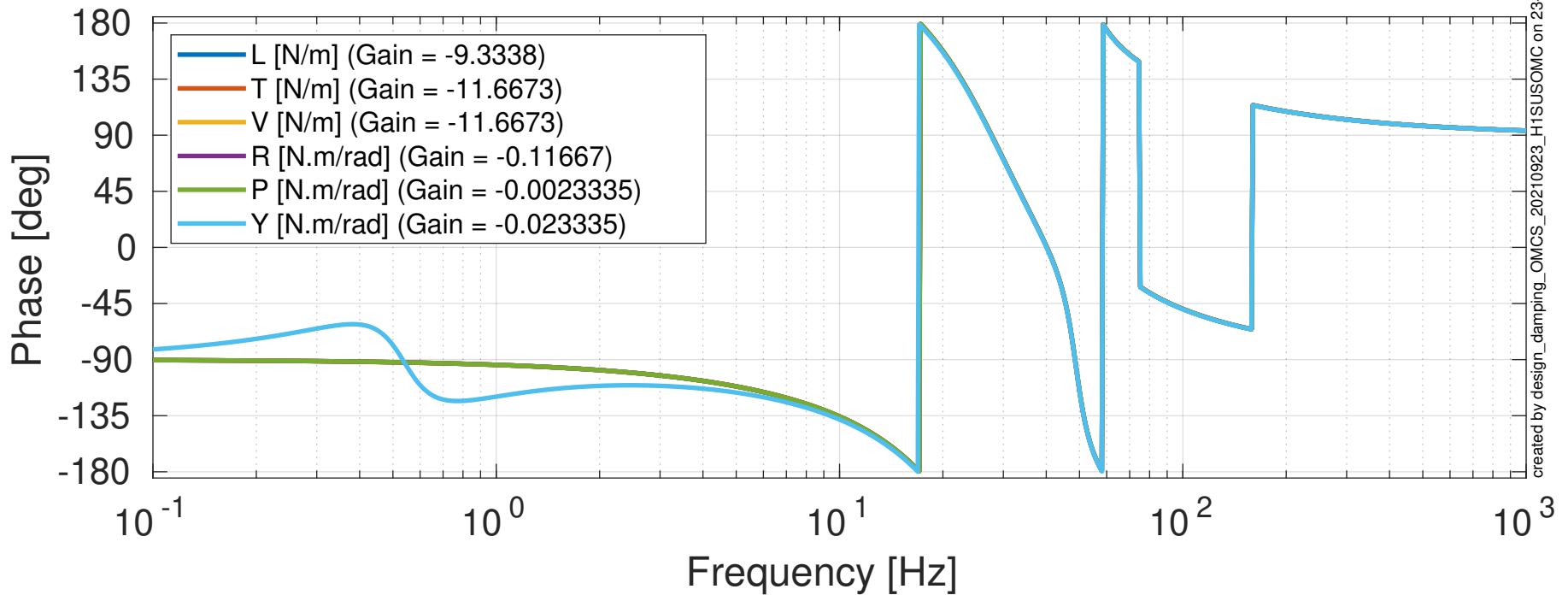
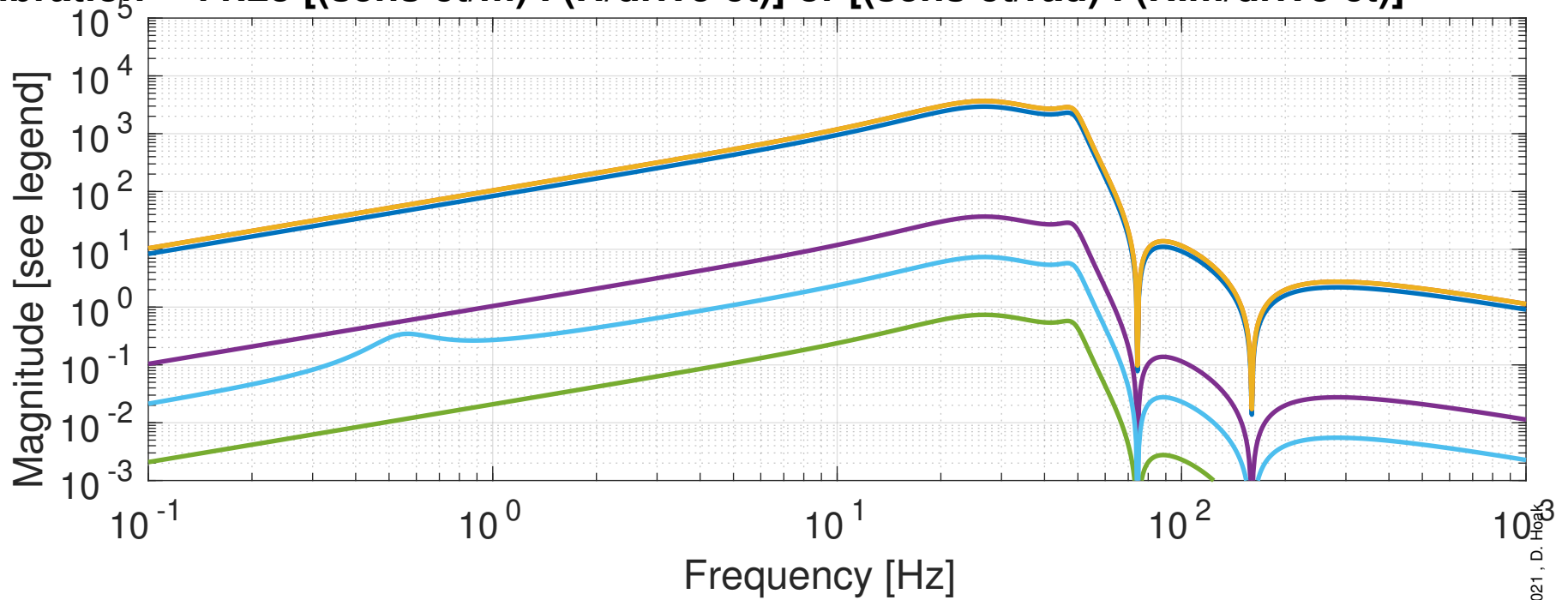


# 2014-12-06 OMCS, Normalized Damping Filters



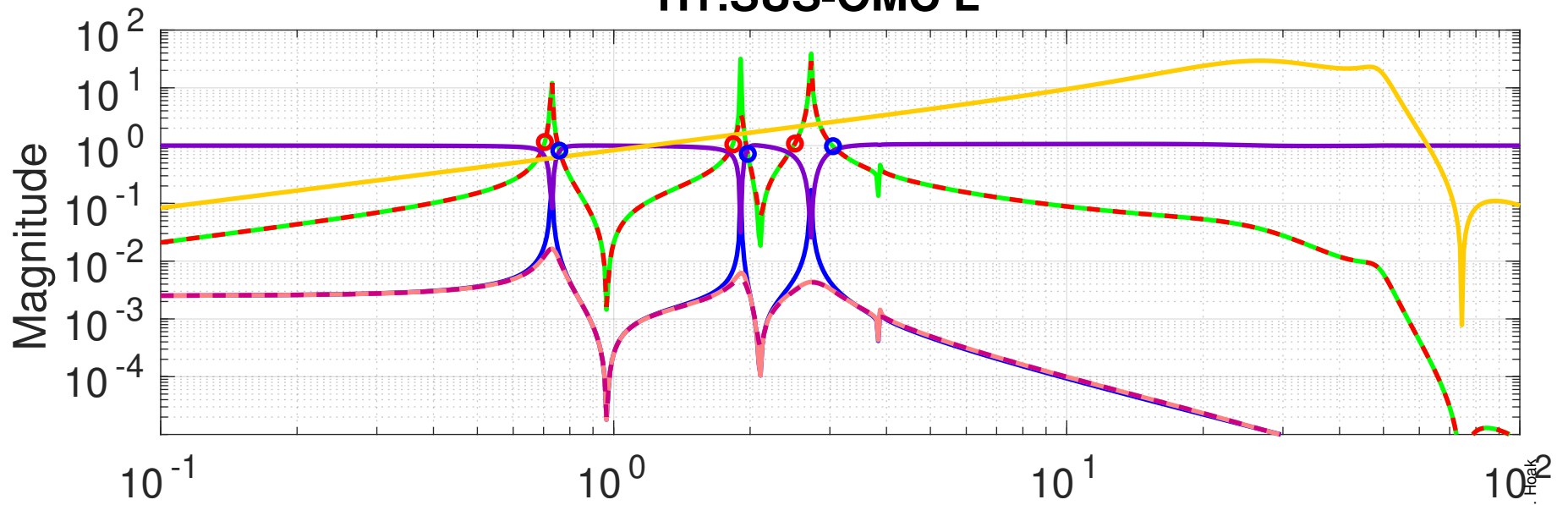
# 2014-12-06 OMCS, Calibrated Damping Filters

Calibration = 11.23 [(sens ct/m) . (N/drive ct)] or [(sens ct/rad) . (N.m/drive ct)]

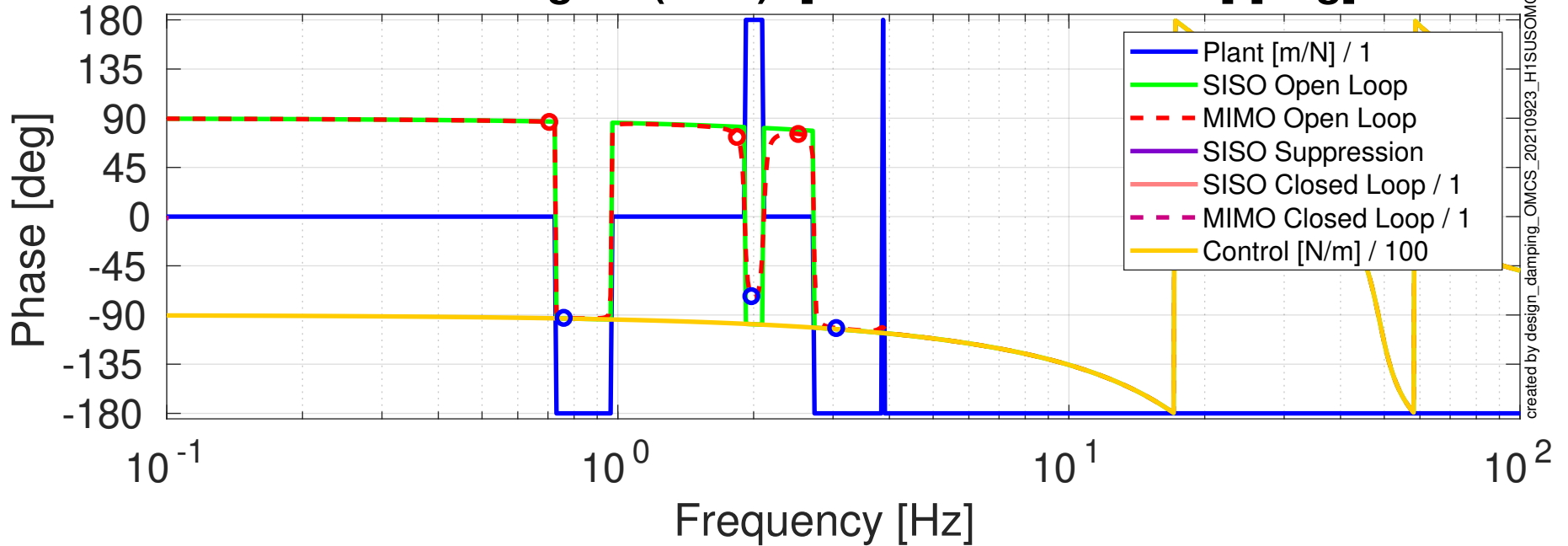


# Damping Loop Design

## H1:SUS-OMC L

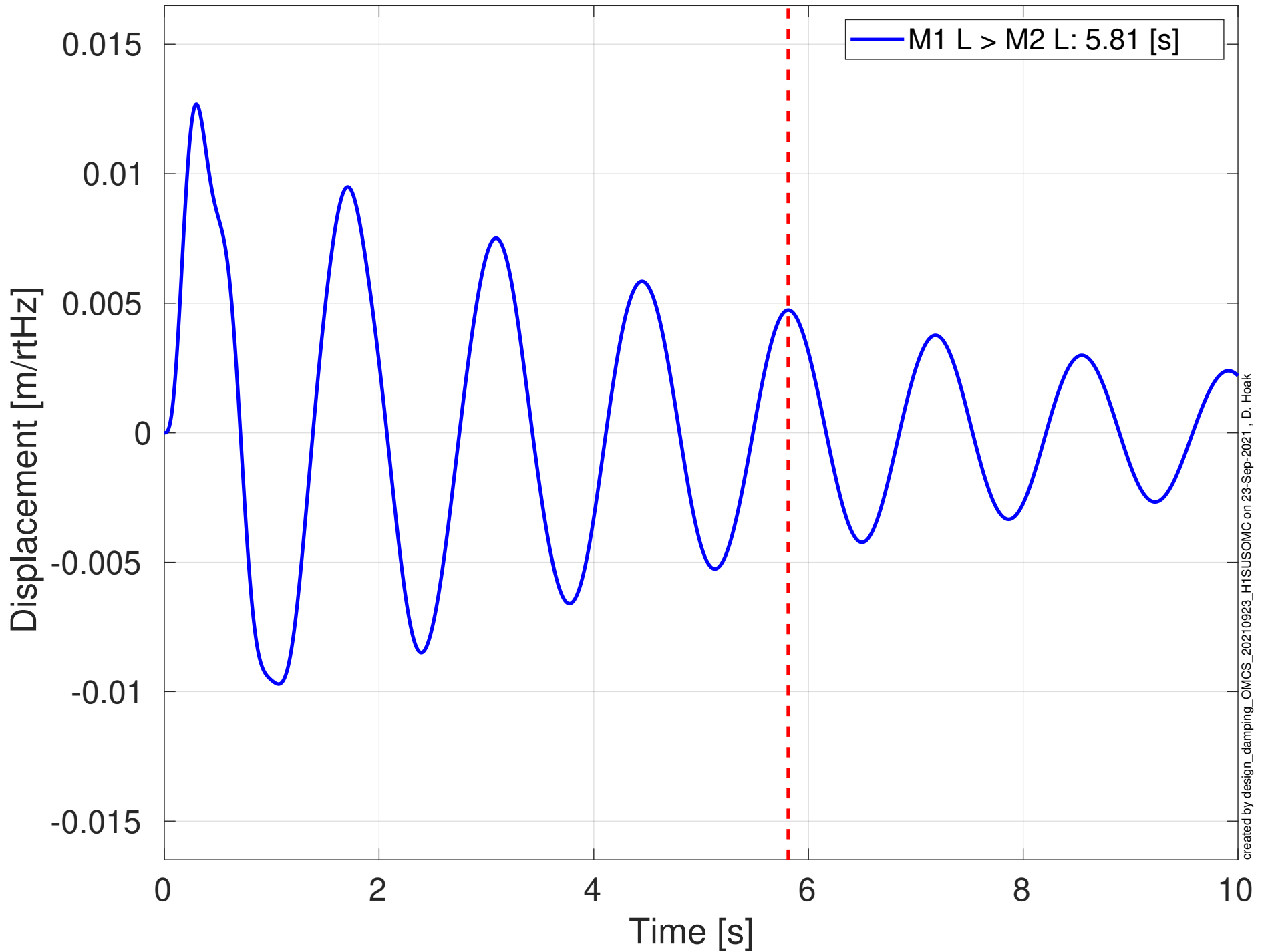


**MIMO LUGF Phase Margins (red): [93.4    107    104] [deg]**  
**MIMO UUGF Phase Margins (blue): [87.4    107    78.1] [deg]**

