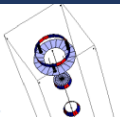
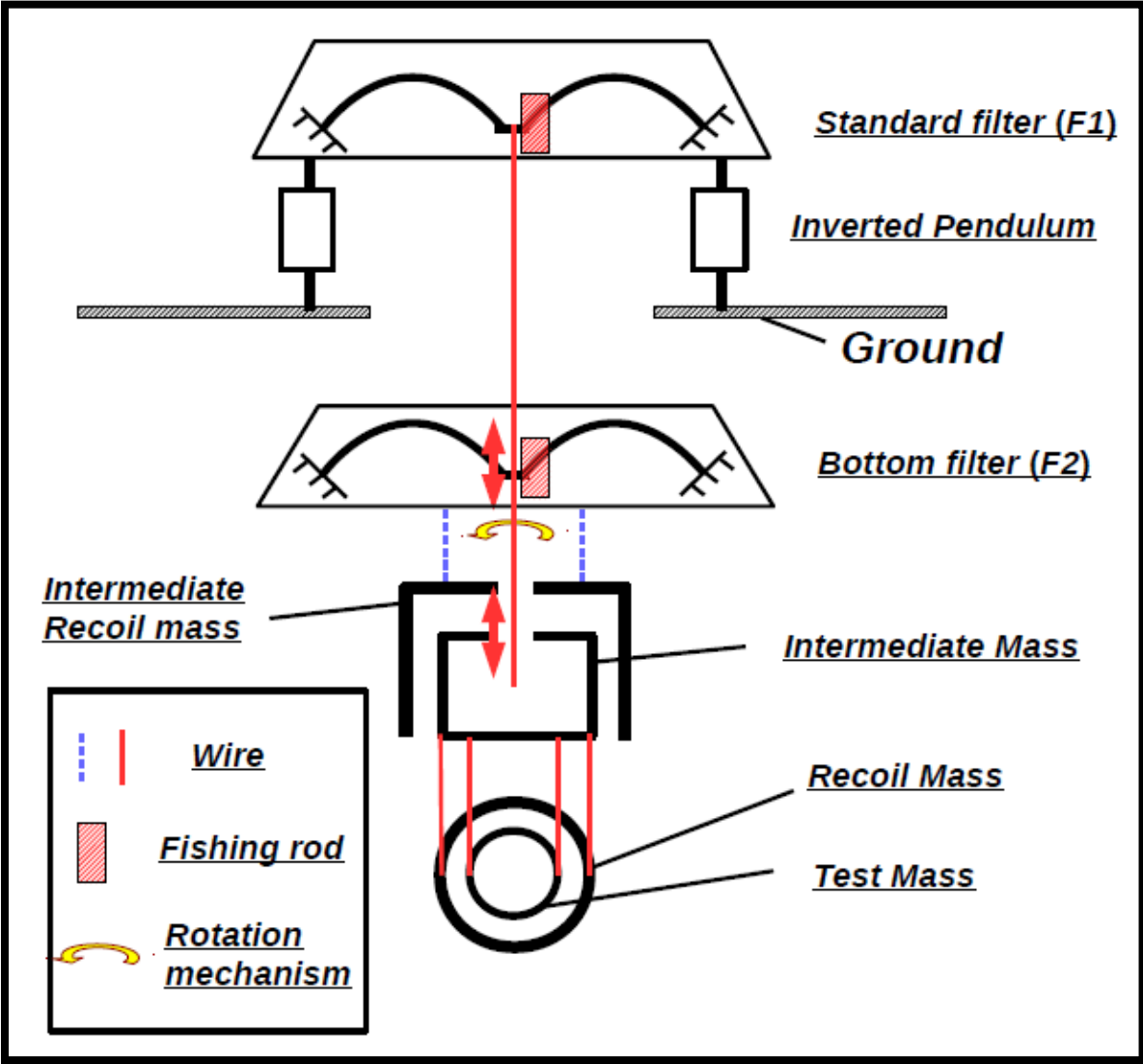


TypeBp with IP



Mechanical response

Calculated by SUMCON (and Simulink)



New Model

Load Model

Save Model

typeBp_wIP160205.m

Model Construction

Calculation Result

Export Model

TypeBp with IP 160205

Model Basic Information

Degrees of Freedom:

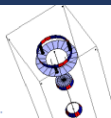
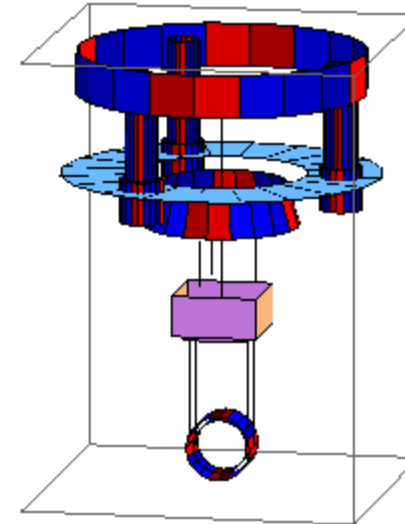
33 State Variables
6 Input Variables
2 Float Variables