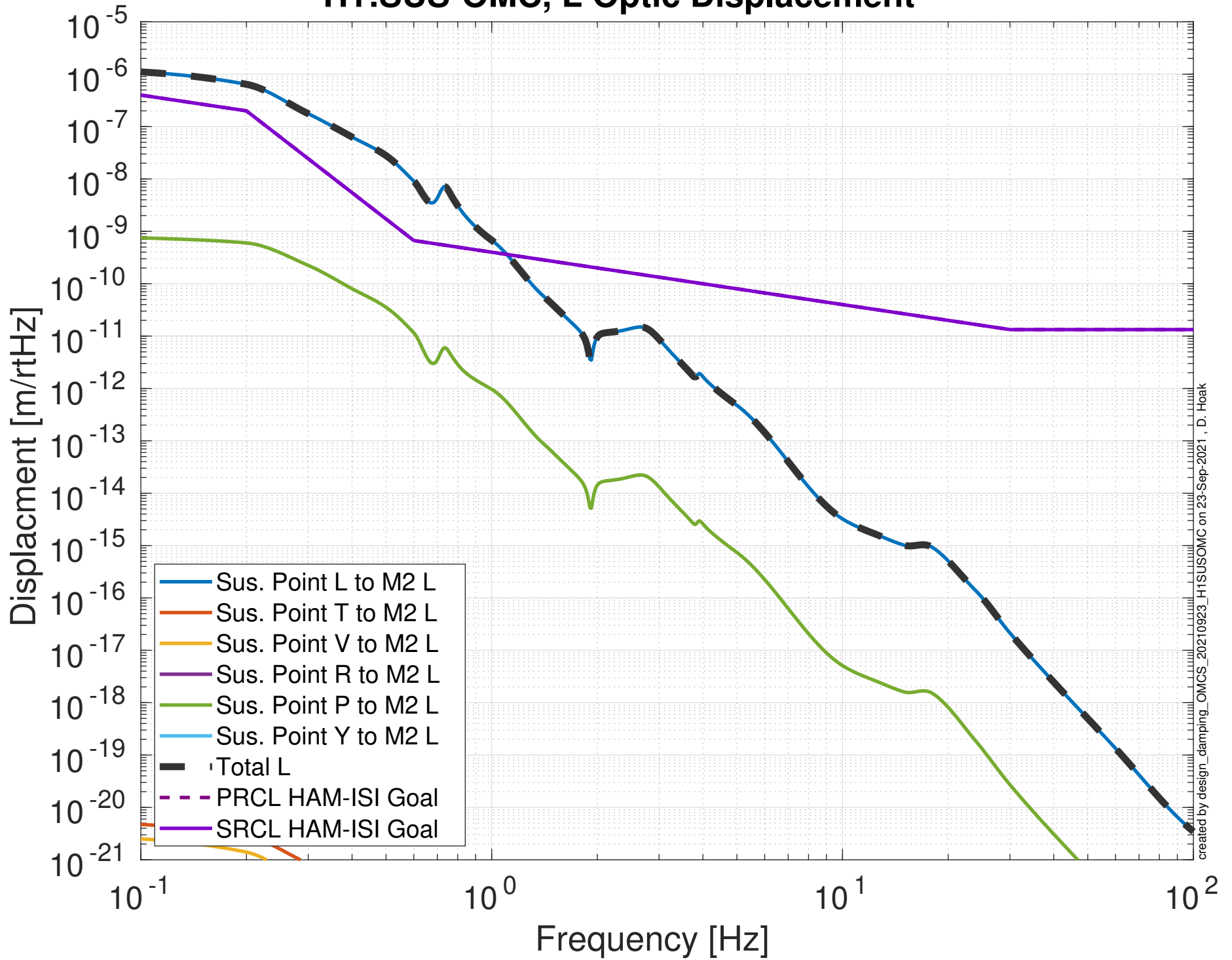


# Damped Impulse Response

## H1:SUS-OMC L

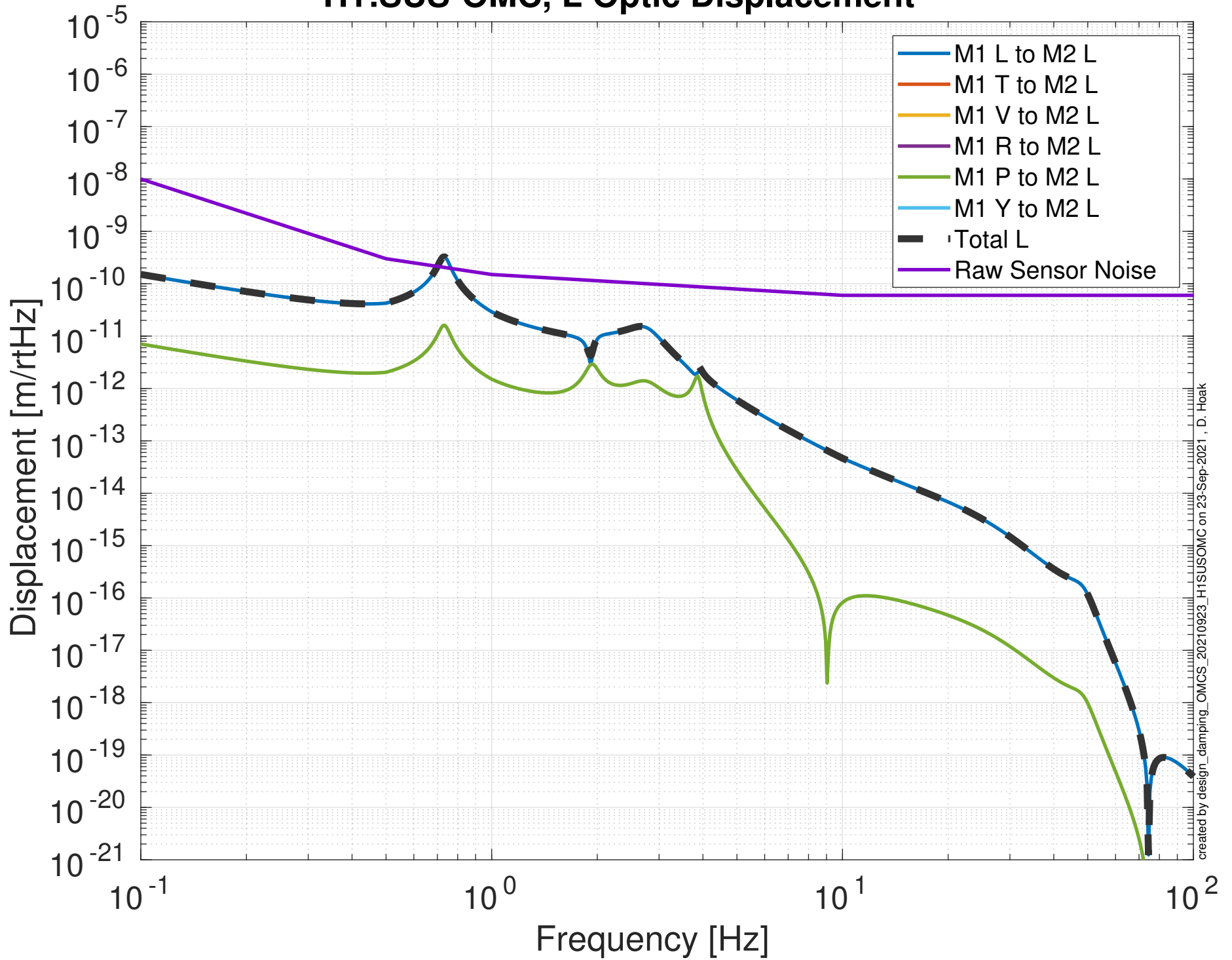


# Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-OMC, L Optic Displacement



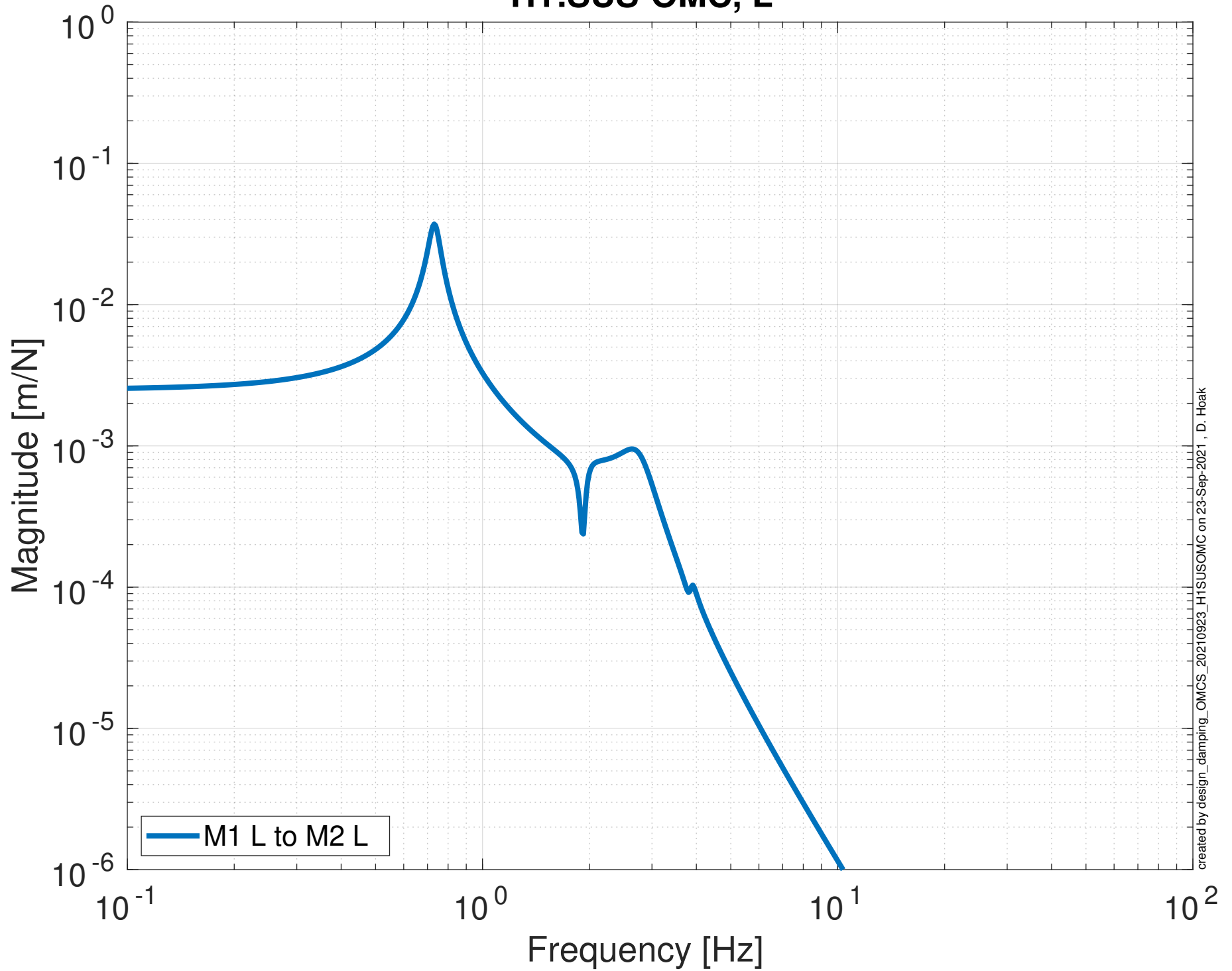
created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

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



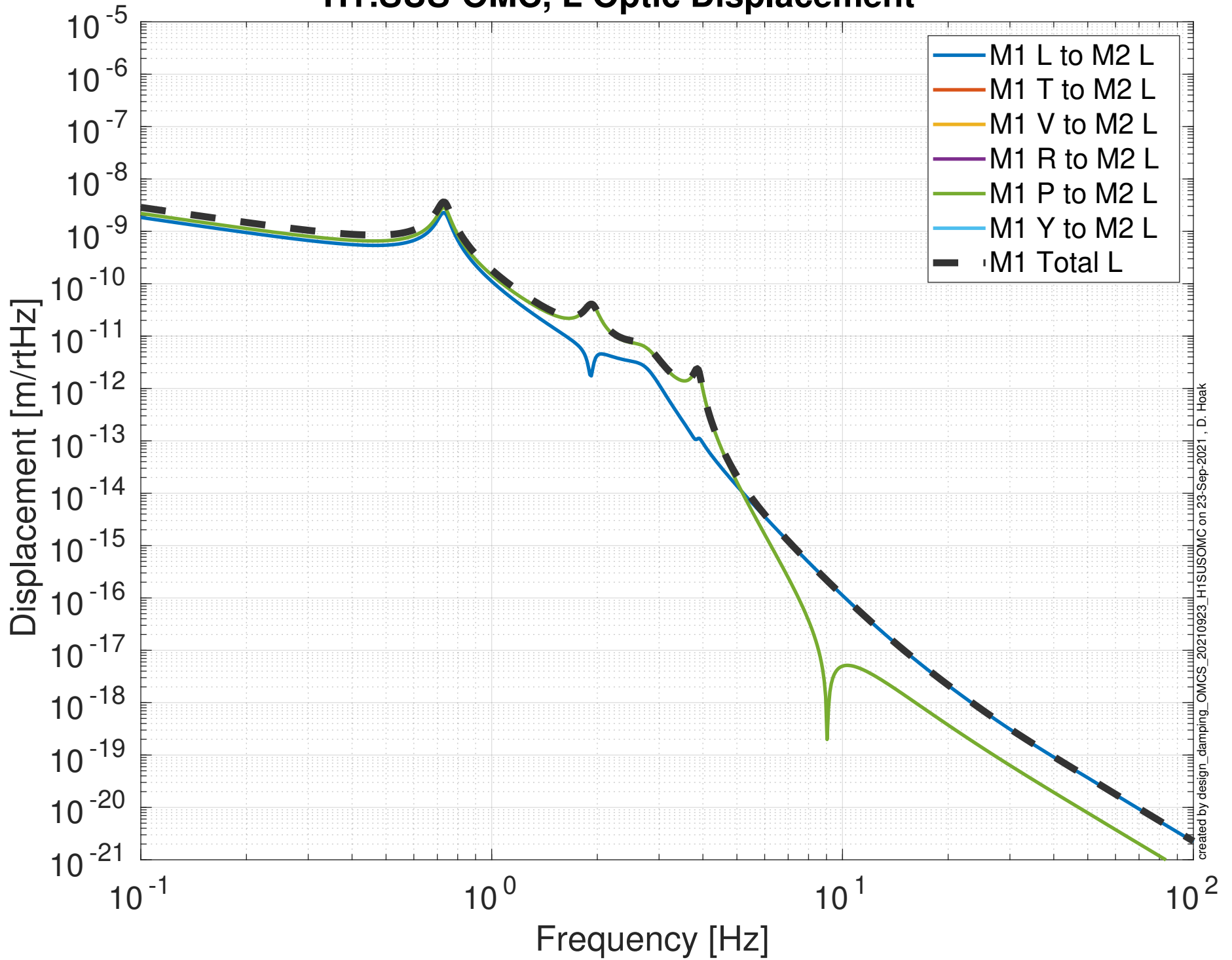
created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

# Global Control Transfer Functions to Optic H1:SUS-OMC, L



created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

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

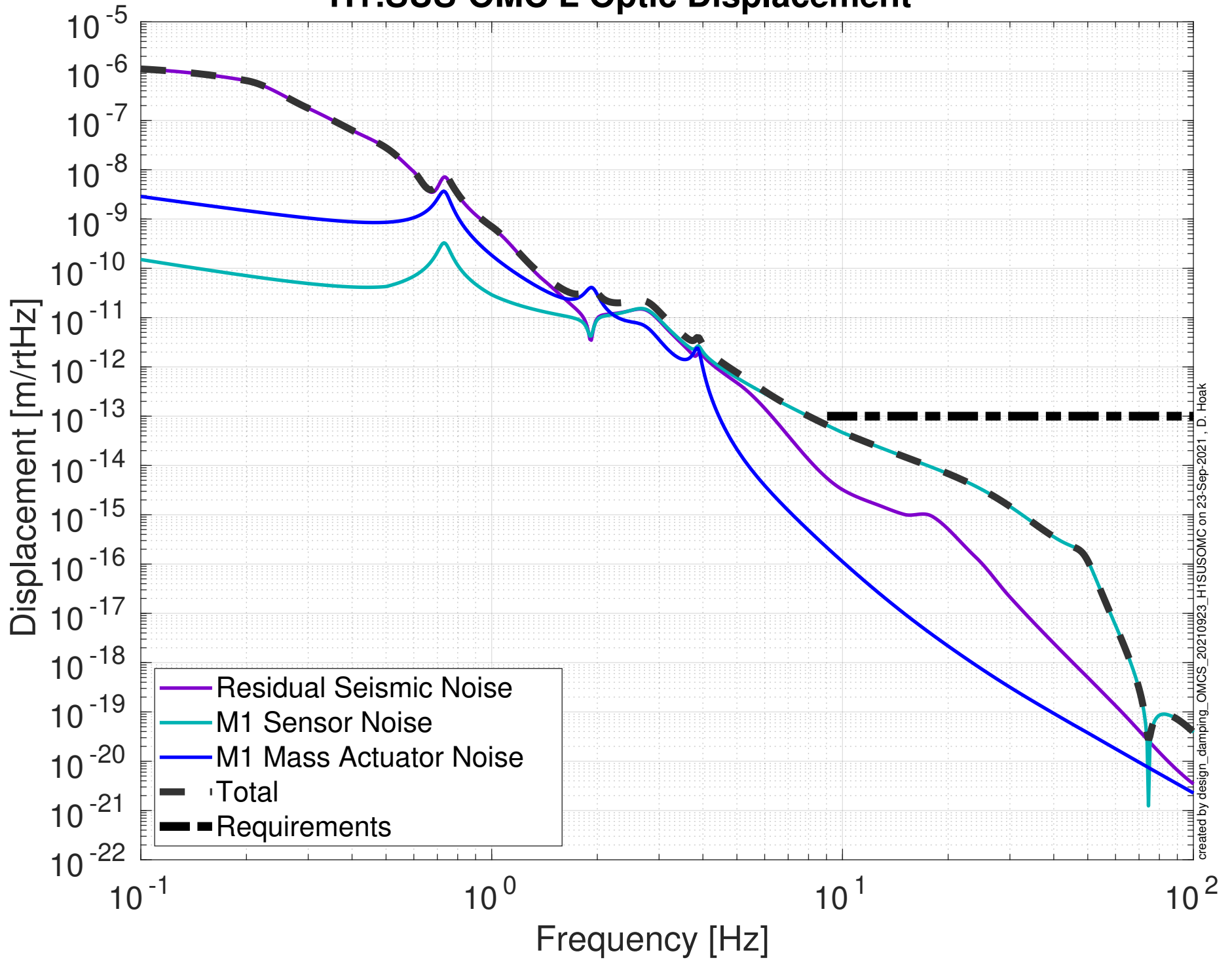


created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak



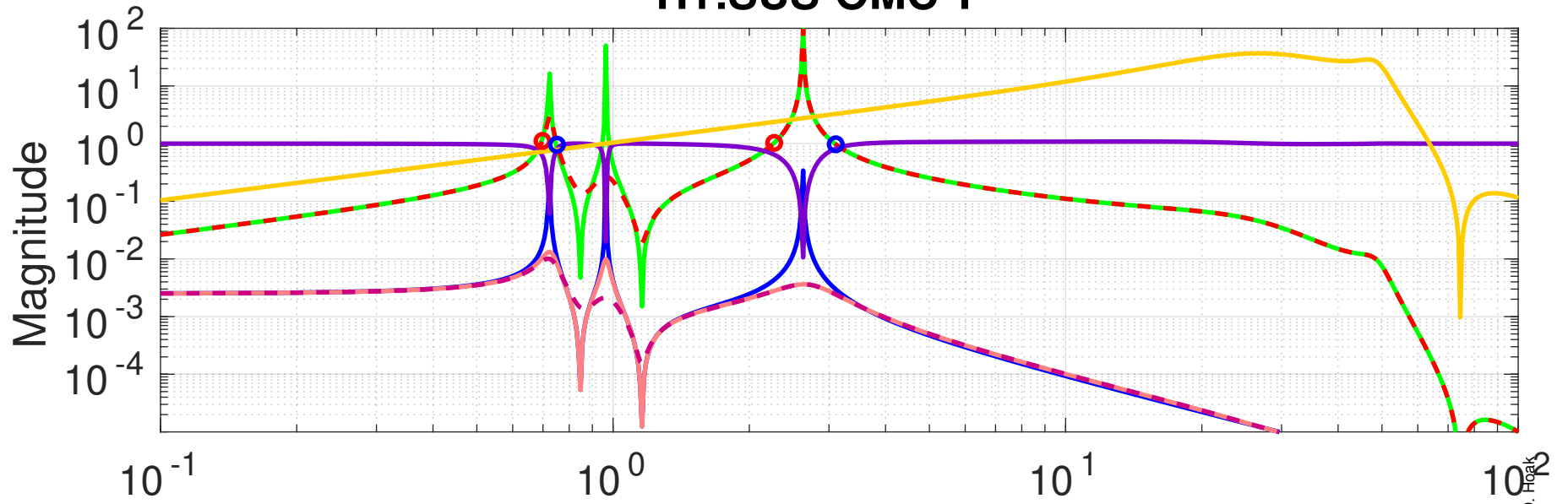
# Damping Loop Performance

## H1:SUS-OMC L Optic Displacement

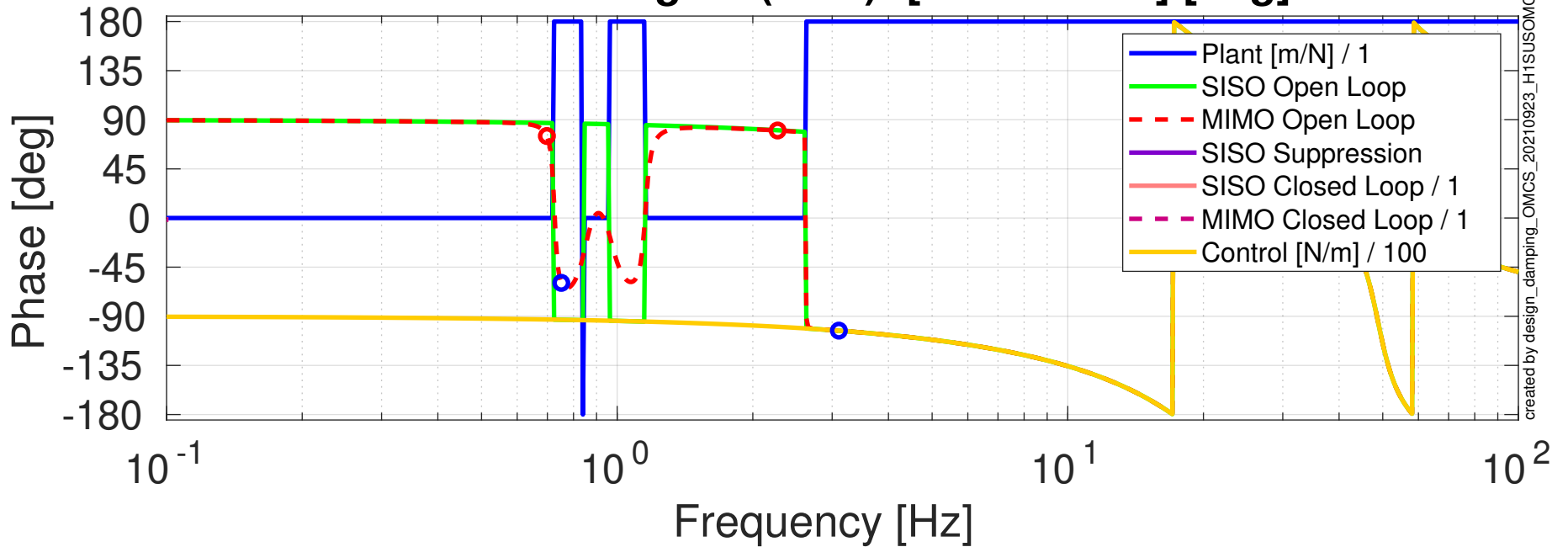


created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

# Damping Loop Design H1:SUS-OMC T

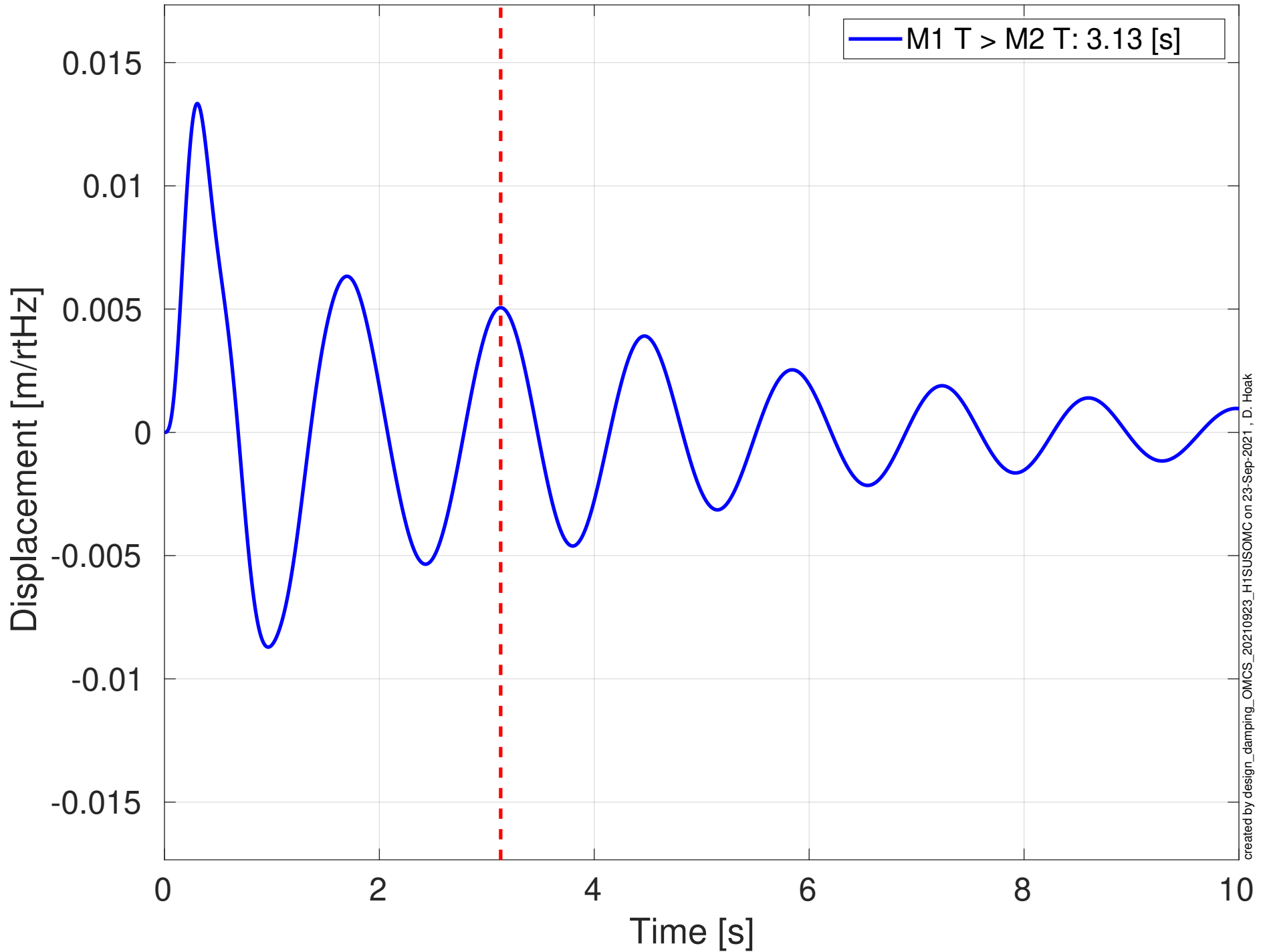


**MIMO LUGF Phase Margins (red): [105 99.8] [deg]**  
**MIMO UUGF Phase Margins (blue): [121 76.8] [deg]**

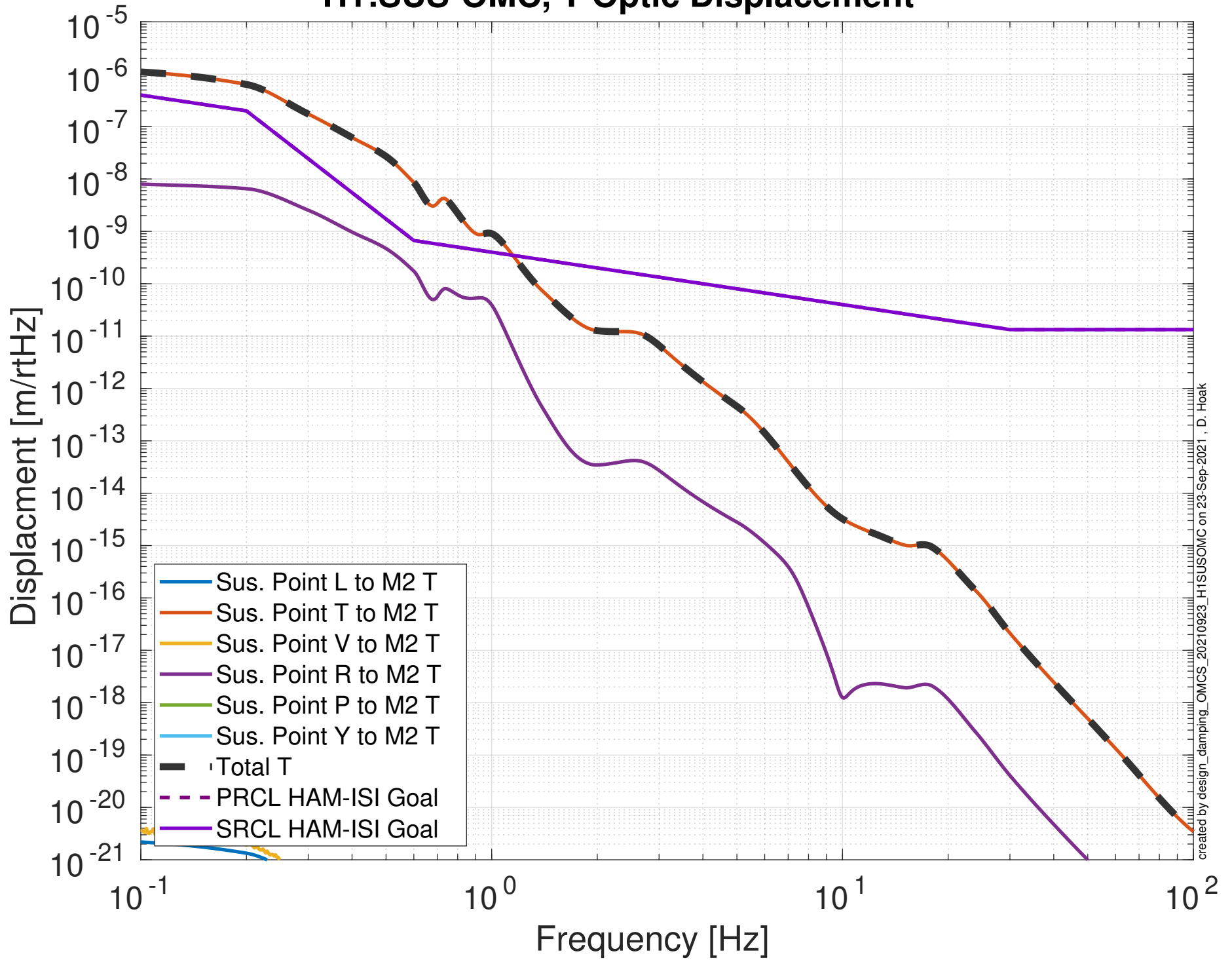


# Damped Impulse Response

## H1:SUS-OMC T

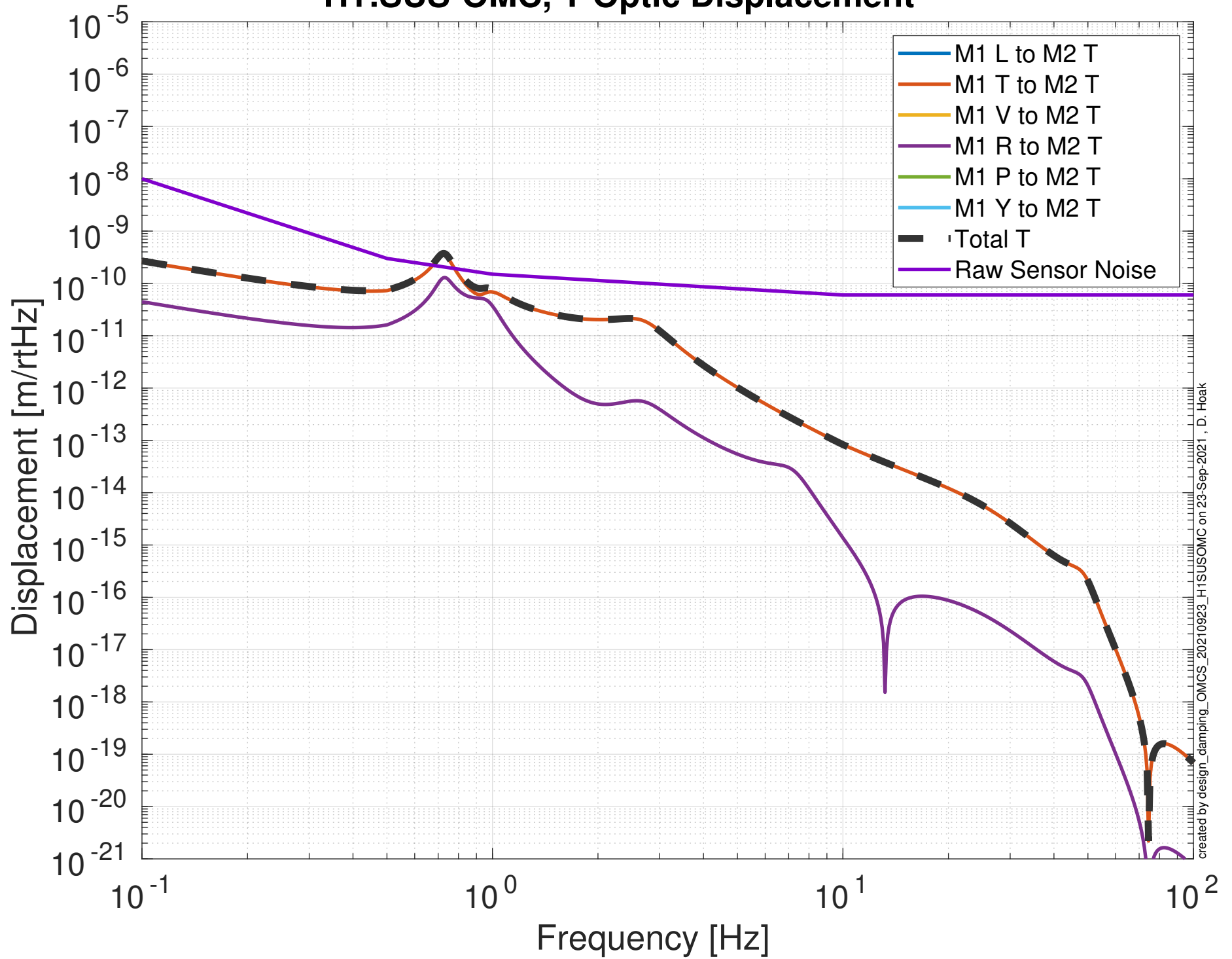


# Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-OMC, T Optic Displacement



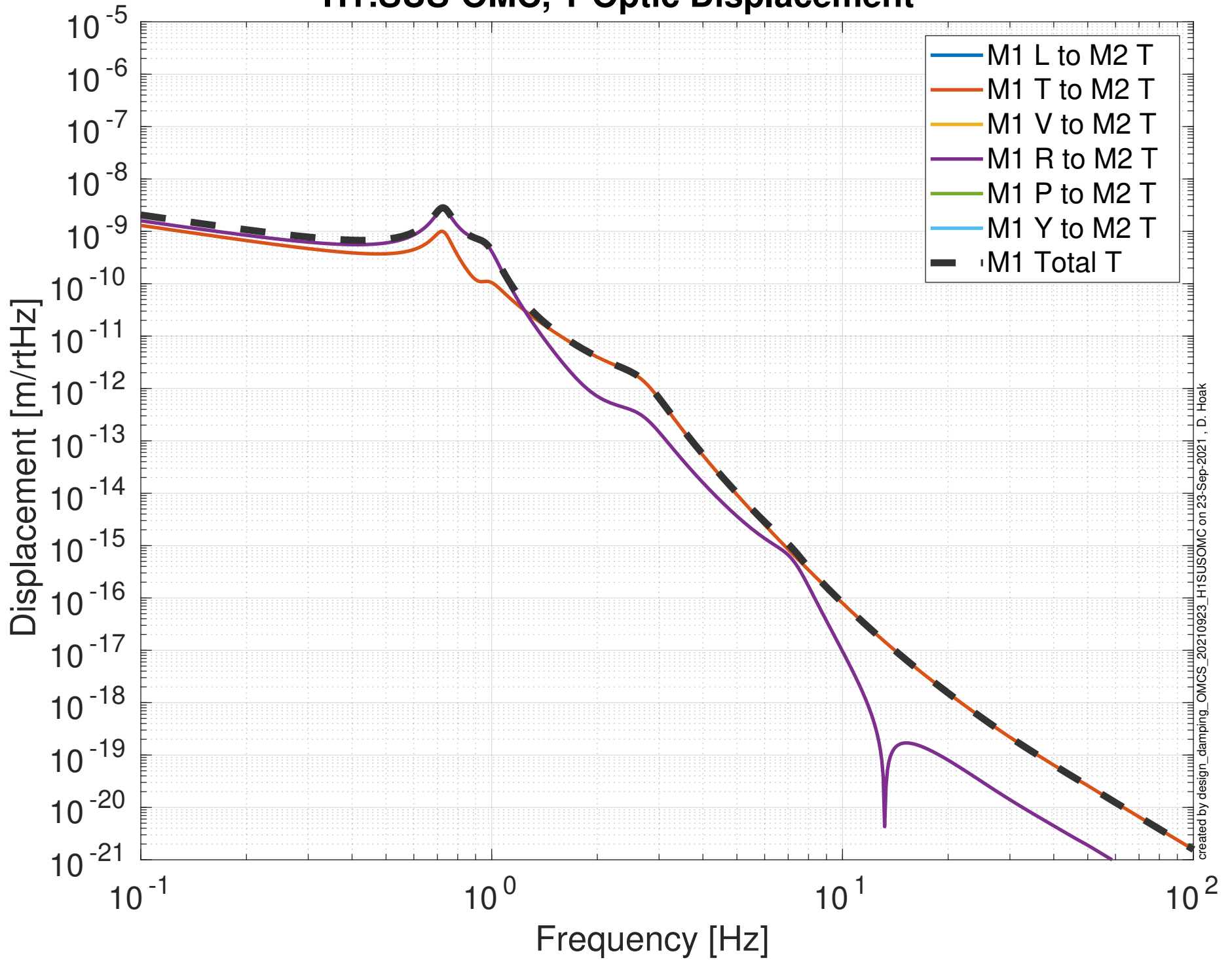
created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

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



created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

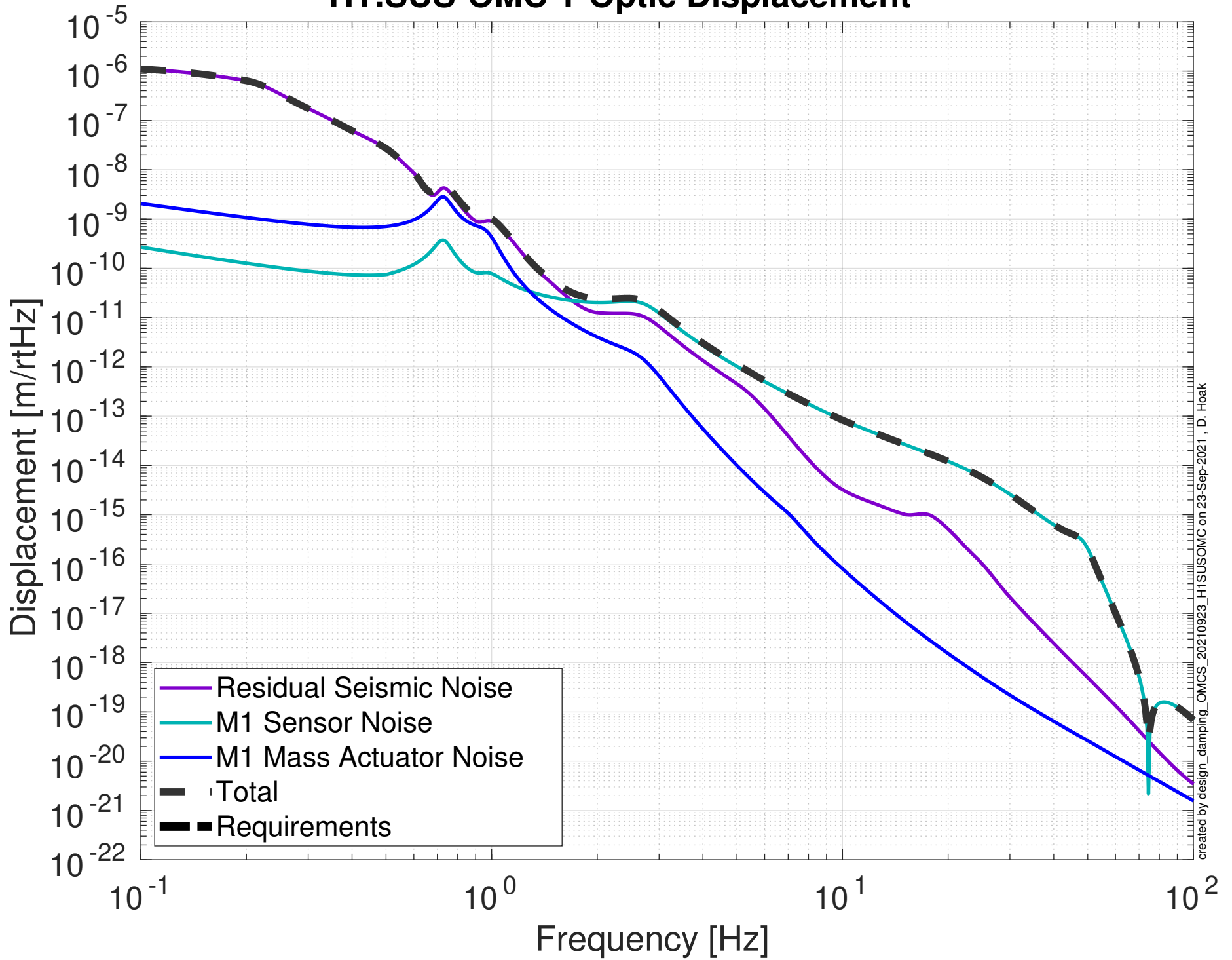
# Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-OMC, T Optic Displacement



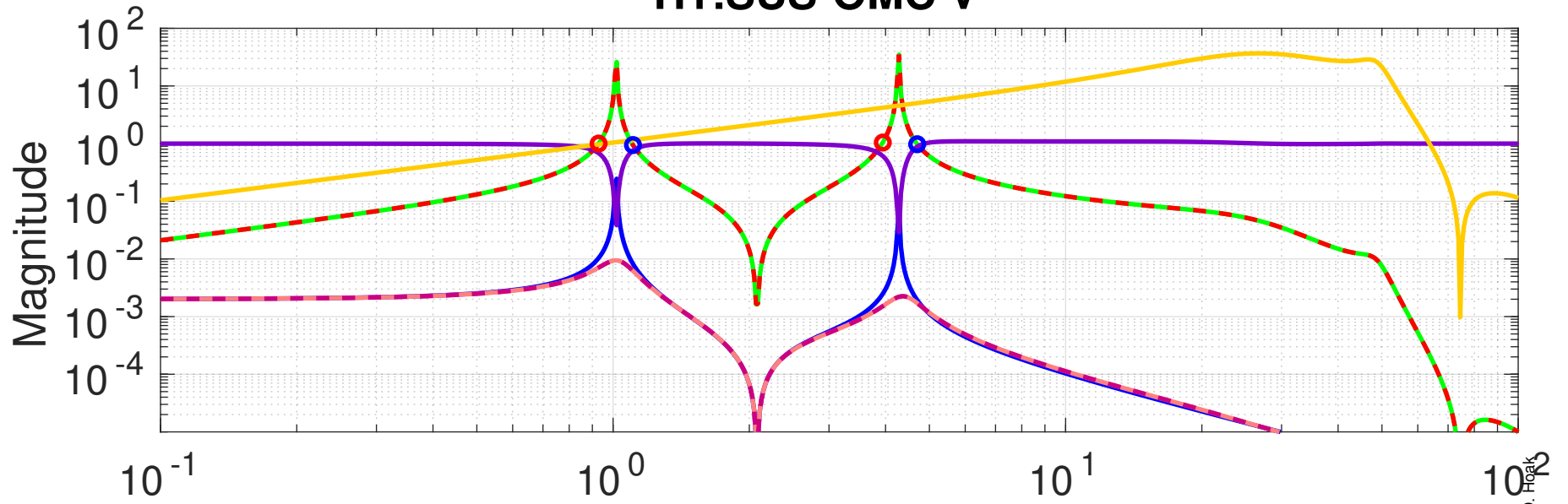
created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