Ground Position:

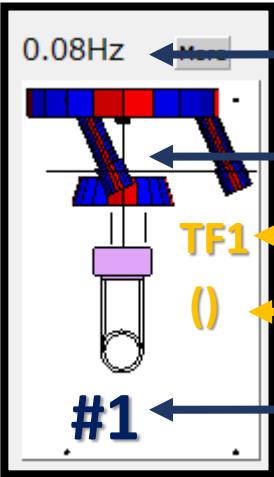
$xg \rightarrow 0.$ $yg \rightarrow 0.$ $zg \rightarrow 0.$ $pitchg \rightarrow 0.$ $yawg \rightarrow 0.$ $rollg \rightarrow 0.$

Equilibrium Point:

$xF2 \rightarrow 0.$	$yF2 \rightarrow -0.1444$	$zF2 \rightarrow 0.$	$pitchF2 \rightarrow 0.$	$yawF2 \rightarrow 0.$	$rollF2 \rightarrow 0.$
$xIR \rightarrow 0.$	$yIR \rightarrow -0.647$	$zIR \rightarrow 0.$	$pitchIR \rightarrow 0.$	$yawIR \rightarrow 0.$	$rollIR \rightarrow 0.$
$xIM \rightarrow 0.$	$yIM \rightarrow -0.6977$	$zIM \rightarrow 0.$	$pitchIM \rightarrow 0.$	$yawIM \rightarrow 0.$	$rollIM \rightarrow 0.$
$xRM \rightarrow 0.$	$yRM \rightarrow -1.2847$	$zRM \rightarrow 0.$	$pitchRM \rightarrow 0.$	$yawRM \rightarrow 0.$	$rollRM \rightarrow 0.$
$xTM \rightarrow 0.$	$yTM \rightarrow -1.2848$	$zTM \rightarrow 0.$	$pitchTM \rightarrow 0.$	$yawTM \rightarrow 0.$	$rollTM \rightarrow 0.$
$xF1 \rightarrow 0.$	$zF1 \rightarrow 0.$	$yawF1 \rightarrow 0.$	$hGAS2 \rightarrow 0.0259$	$hGAS1 \rightarrow -0.0839$	