# Damping Loop Performance

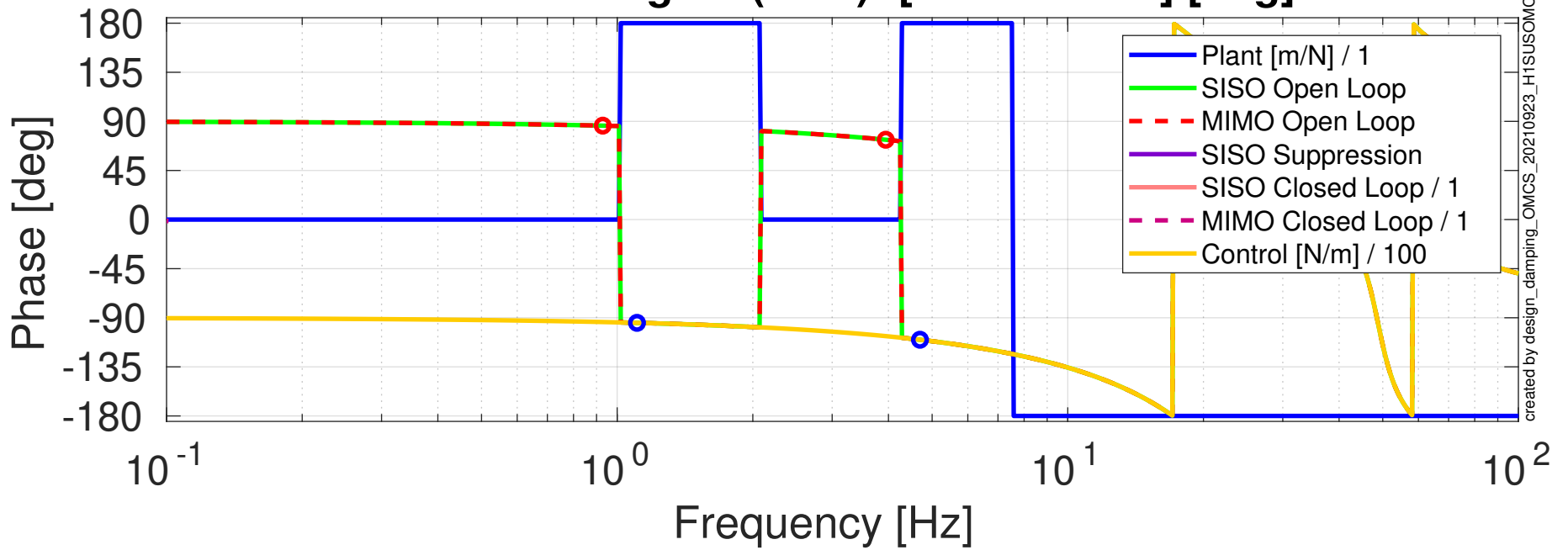
## H1:SUS-OMC T Optic Displacement



# Damping Loop Design H1:SUS-OMC V

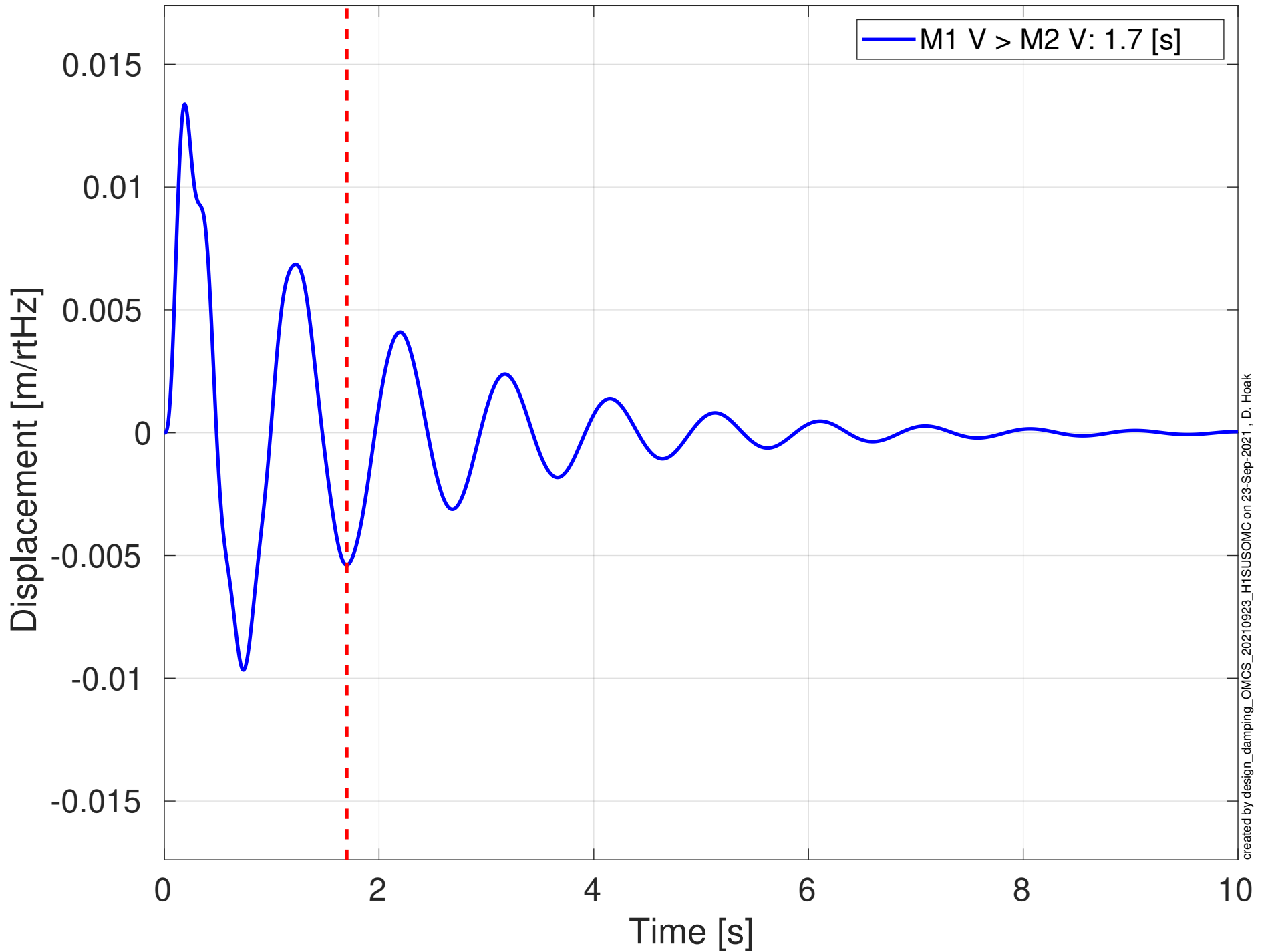


**MIMO LUGF Phase Margins (red): [93.9 107] [deg]**  
**MIMO UUGF Phase Margins (blue): [85.3 69.8] [deg]**

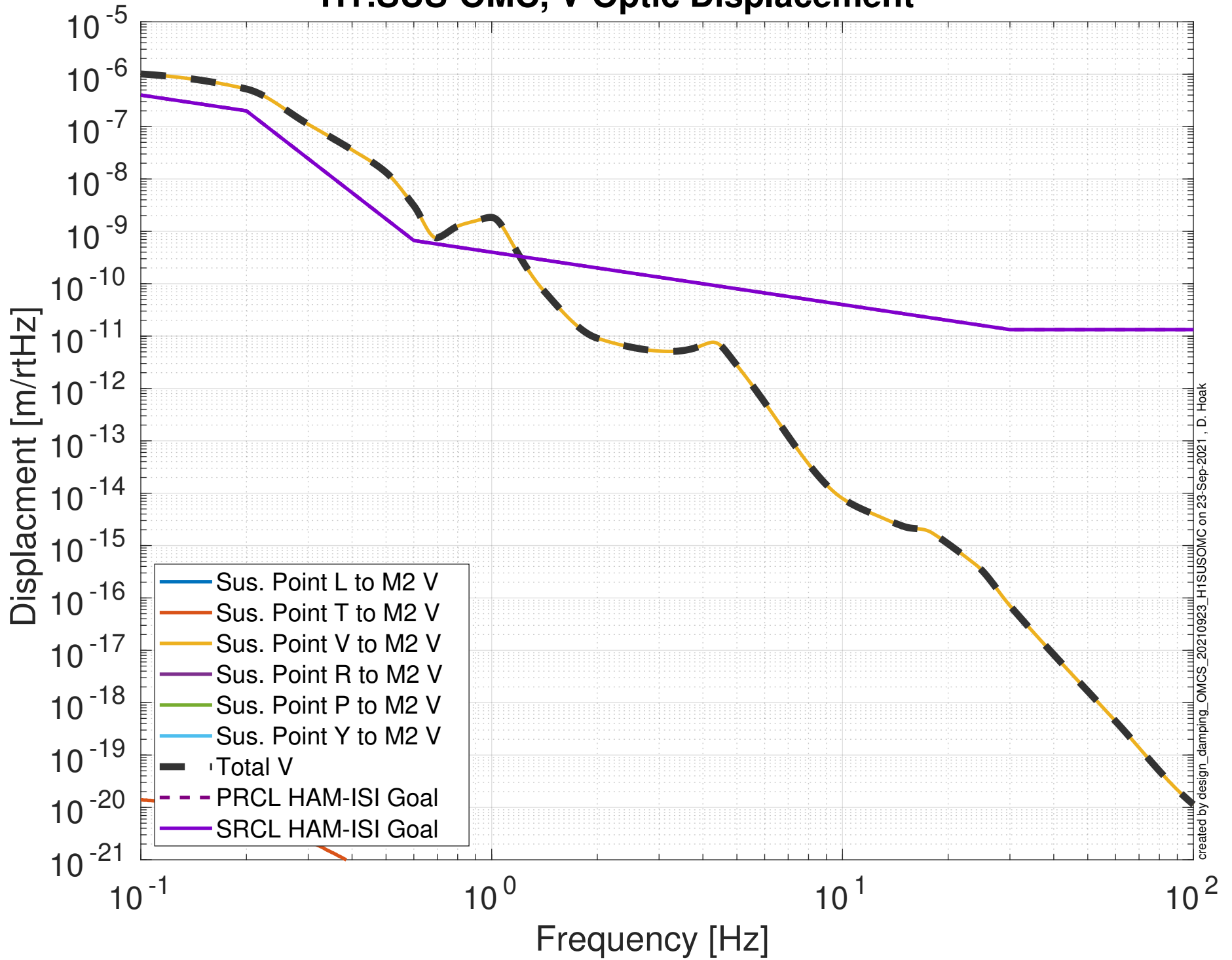




# Damped Impulse Response H1:SUS-OMC V

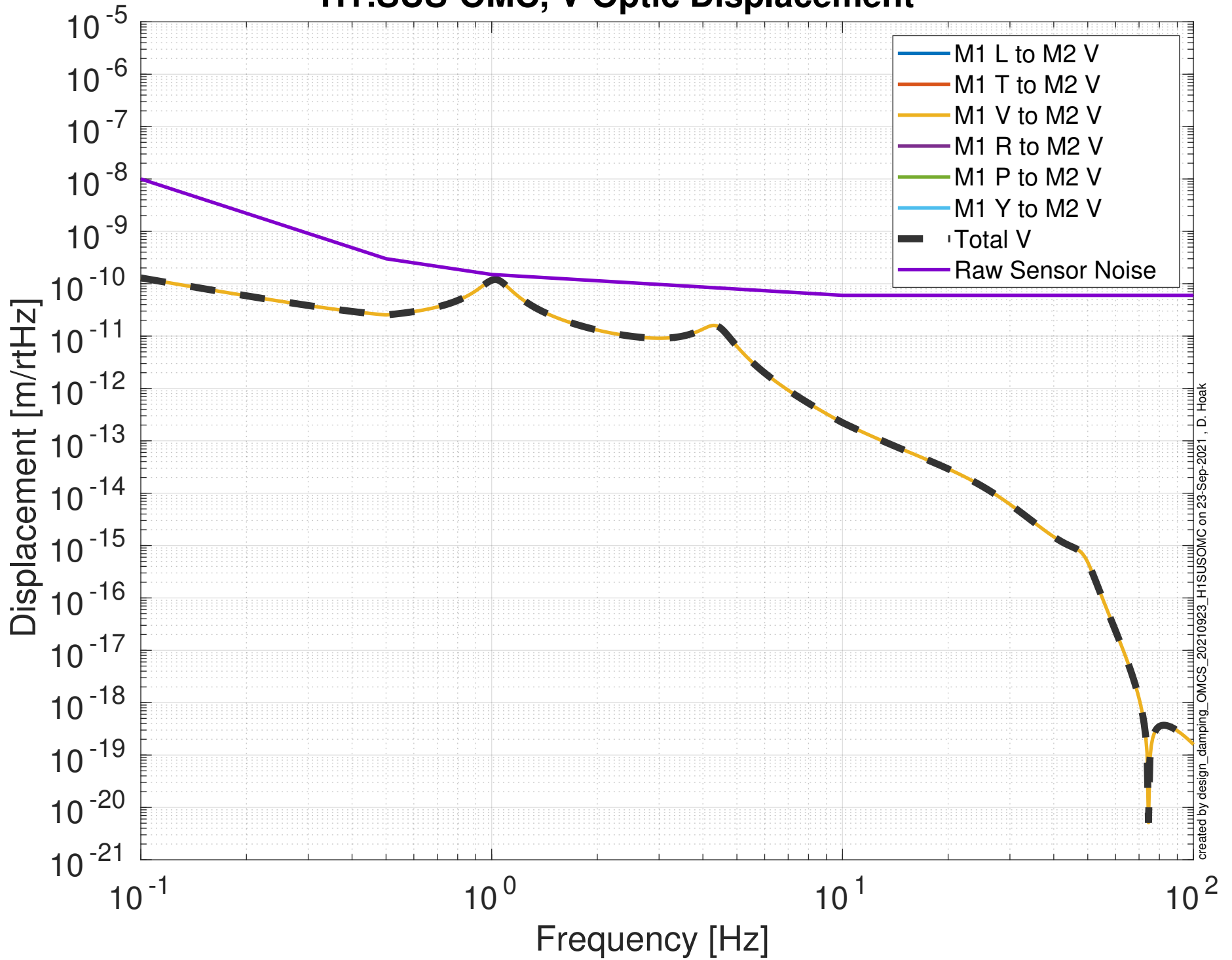


# Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-OMC, V Optic Displacement



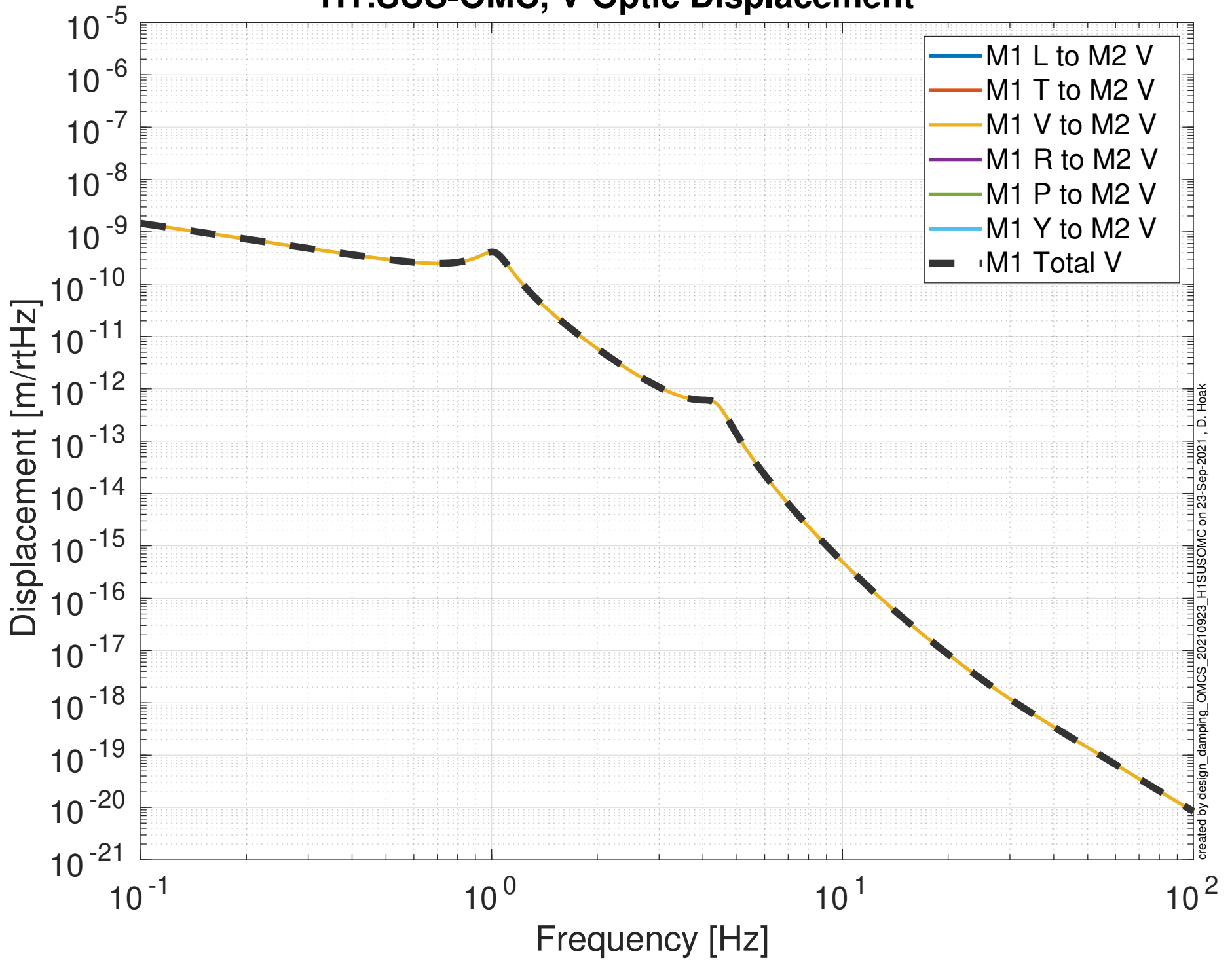
created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

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



created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

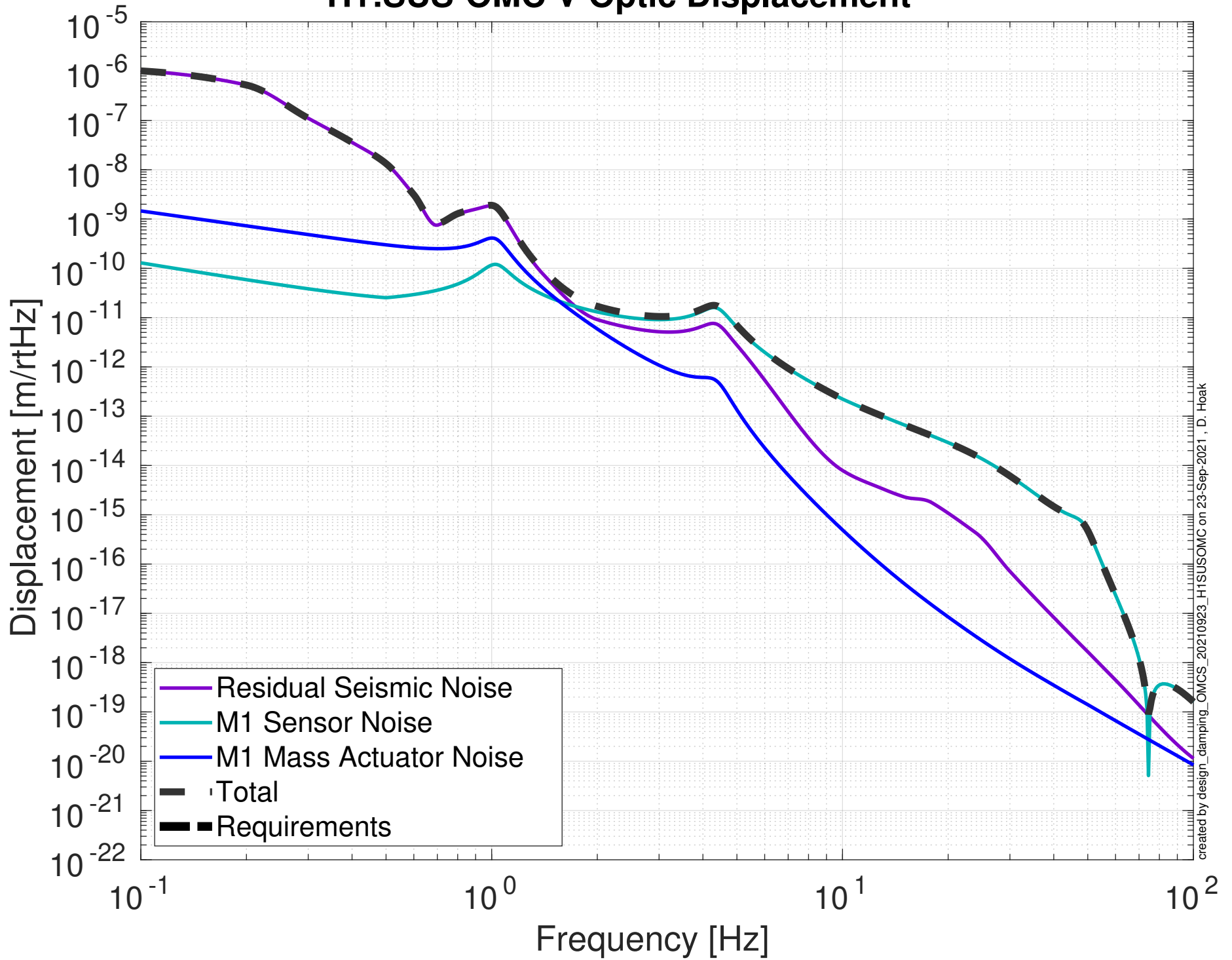
# Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-OMC, V Optic Displacement



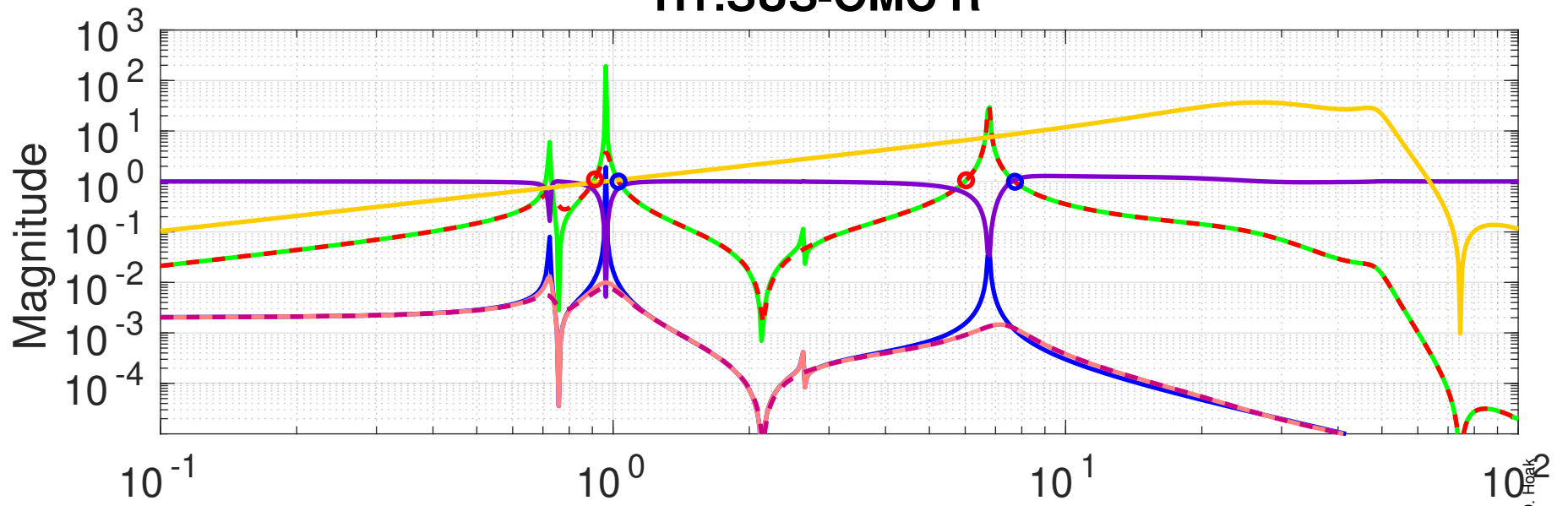
created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

# Damping Loop Performance

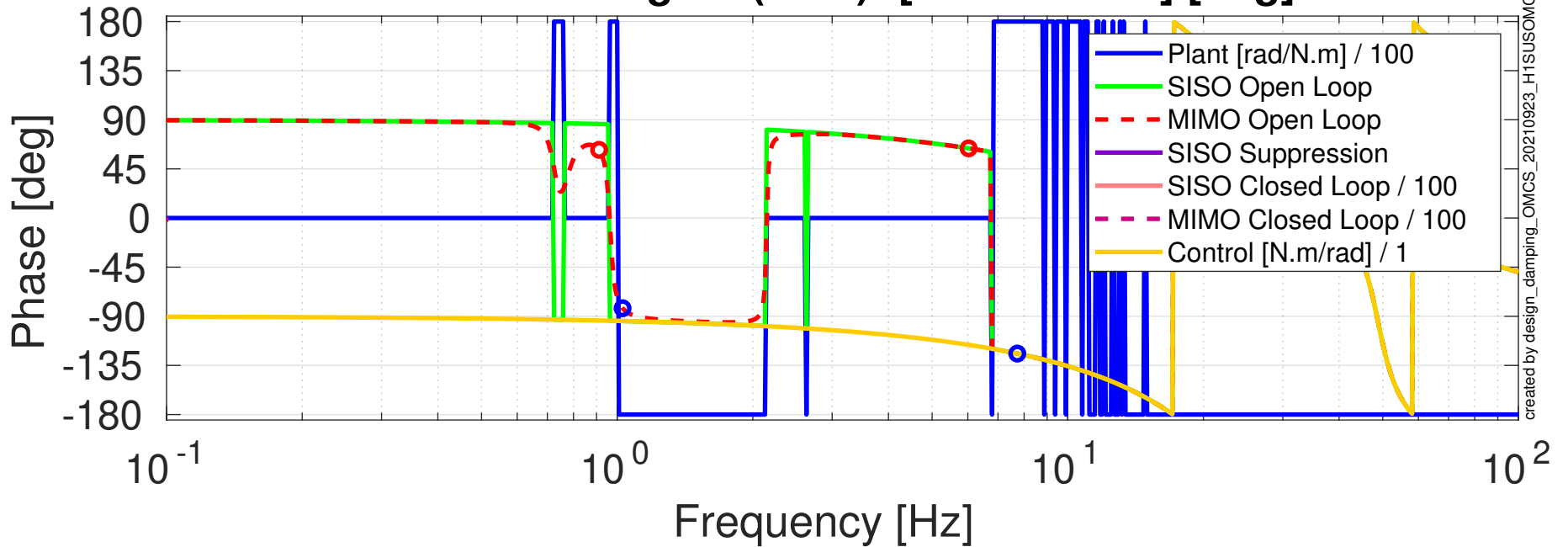
## H1:SUS-OMC V Optic Displacement



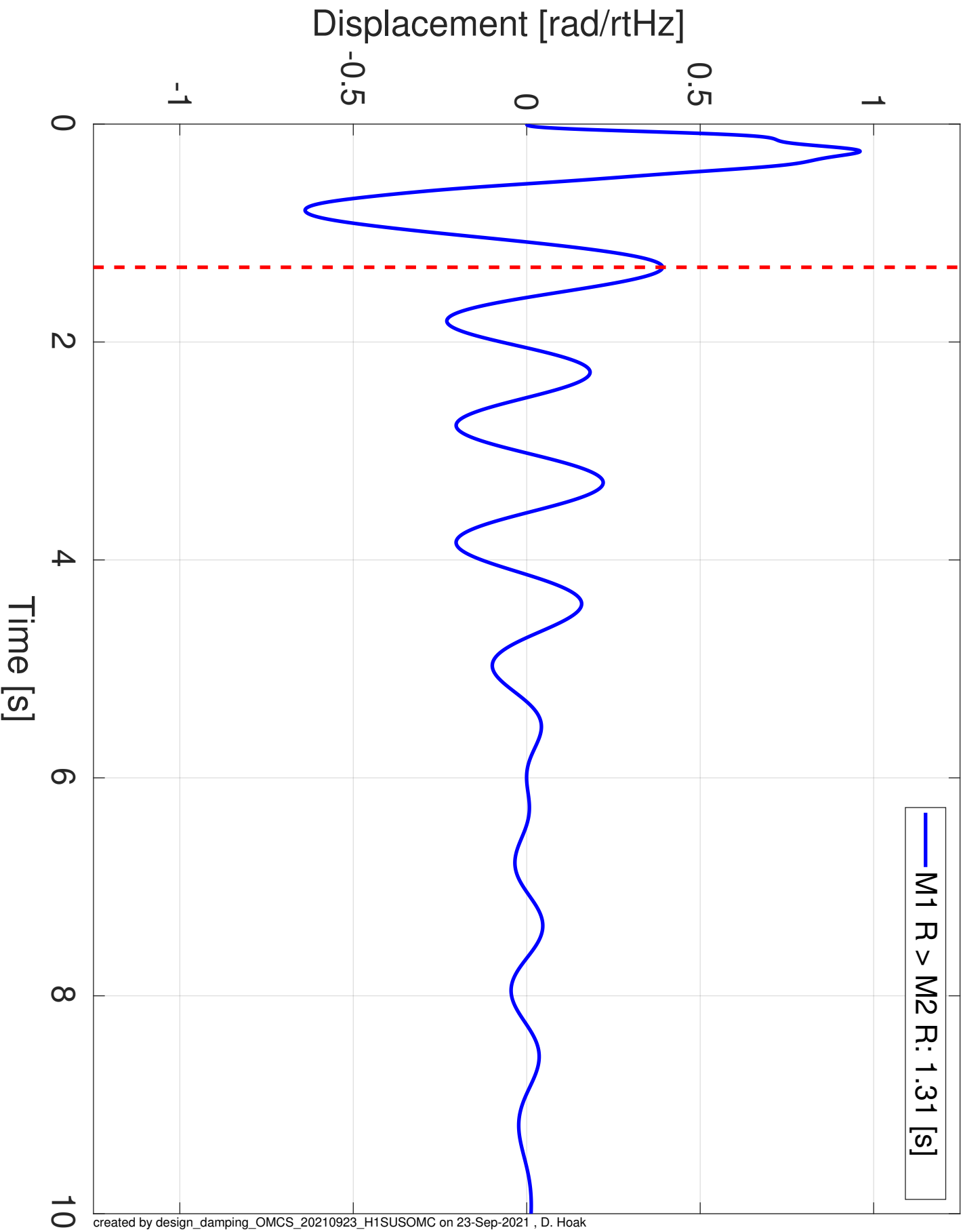
# Damping Loop Design H1:SUS-OMC R



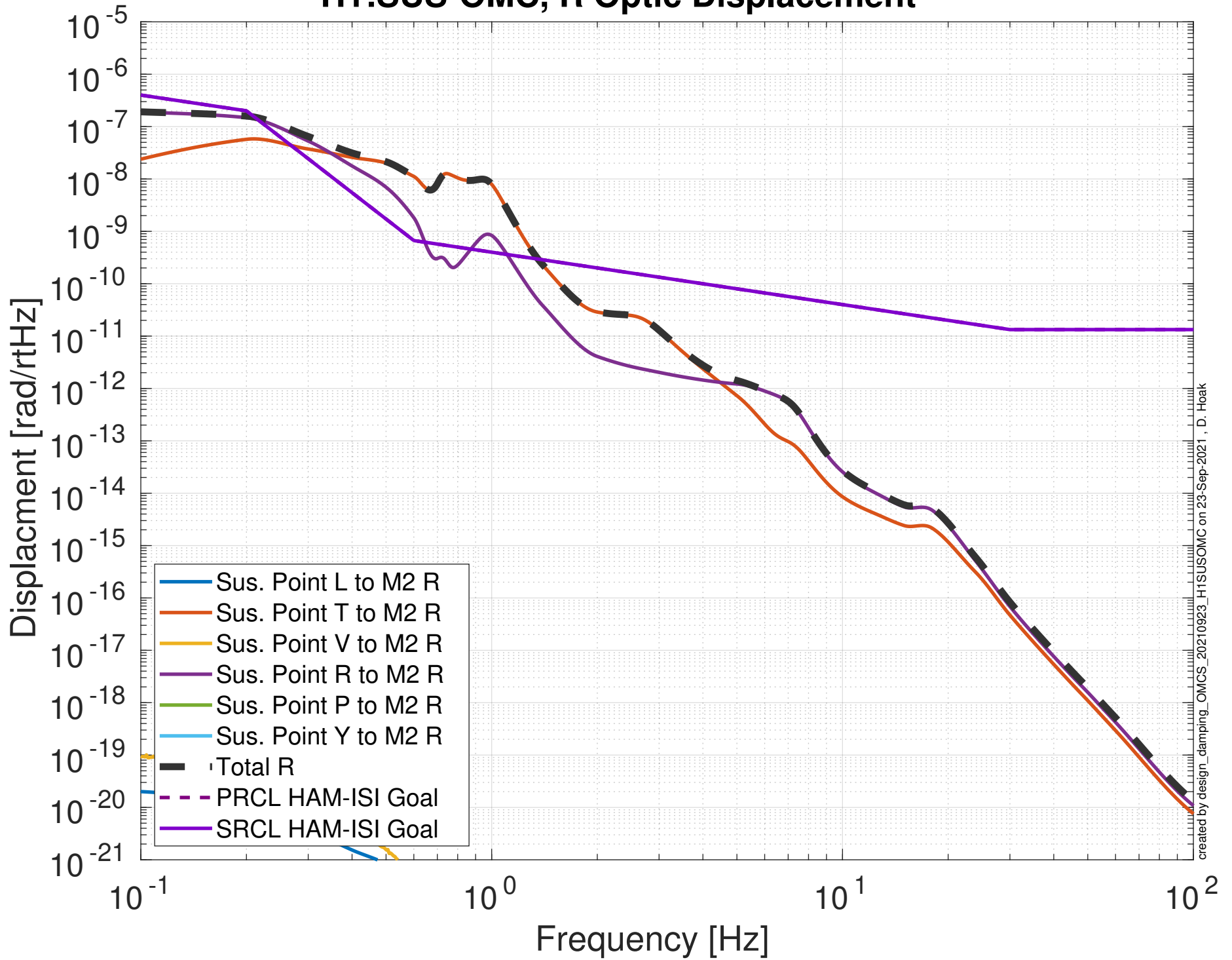
**MIMO LUGF Phase Margins (red): [118 116] [deg]**  
**MIMO UUGF Phase Margins (blue): [97.4 55.8] [deg]**



# Damped Impulse Response H1:SUS-OMC R



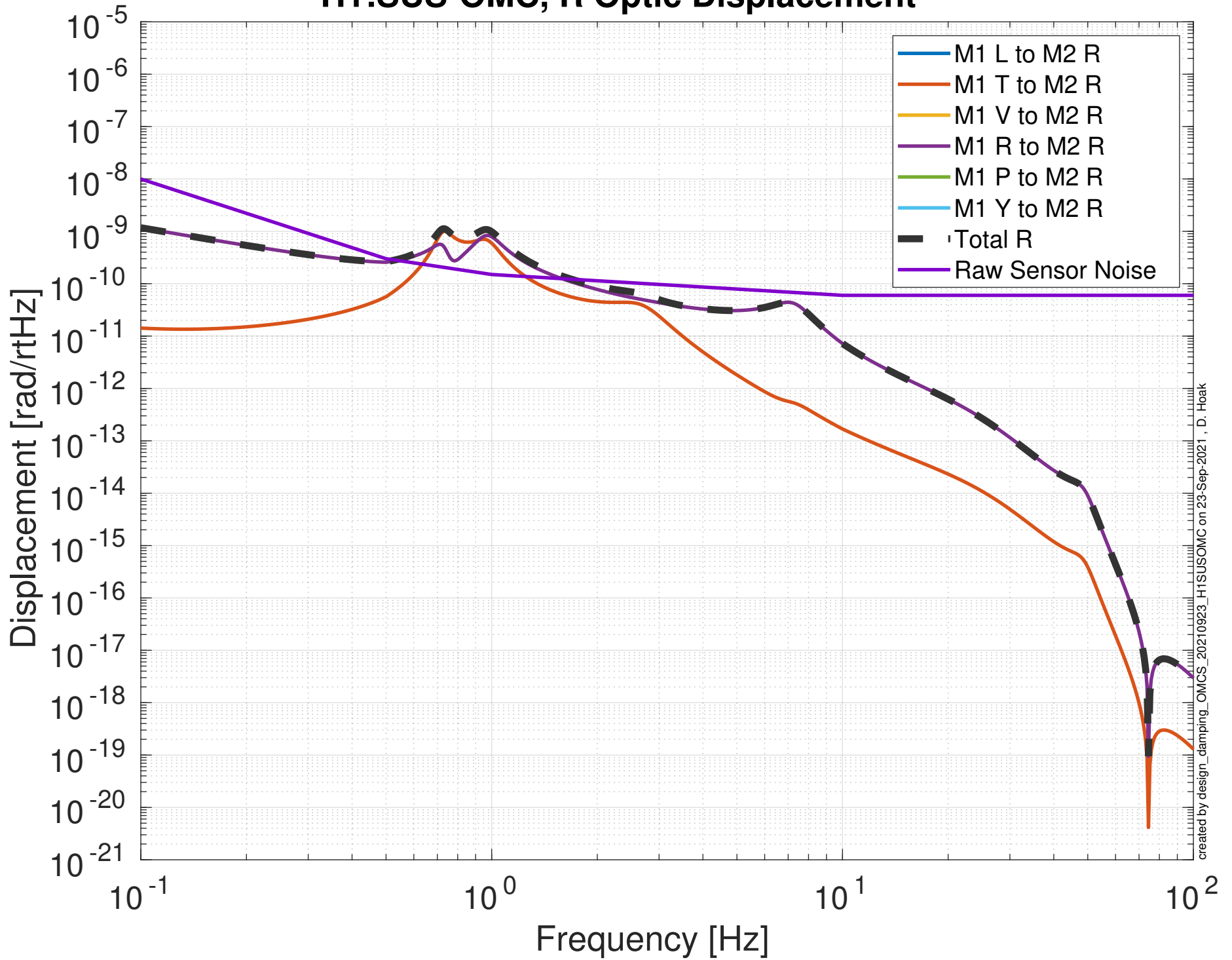
# Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-OMC, R Optic Displacement



created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

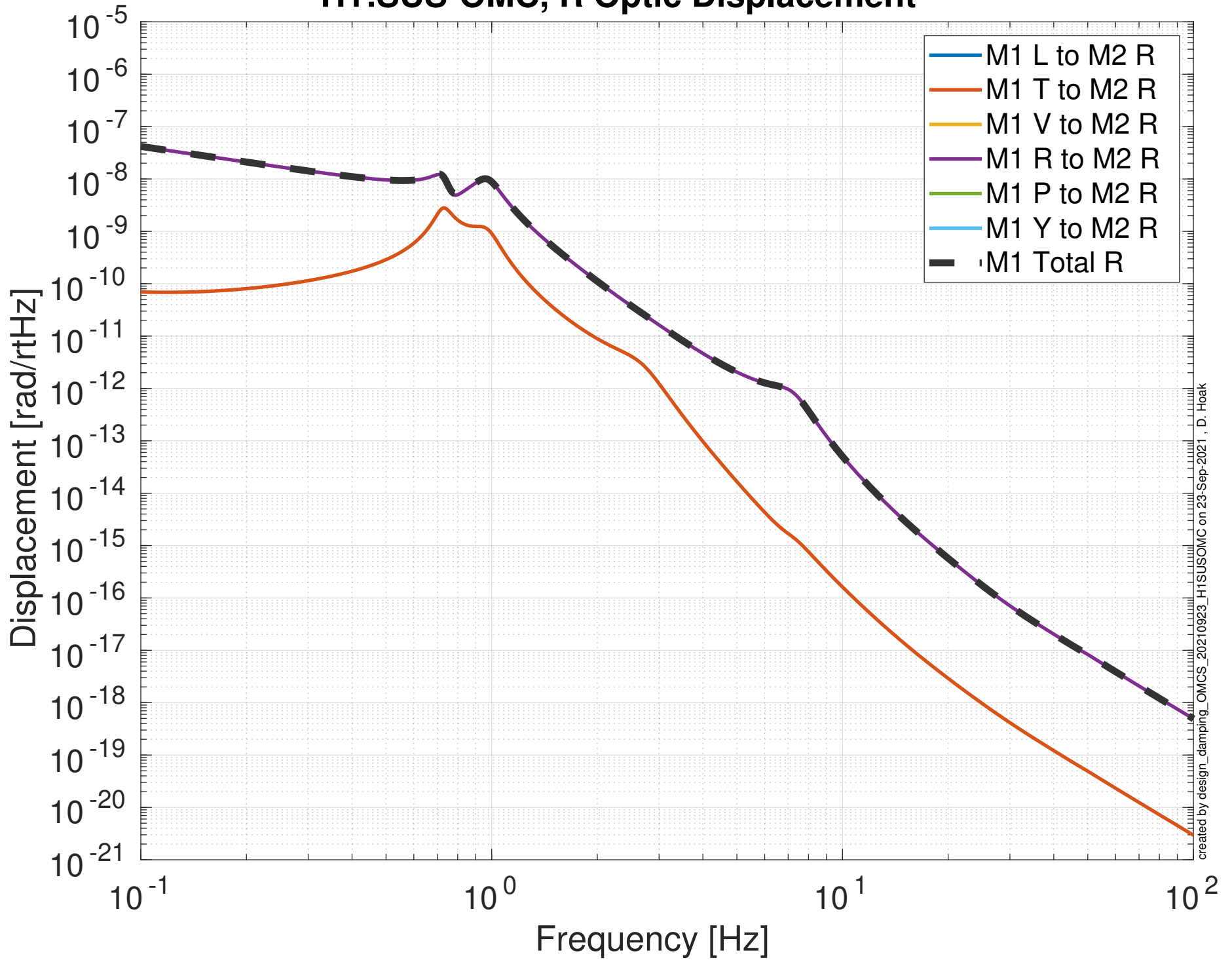


# Projected Top Mass Sensor > Optic Noise Budget H1:SUS-OMC, R Optic Displacement



created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

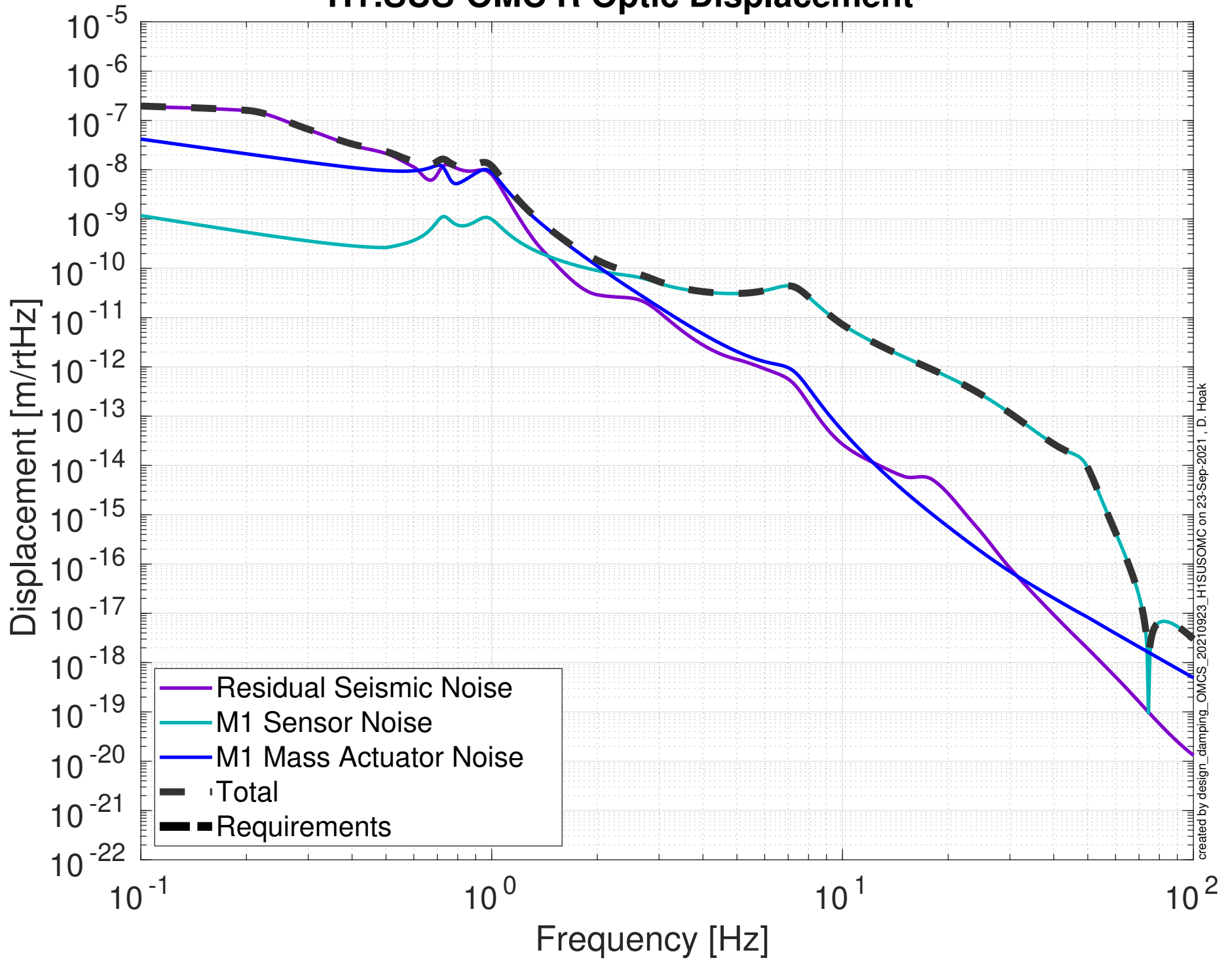
# Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-OMC, R Optic Displacement