Eigen Mode List



Resonance frequency

Eigen mode shape

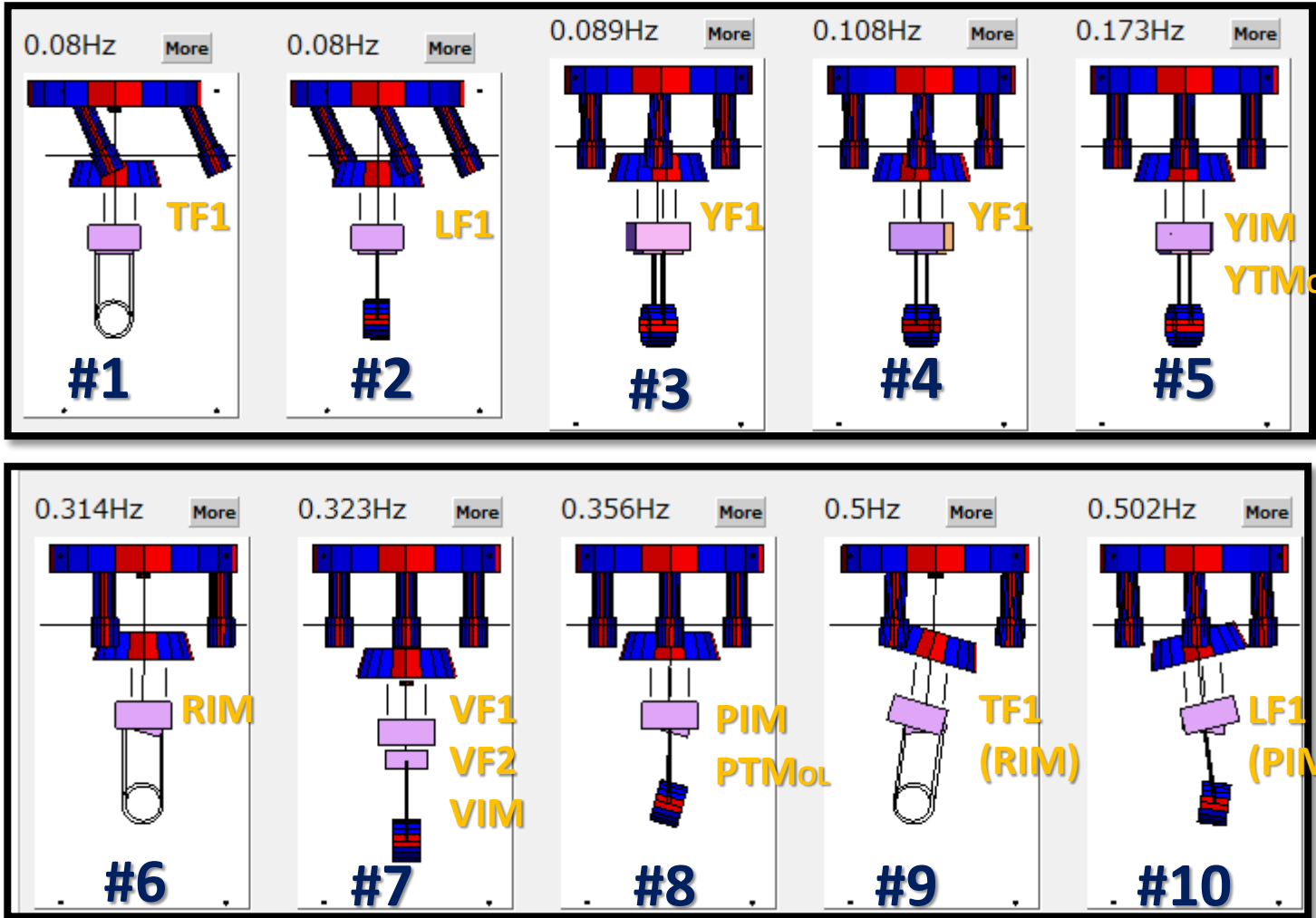
Sensing / Excitation point

Hardly seen/excited

Eigen mode number



Eigen Mode Shape



#1 : TIP

#6 : RPayload

#2 : LIP

#7 : VPayload

#3 : YIP

#8 : PTM

Whole chain
(common)

PTM, PRM, PIM

#9 : TPen

#4 : YIP

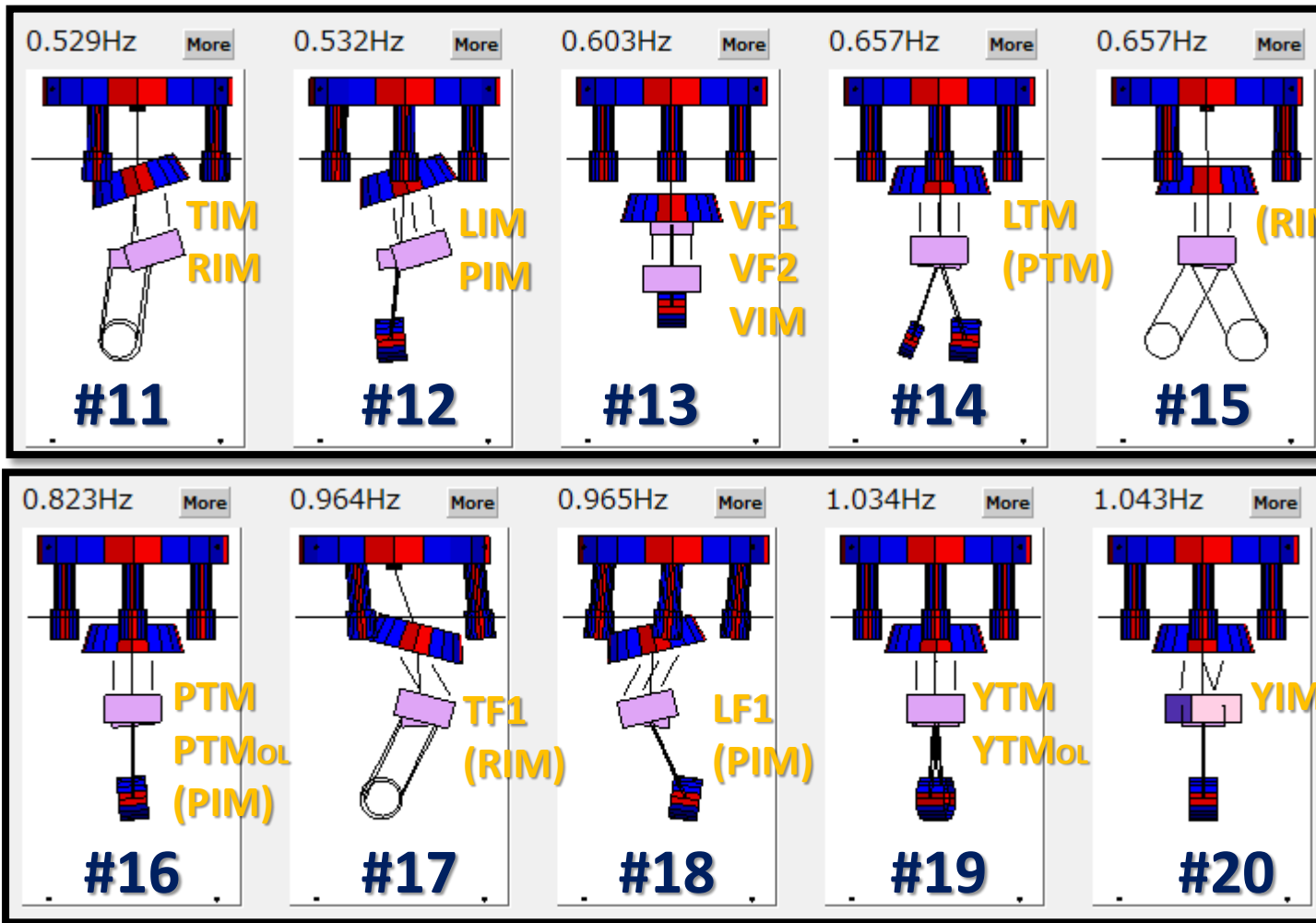
Whole chain
(diff)

#10 : LPen

#5 : YPen

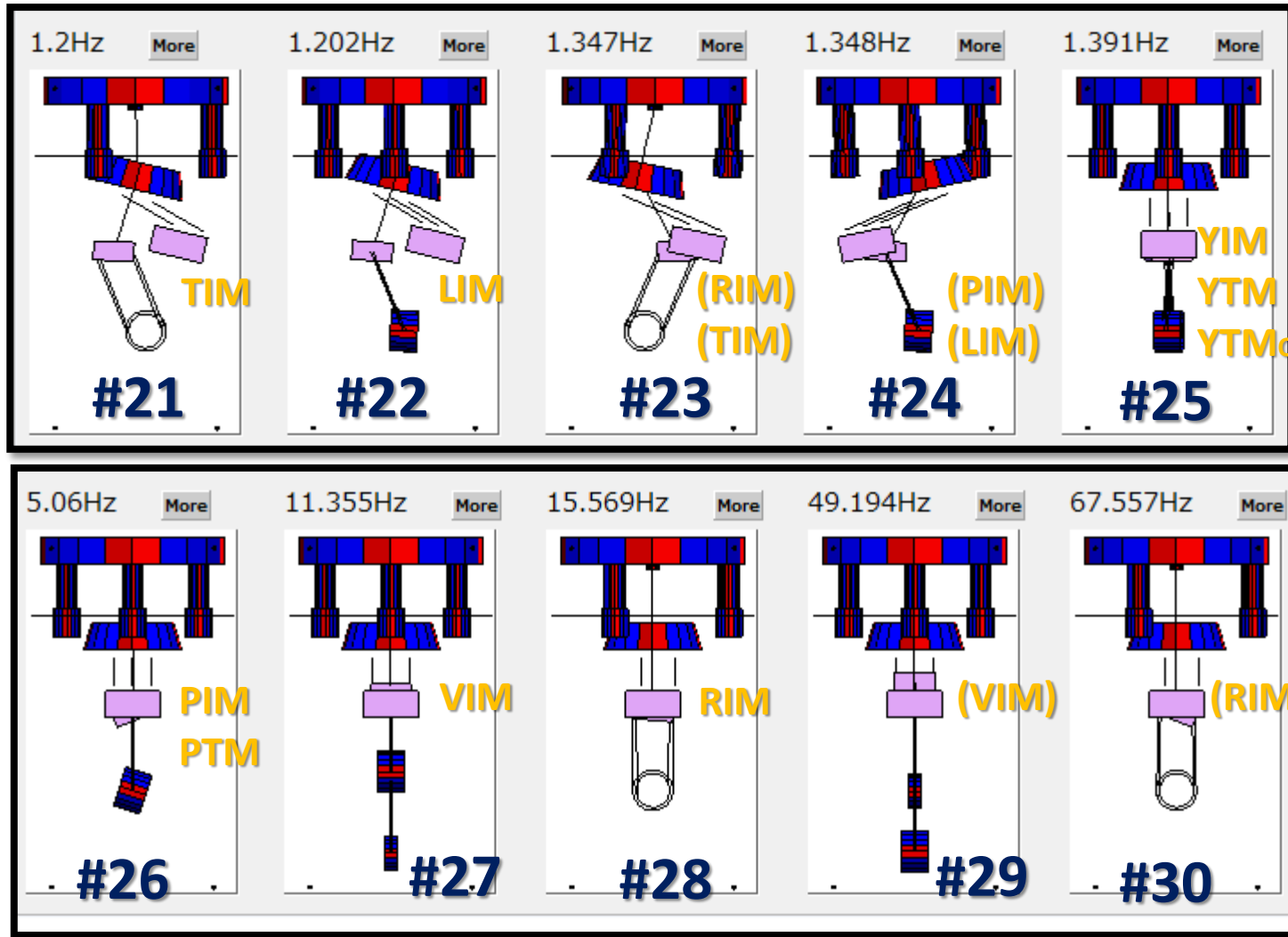
Yaw Payload

Eigen Mode Shape



- #11 : VF2 #16 : PTM
- #12 : RF2 #17 : TPen
- #13 : VF2 #18 : LPen
- #14 : LTM #19 : YTM
- ,PTM (RM, TM diff)
- #15 : TTM #20 : YIR
- ,RTM

Eigen Mode Shape



#21 : TIR
(IM, IR diff)

#26 : PTM
(TM, RM diff)

#22 : LIR
(IM, IR diff)

#27 : VTM
(TM, RM diff)

#23 : TIR
(IM, IR common)

#28 : RTM
(TM, RM diff)