created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

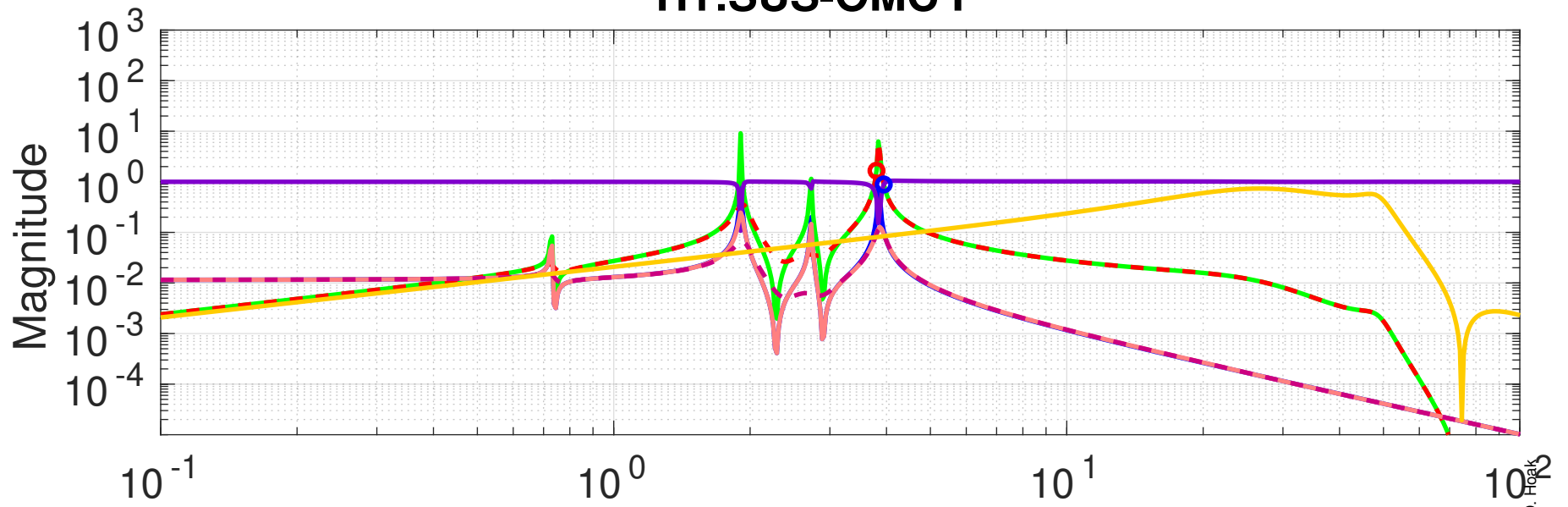
# Damping Loop Performance

## H1:SUS-OMC R Optic Displacement

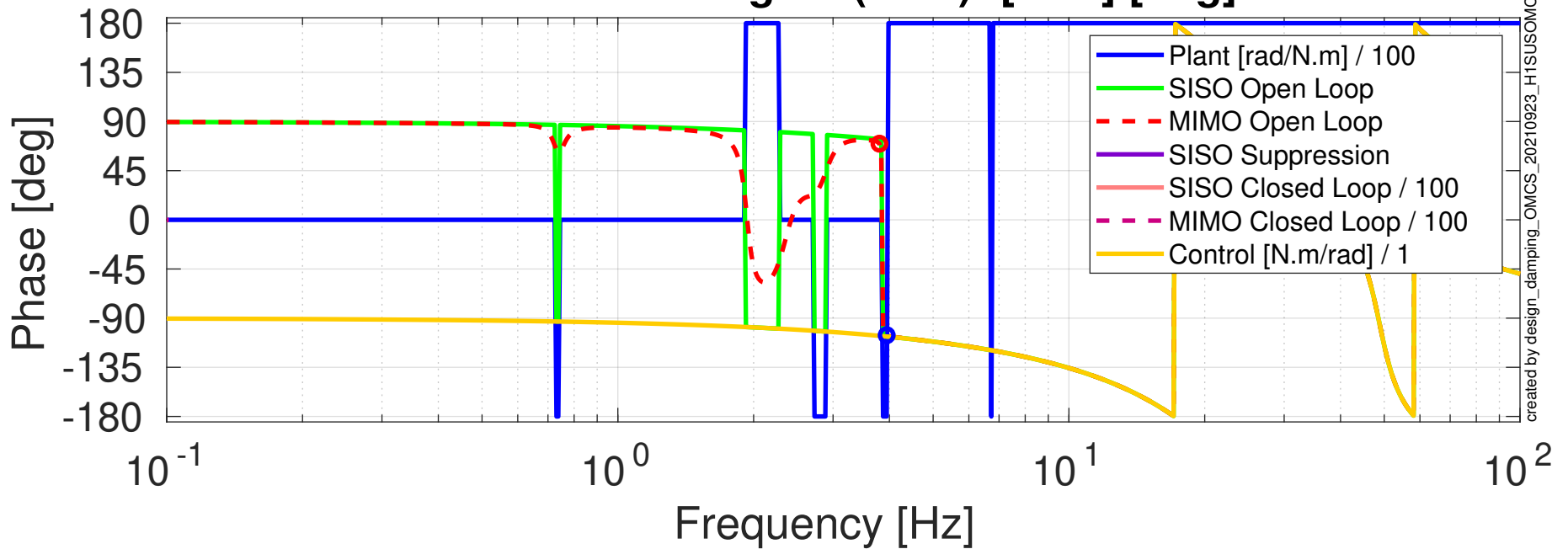


# Damping Loop Design

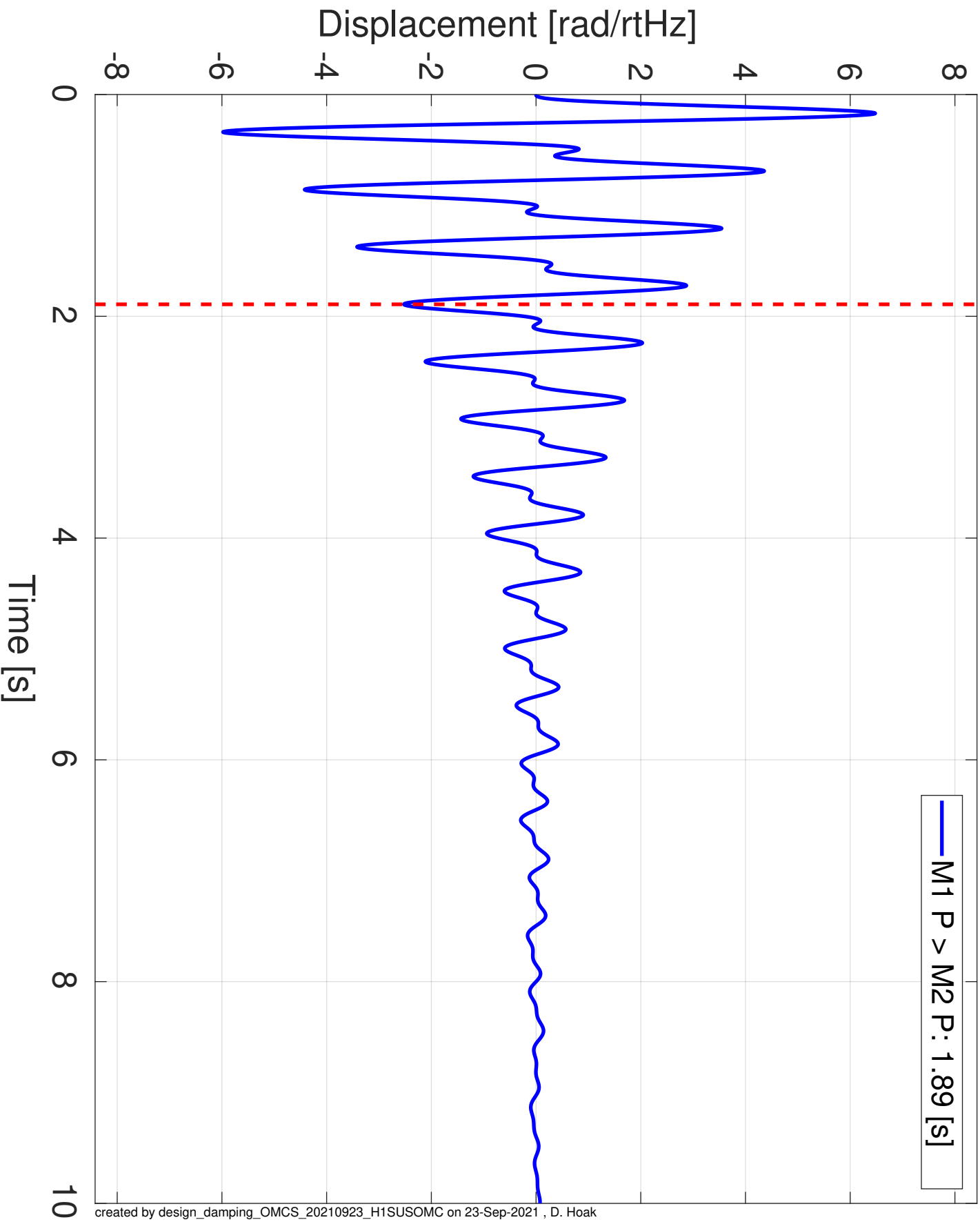
## H1:SUS-OMC P



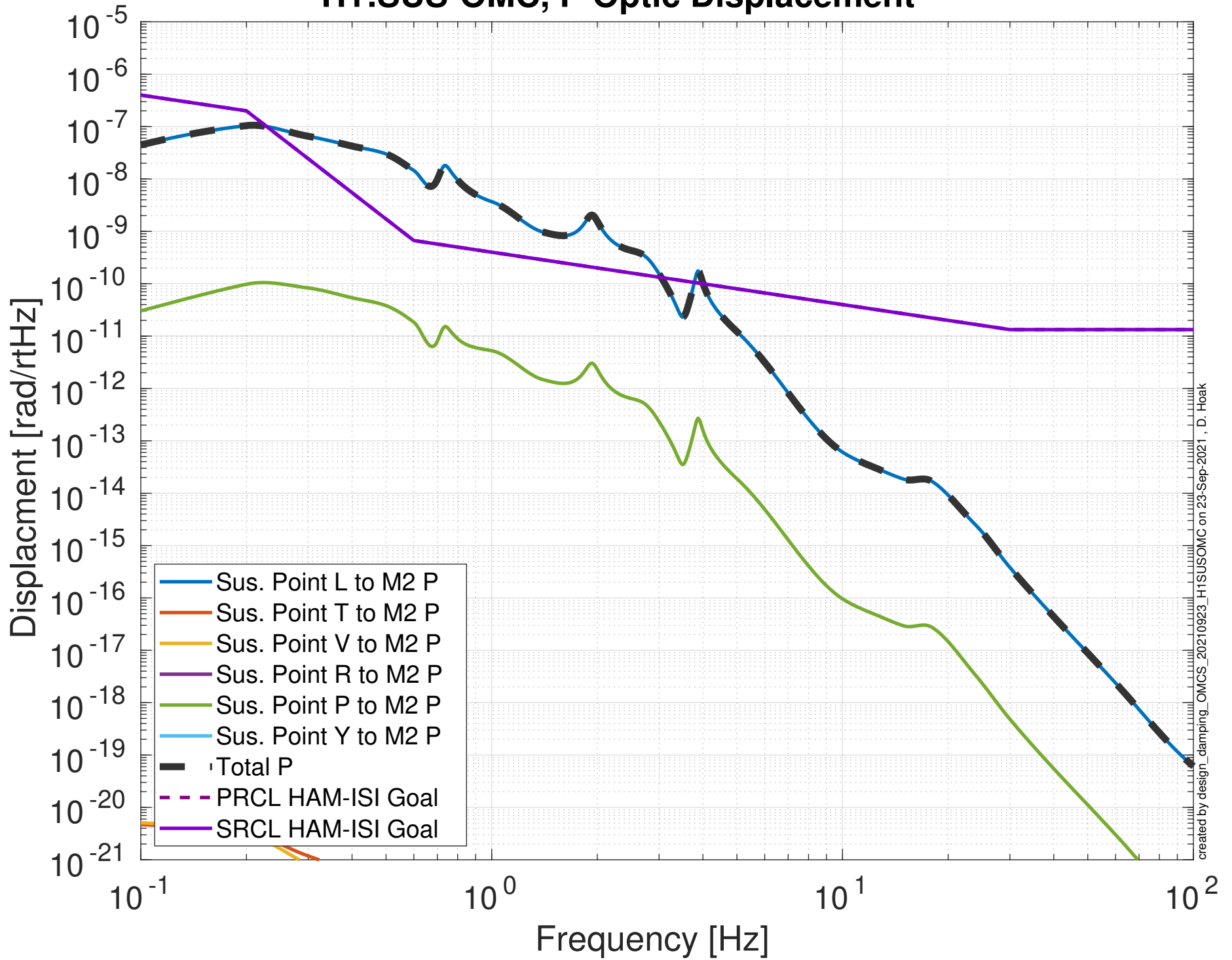
**MIMO LUGF Phase Margins (red): [110] [deg]**  
**MIMO UUGF Phase Margins (blue): [74.4] [deg]**



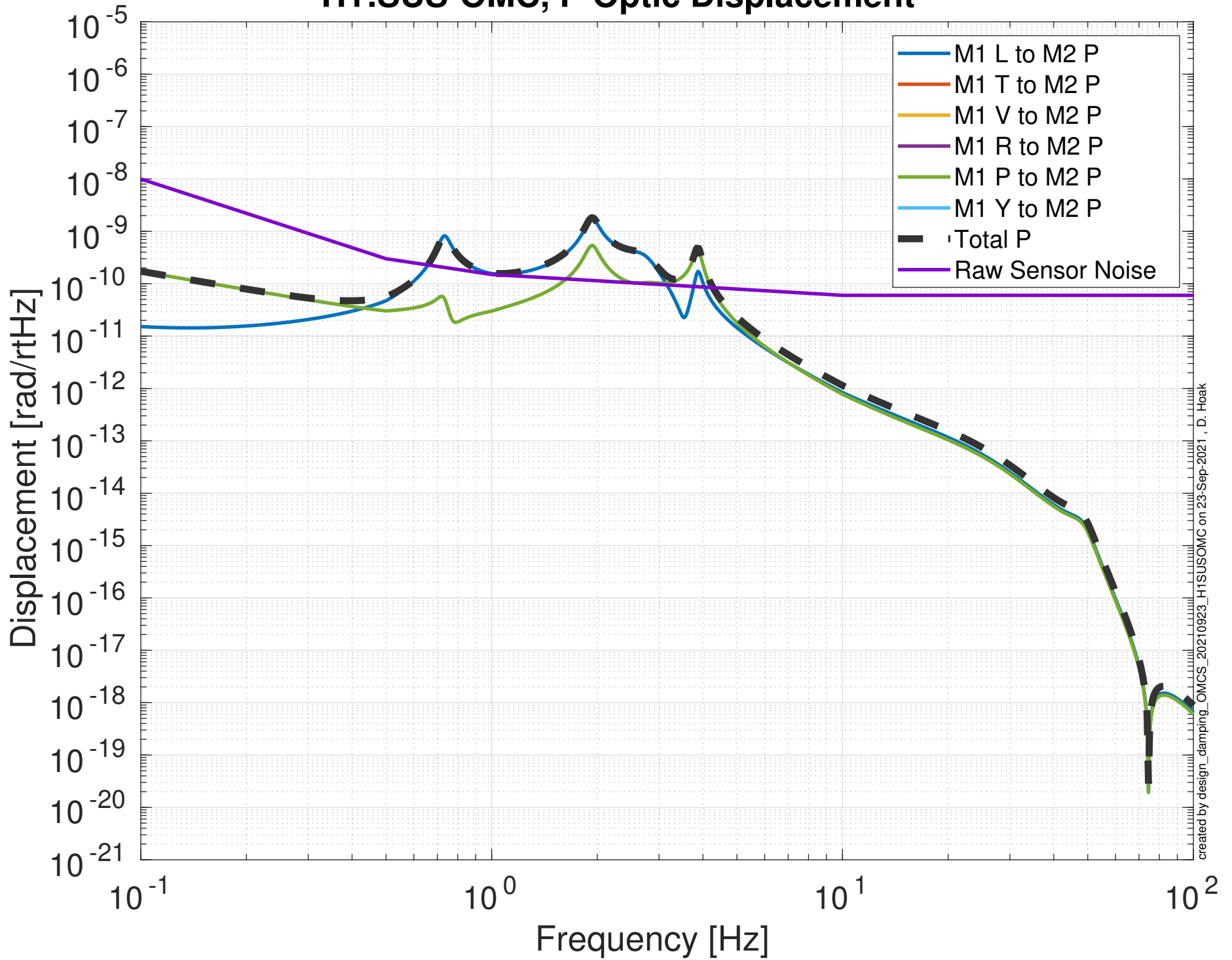
# Damped Impulse Response H1:SUS-OMC P



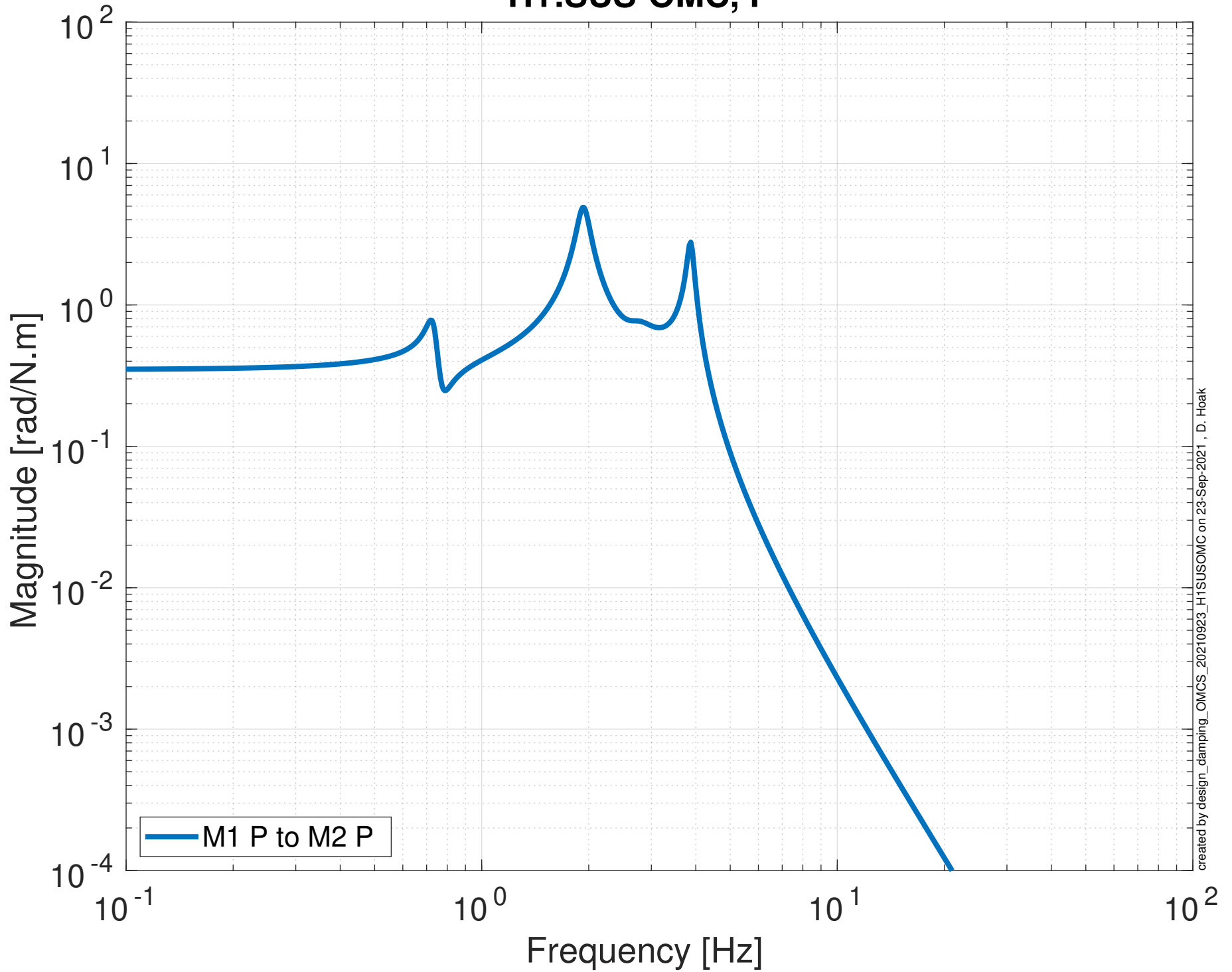
# Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-OMC, P Optic Displacement



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



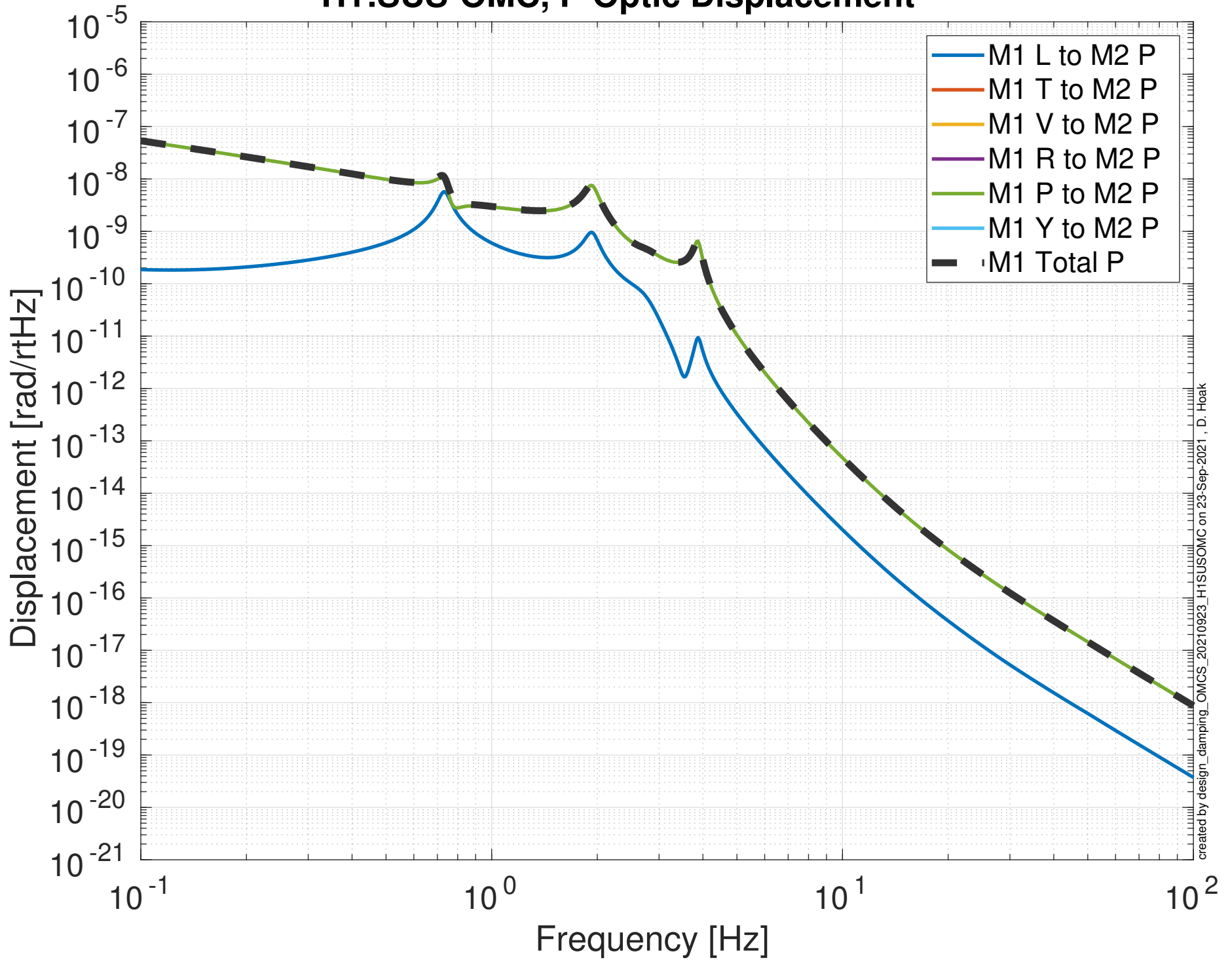
# Global Control Transfer Functions to Optic H1:SUS-OMC, P