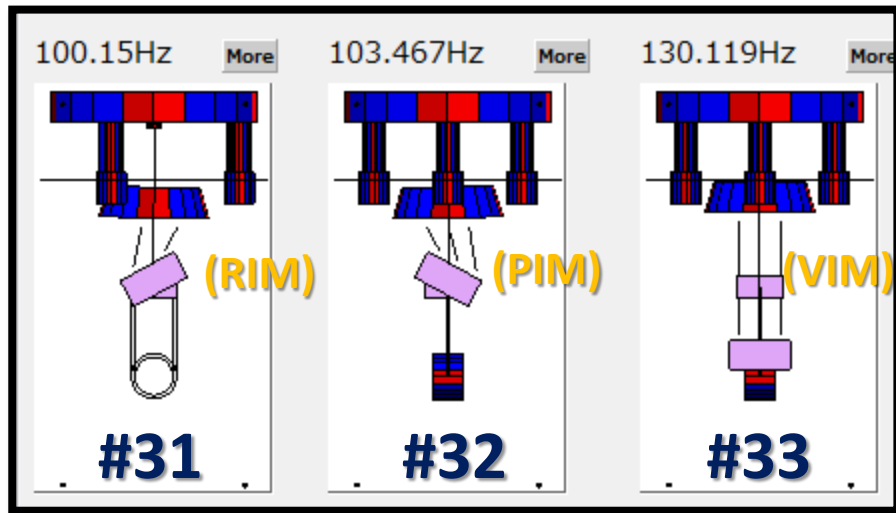
#24 : LIR
(IM, IR common)

#29 : VRM
(RM, IM diff)

#25 : YTM
(TM, RM common)

#30 : RRM
(RM, IM diff)

Eigen Mode Shape



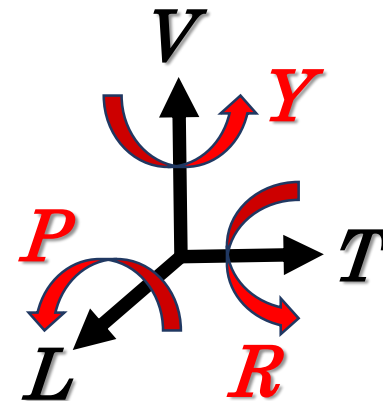
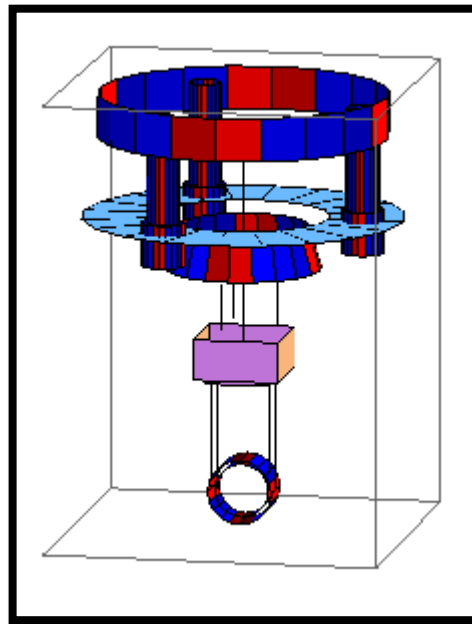
#31 : RIR

#32 : PIR

#33 : VIR

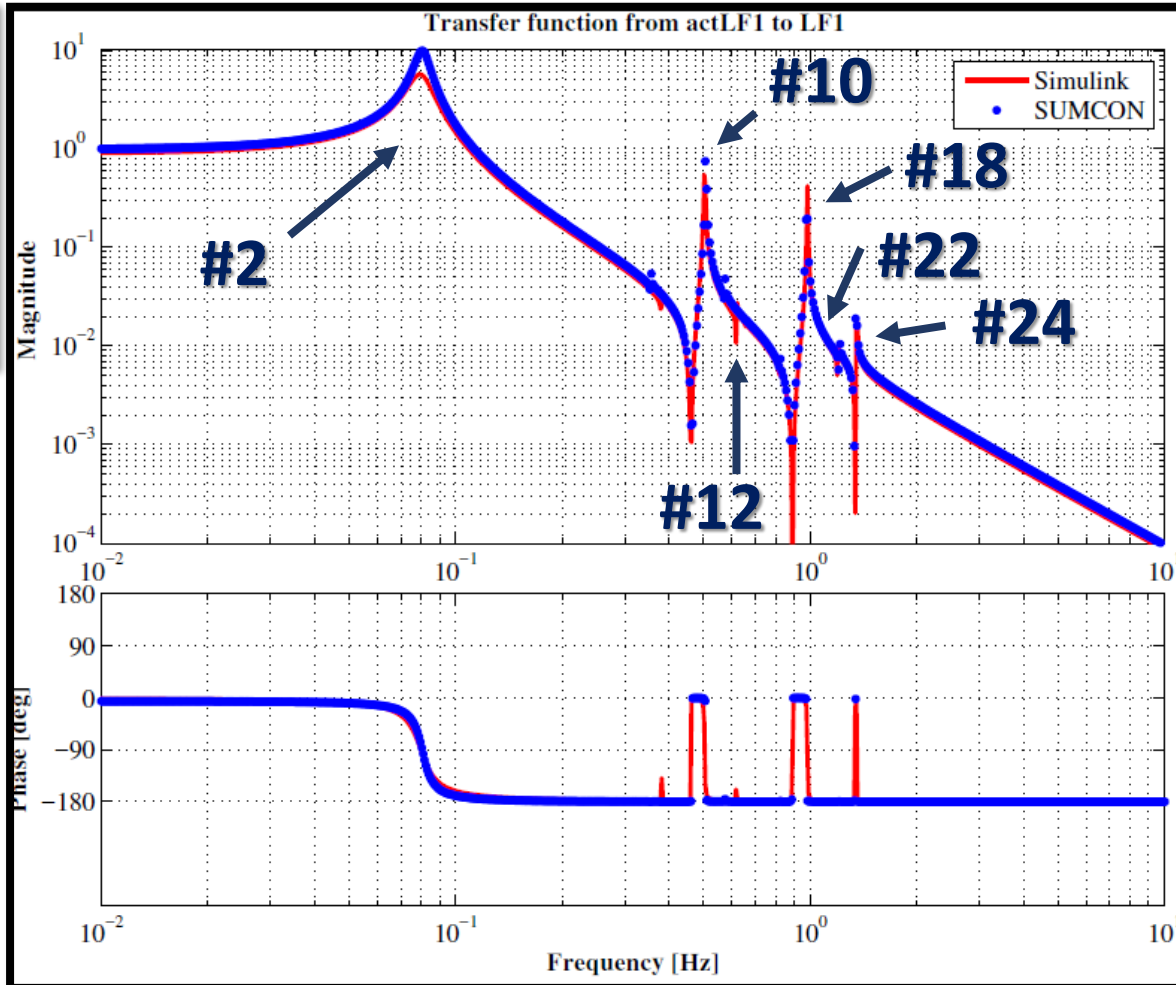
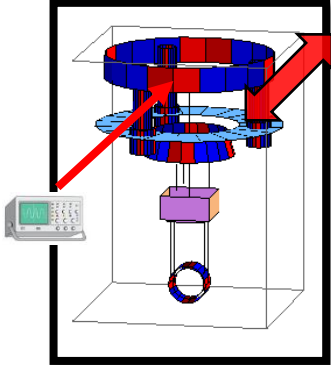
Force Transfer Functions

(, which can be measured, with No ctrl)



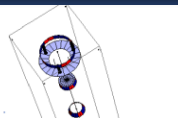
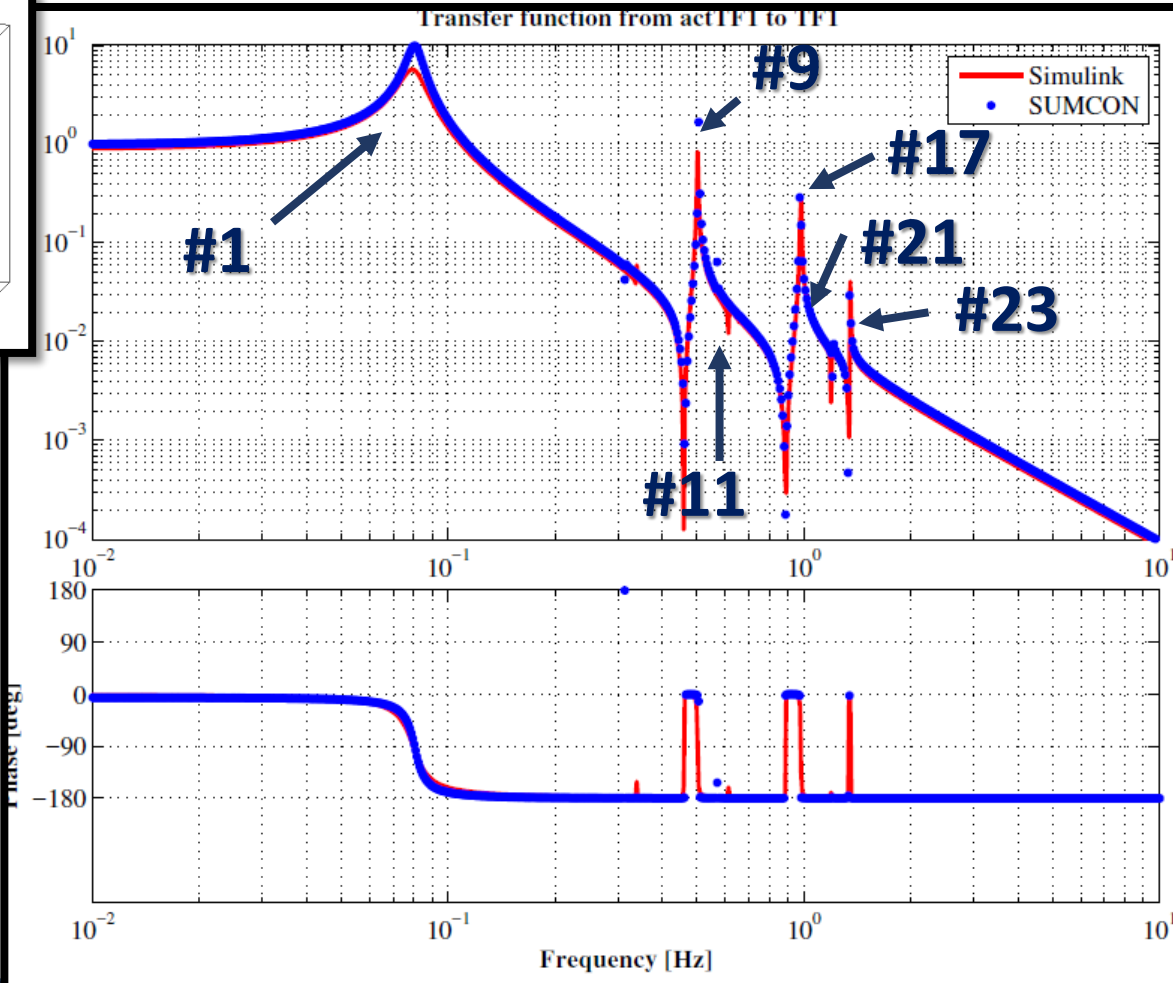
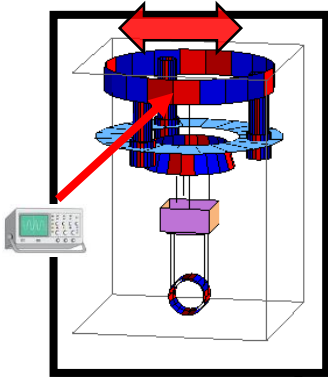
Force Transfer Function