created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak



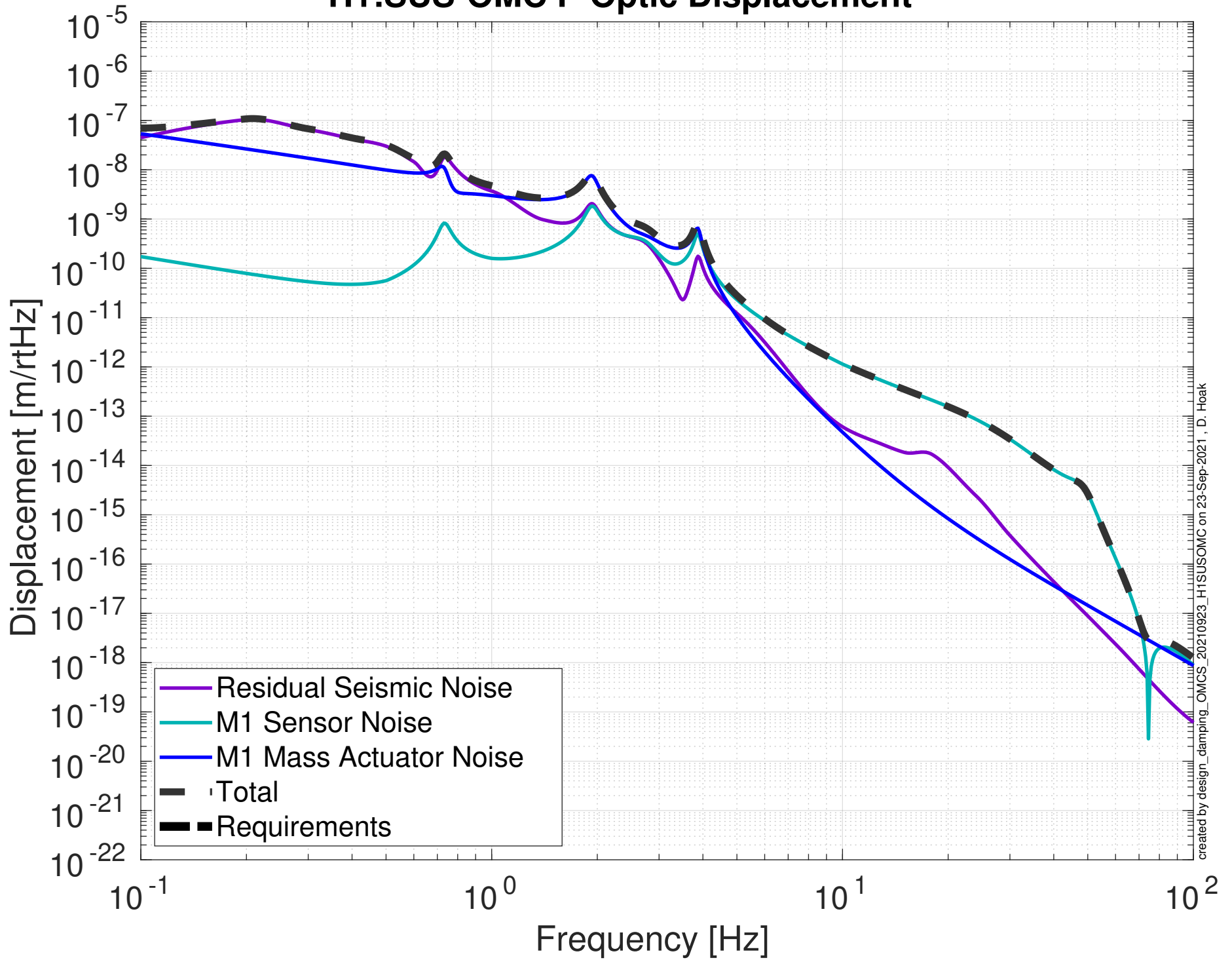
# Projected M1 Mass Actuator > Optic Noise Budget H1:SUS-OMC, P Optic Displacement



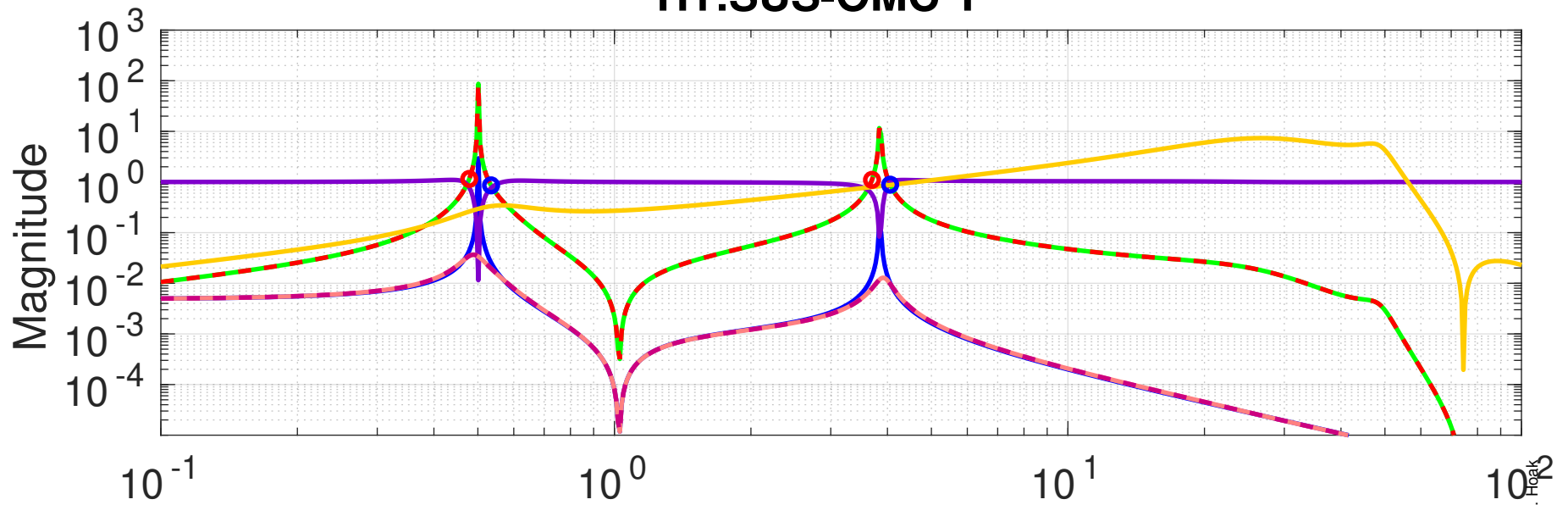
created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

# Damping Loop Performance

## H1:SUS-OMC P Optic Displacement

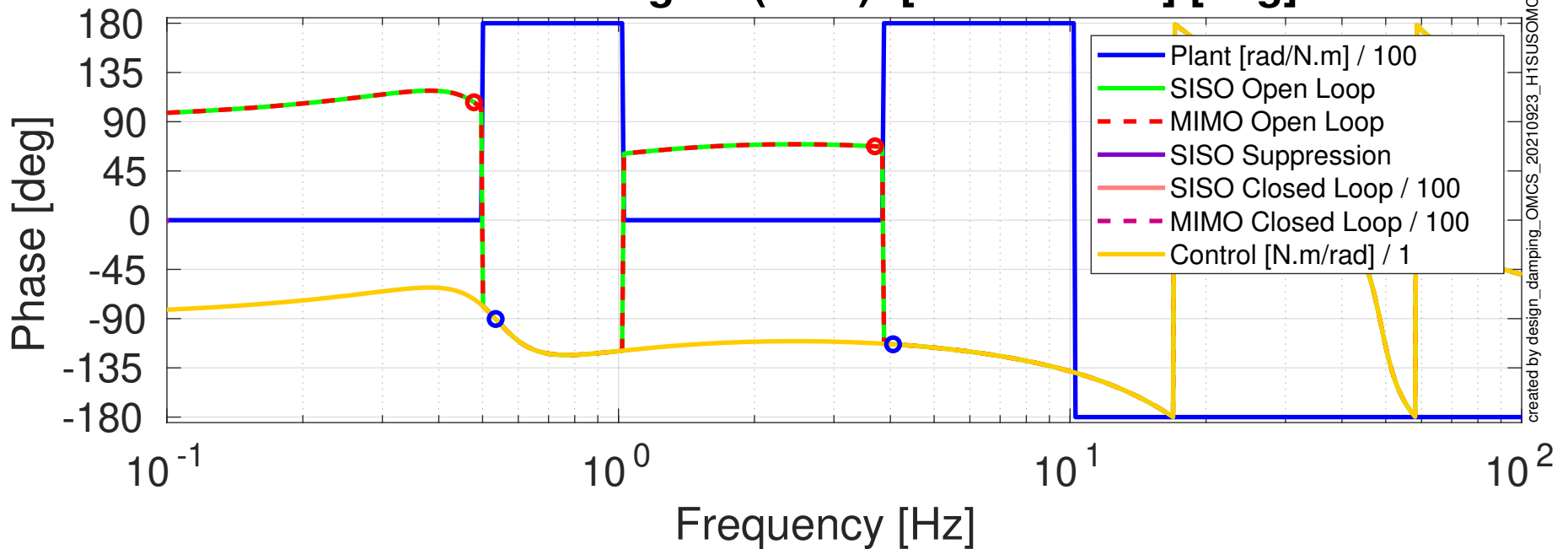


# Damping Loop Design H1:SUS-OMC Y

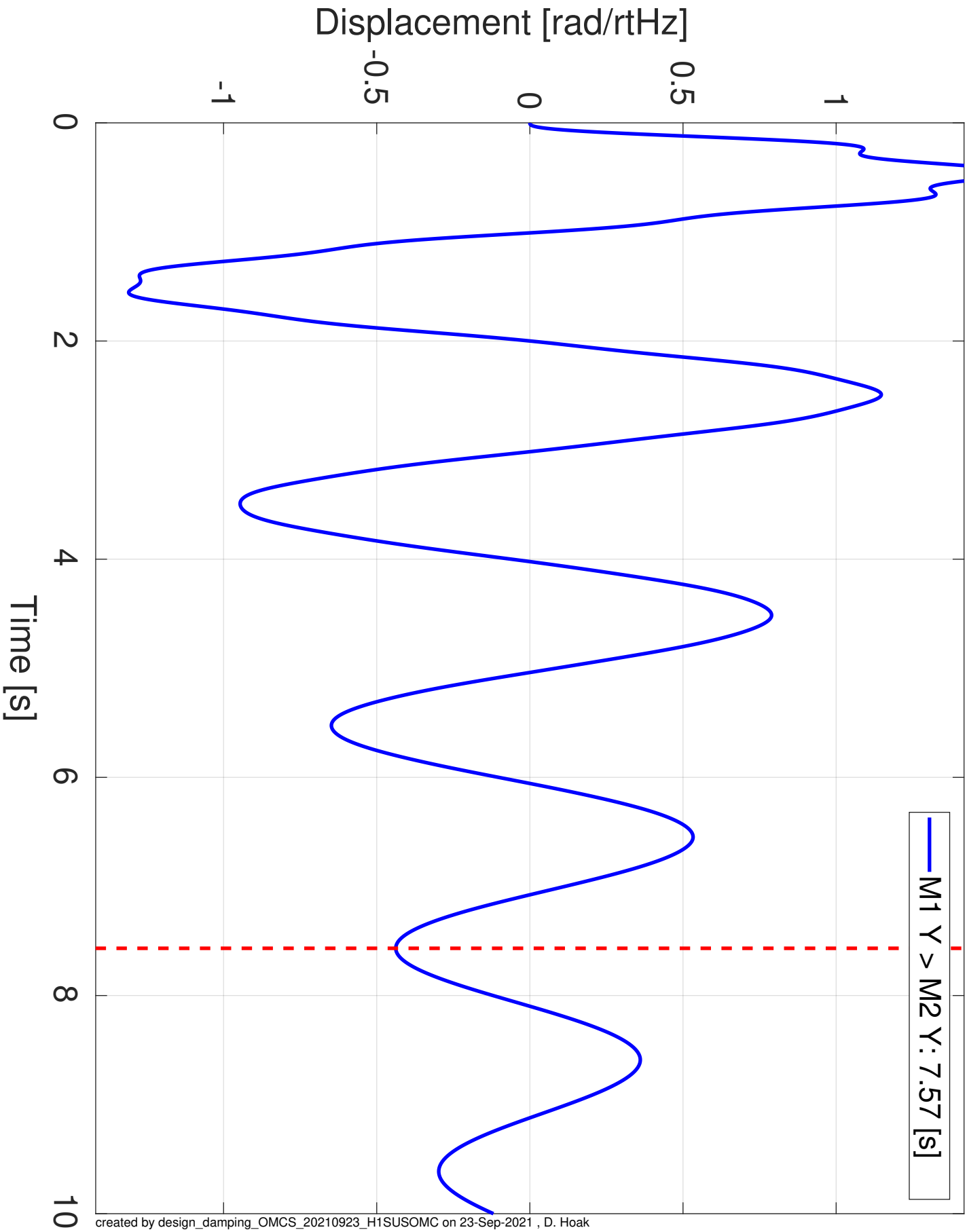


**MIMO LUGF Phase Margins (red): [72.2**  
**MIMO UUGF Phase Margins (blue): [89.7**

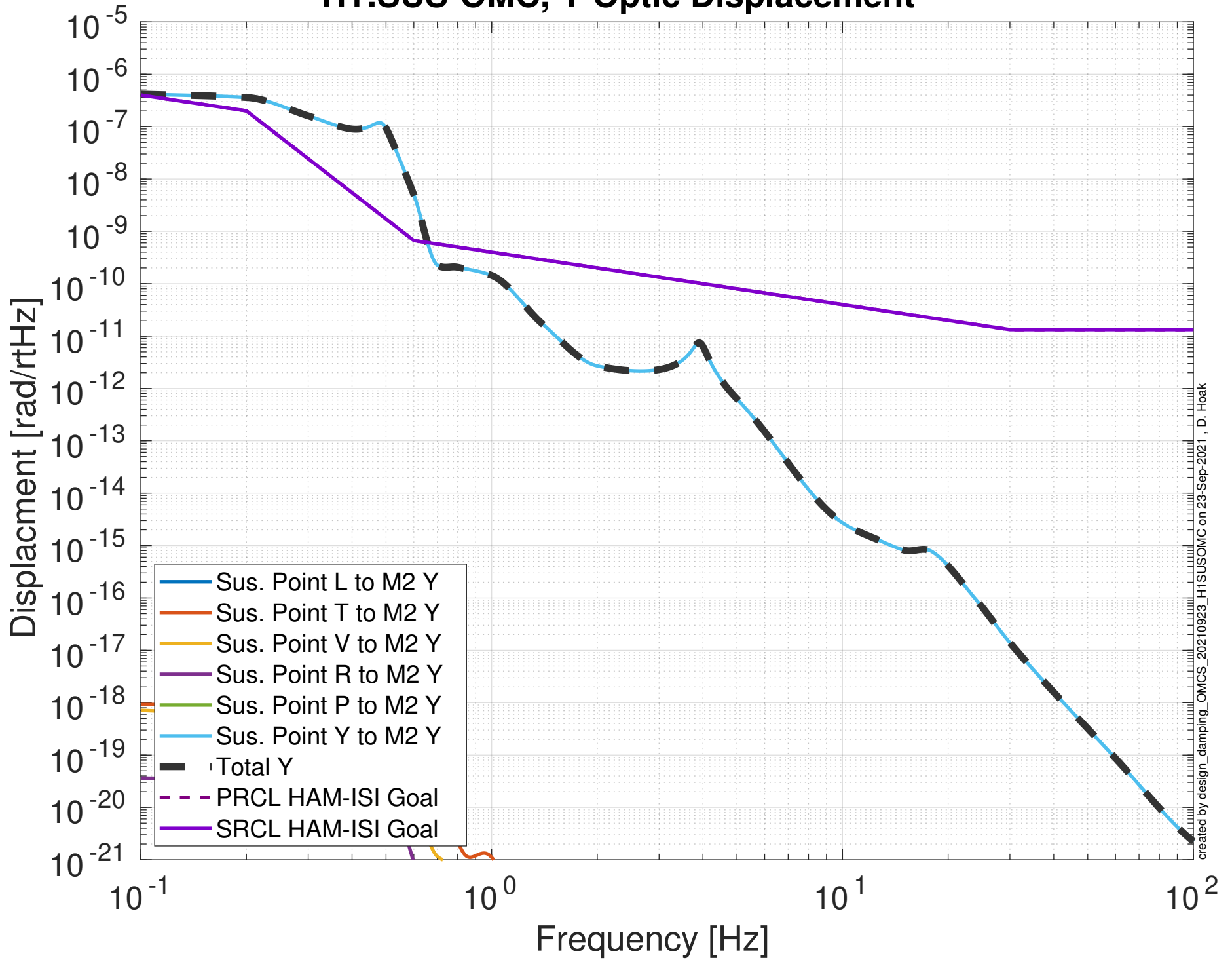
**113] [deg]**  
**66.5] [deg]**



# Damped Impulse Response H1:SUS-OMC Y

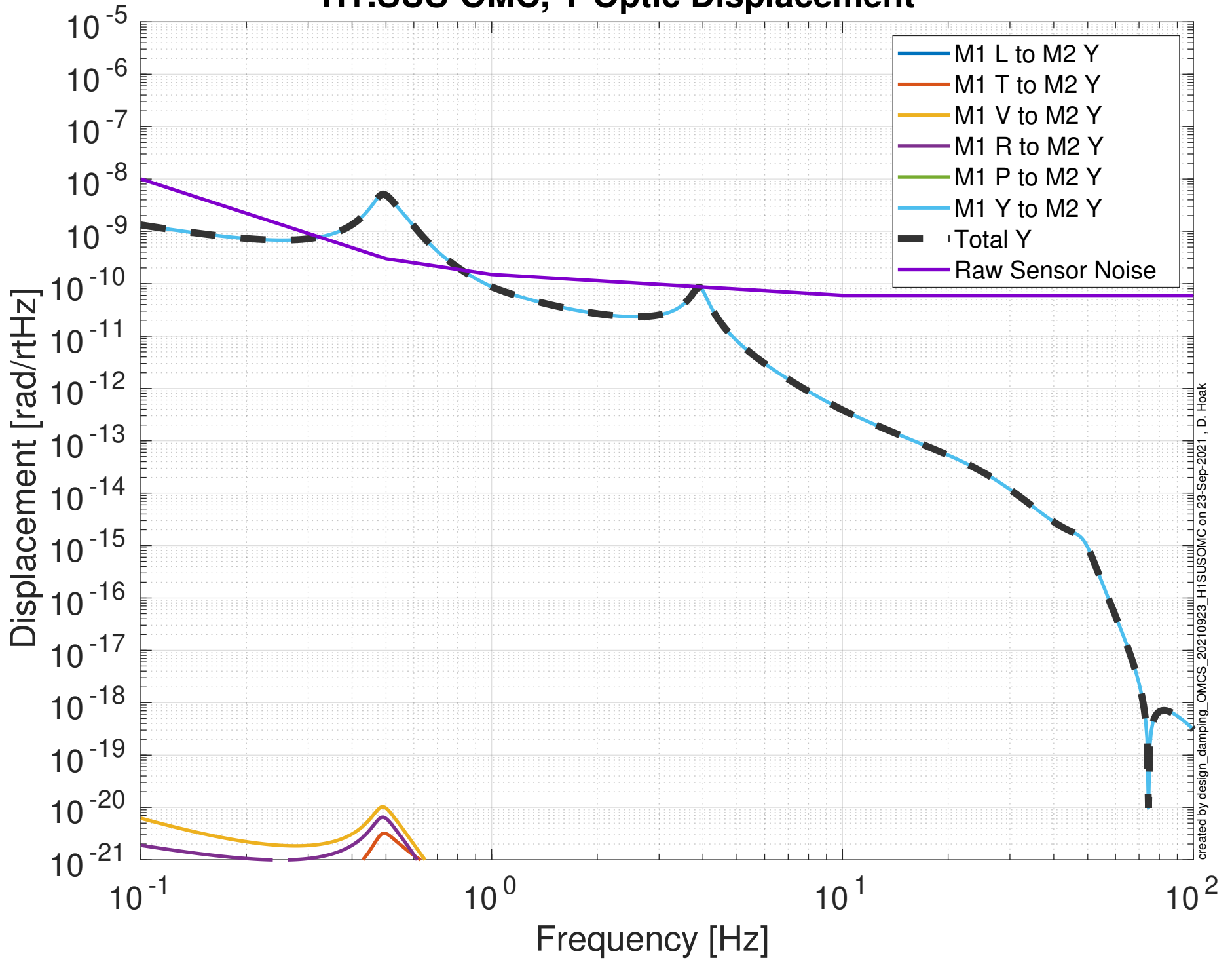


# Projected Sus. Point > Optic Seismic Noise Budget H1:SUS-OMC, Y Optic Displacement



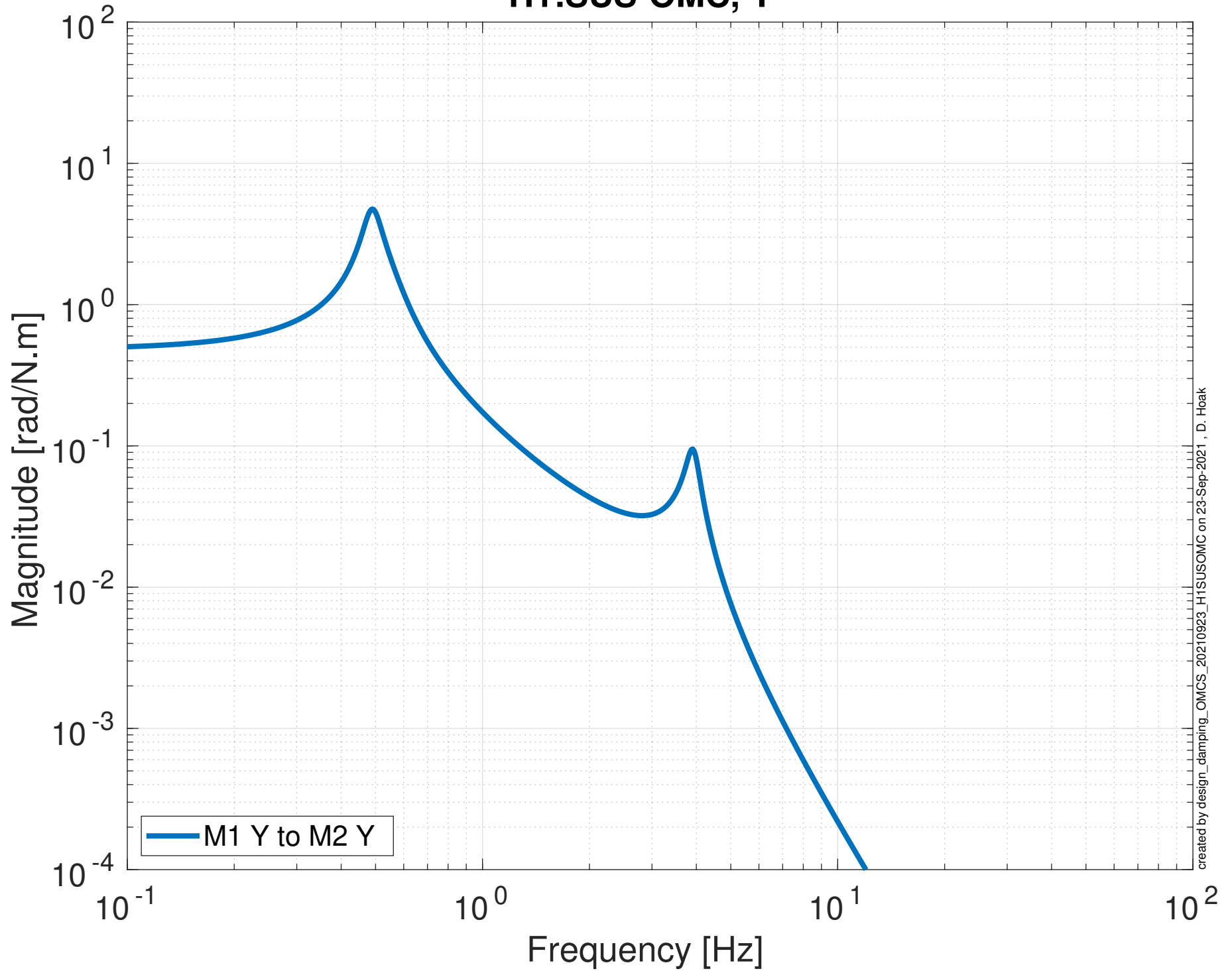
created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