LVDT_LF1 / actLF1



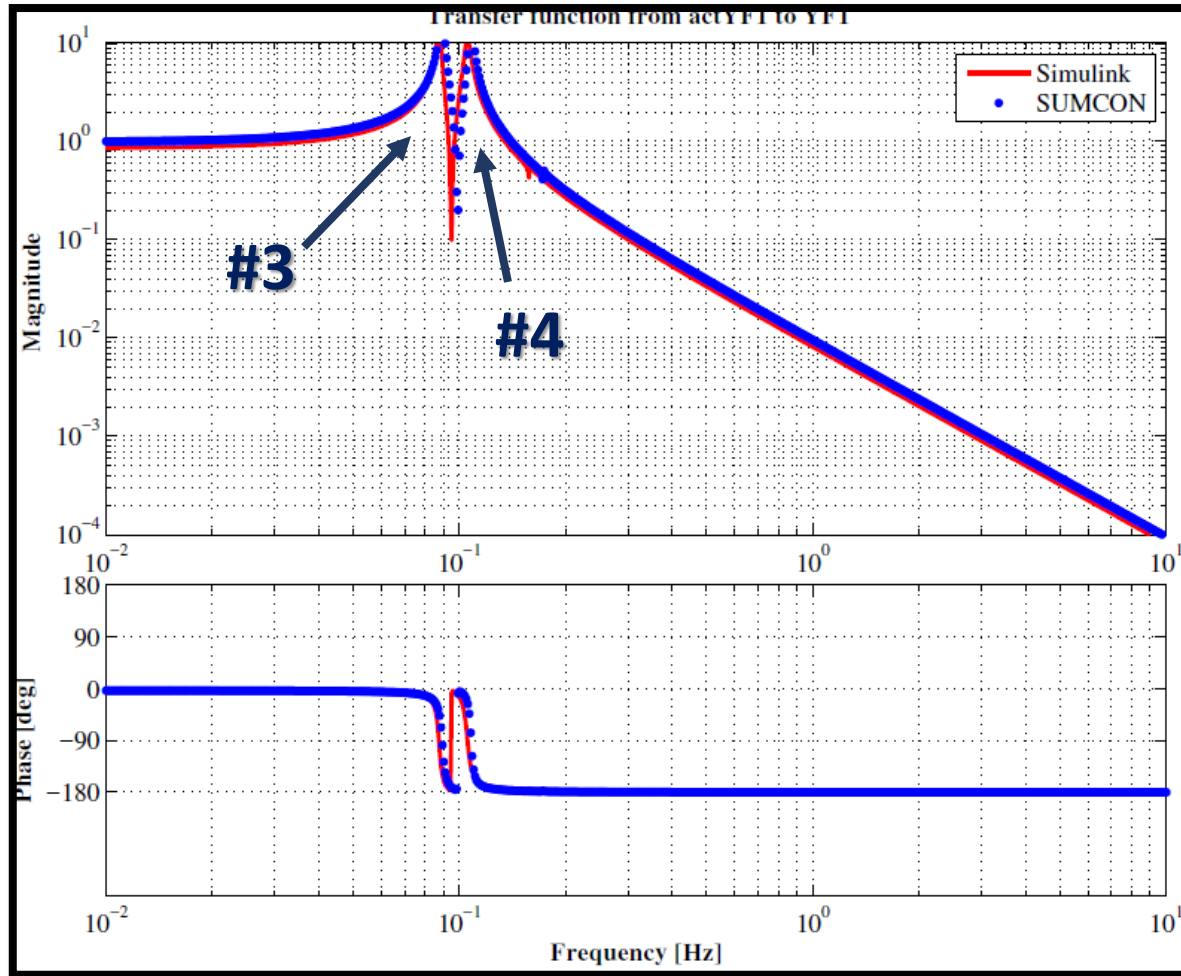
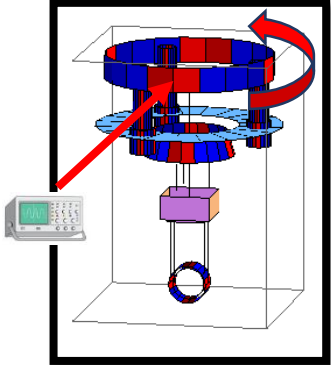
Force Transfer Function