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



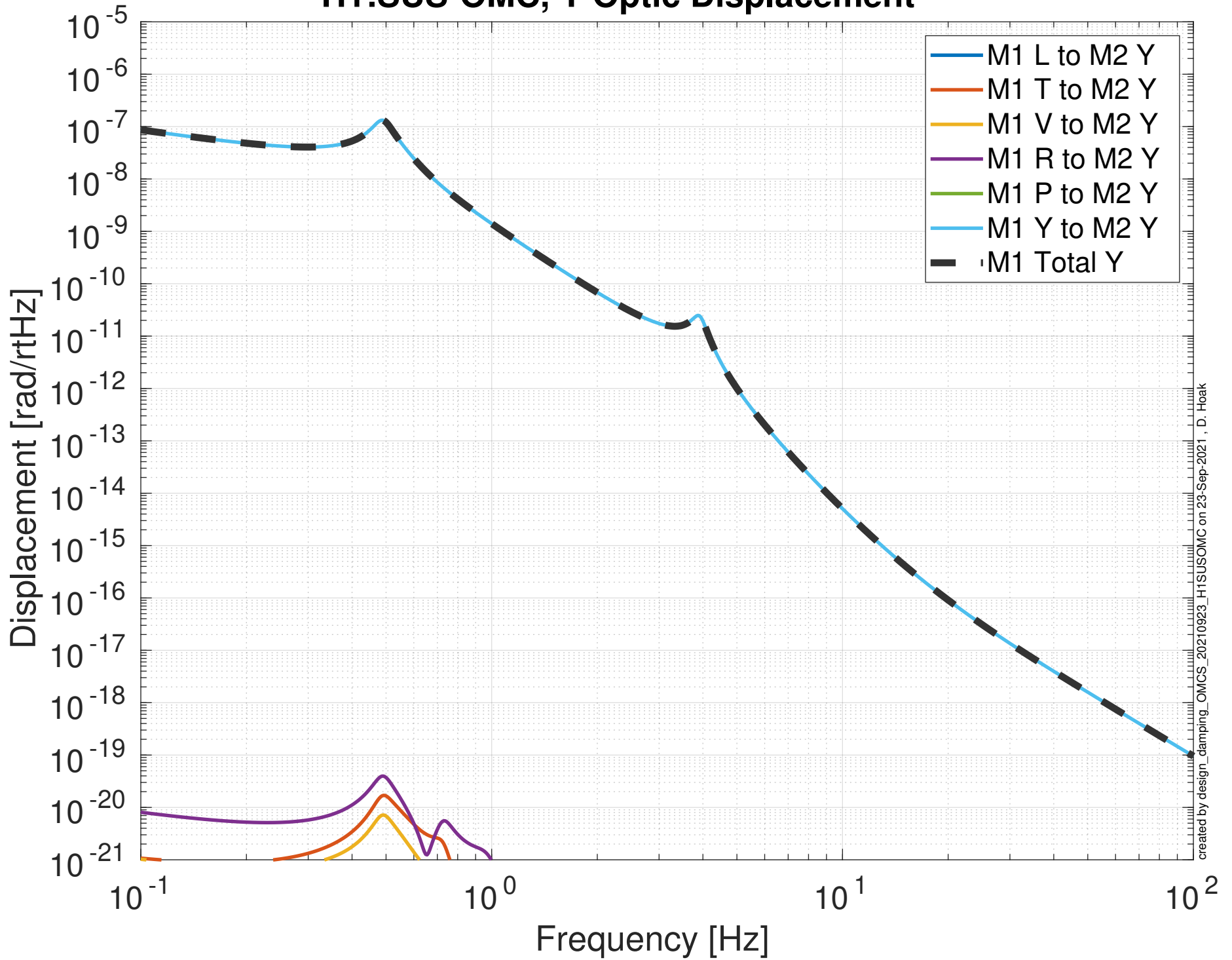
created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

# Global Control Transfer Functions to Optic H1:SUS-OMC, Y



created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak

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

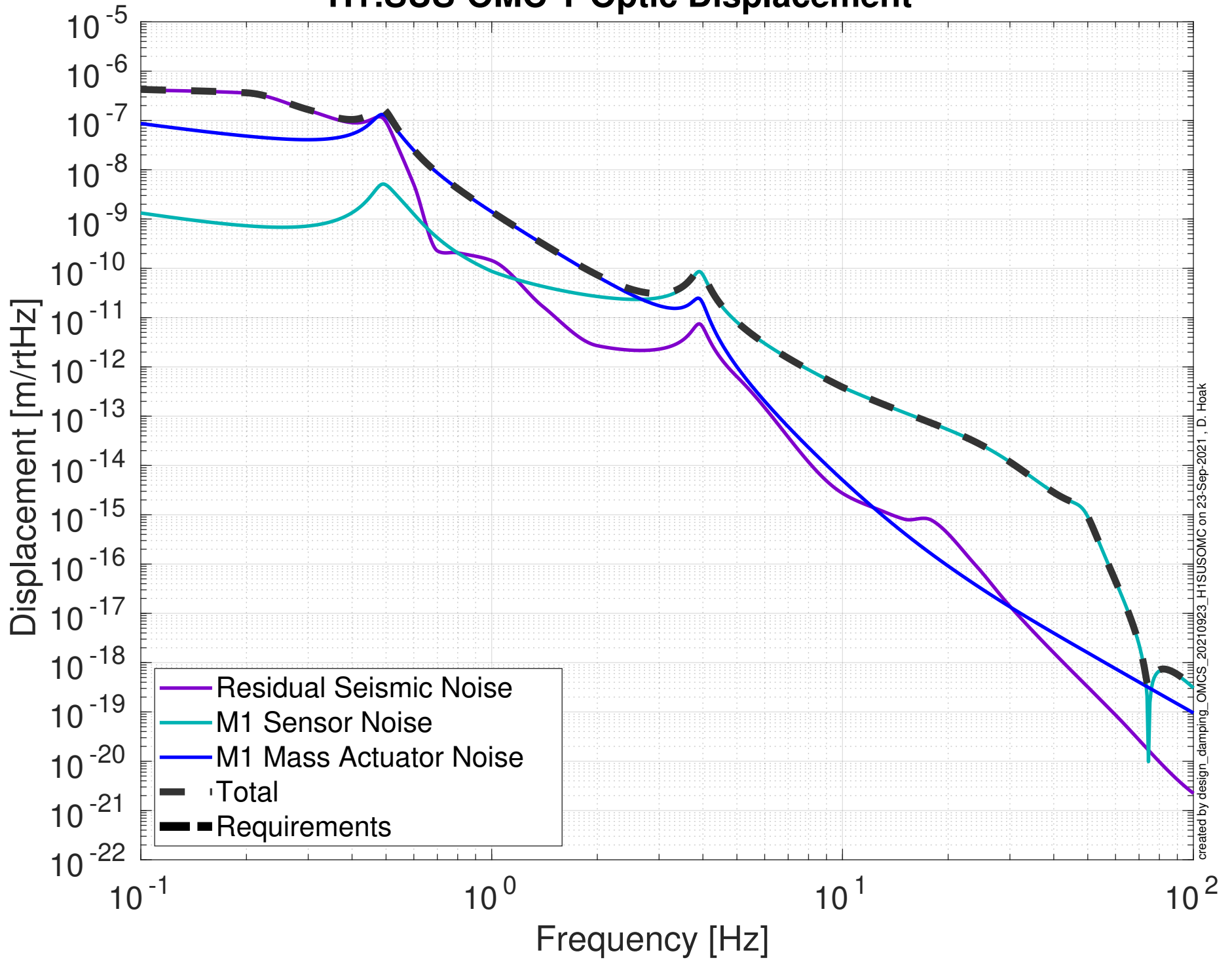


created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak



# Damping Loop Performance

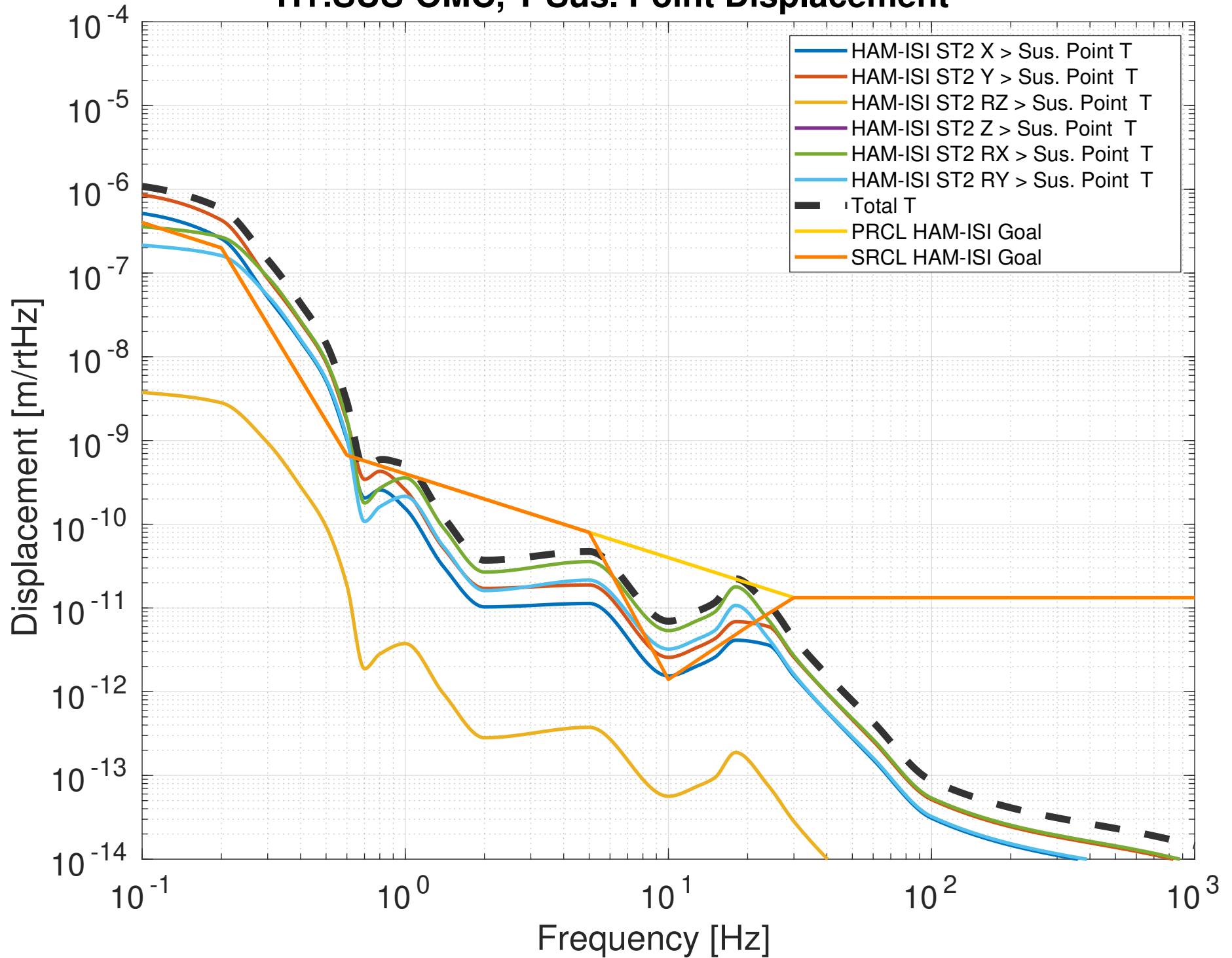
## H1:SUS-OMC Y Optic Displacement



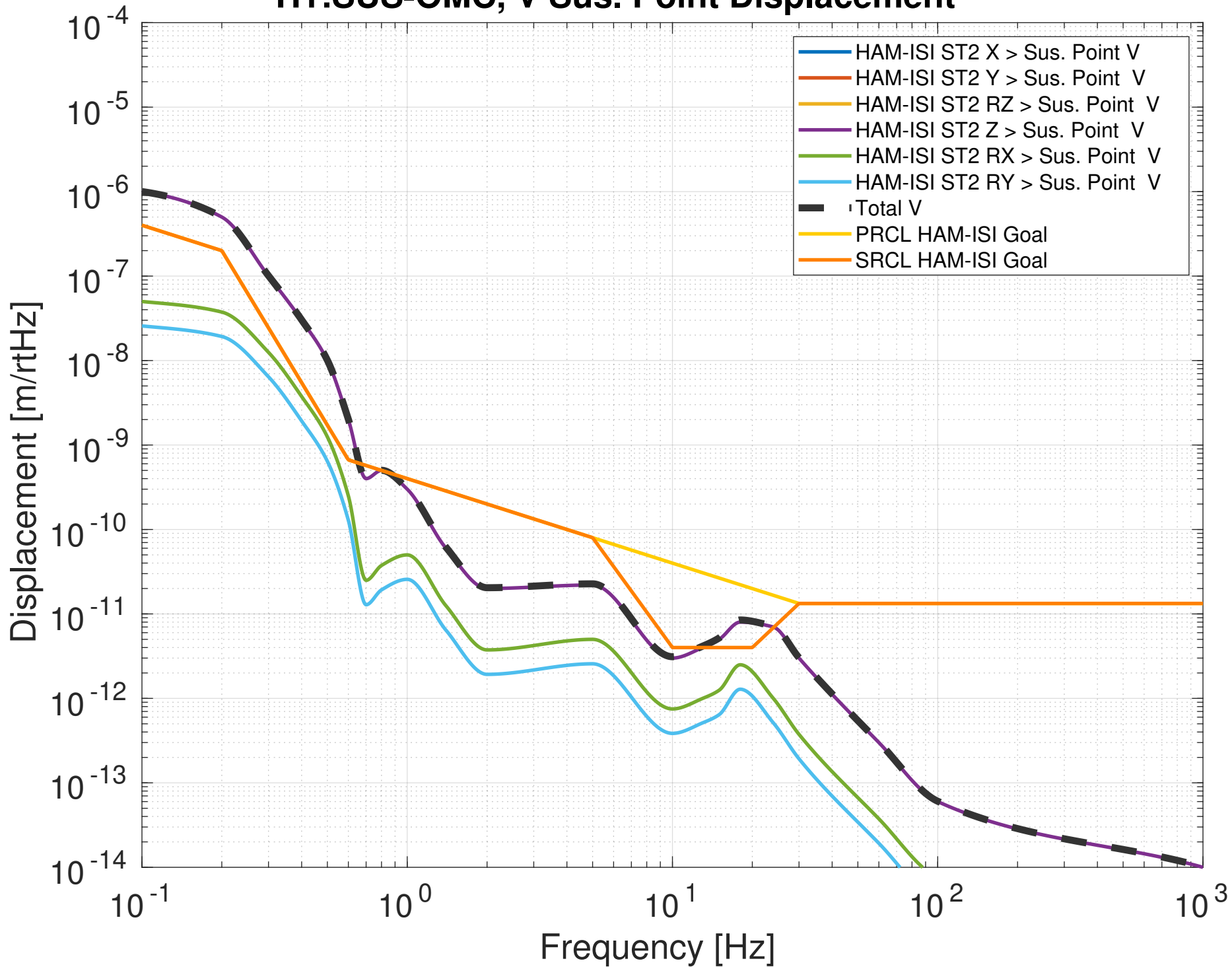
created by design\_damping\_OMCS\_20210923\_H1SUSOMC on 23-Sep-2021, D. Hoak



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

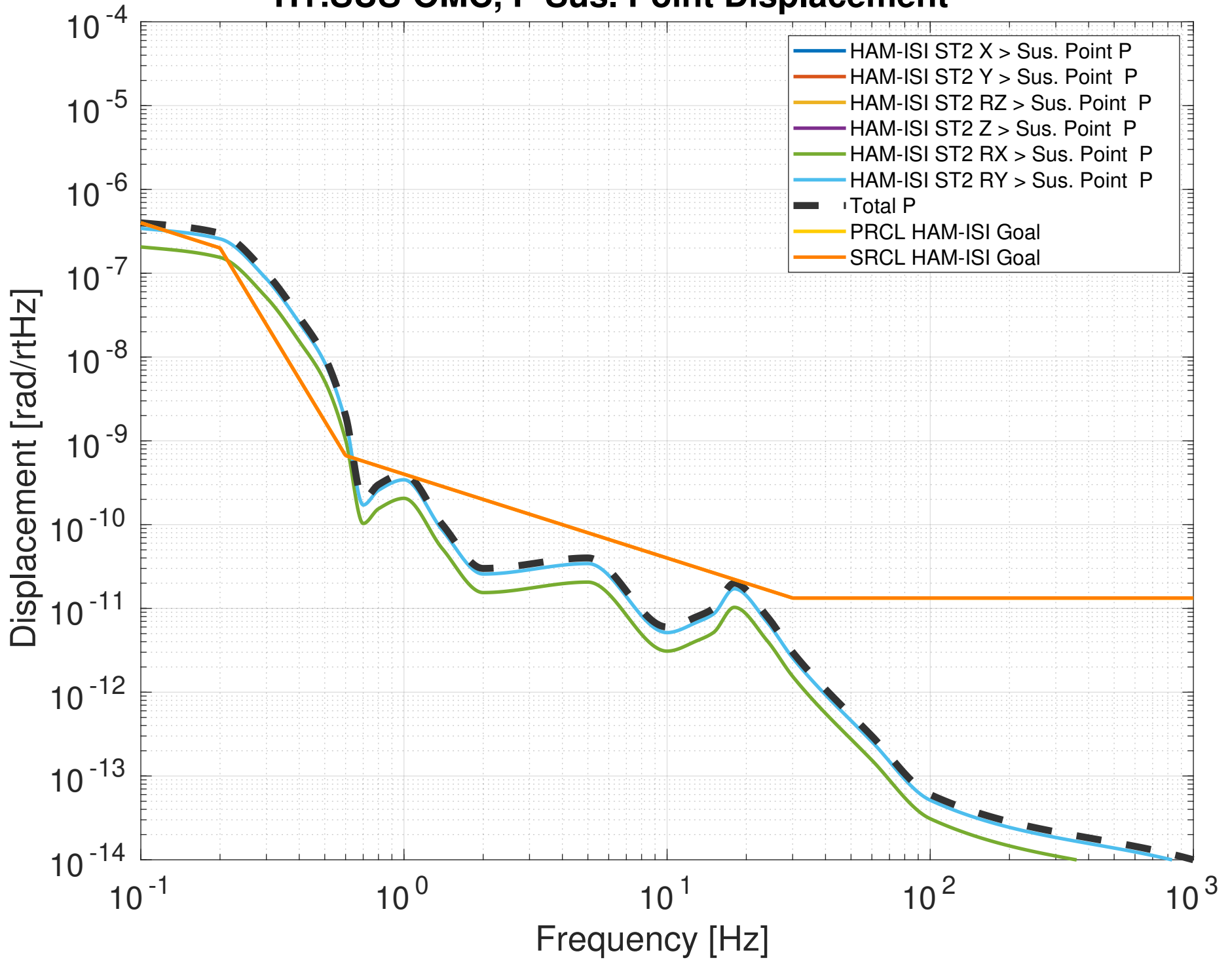


# Projected ISI Seismic Noise Budget H1:SUS-OMC, V Sus. Point Displacement





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





# Projected Input Top Mass Sensor Noise Budget