LVDT_TF1 / actTF1



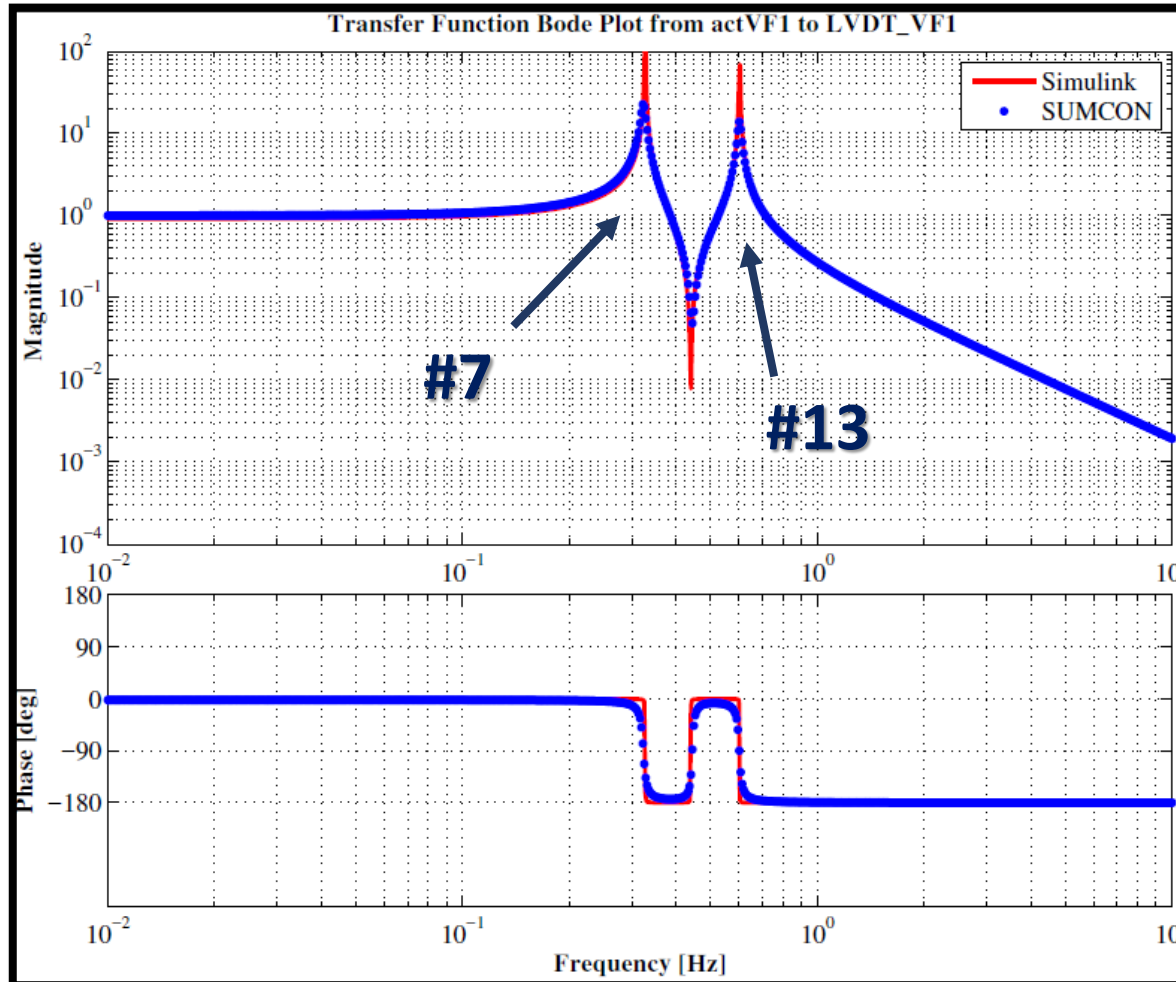
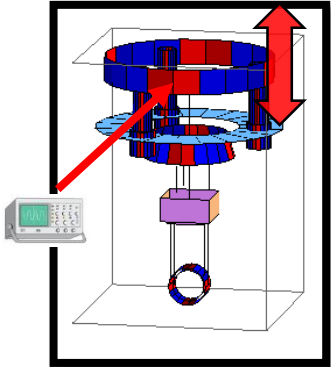
Force Transfer Function

LVDT_YF1 / actYF1



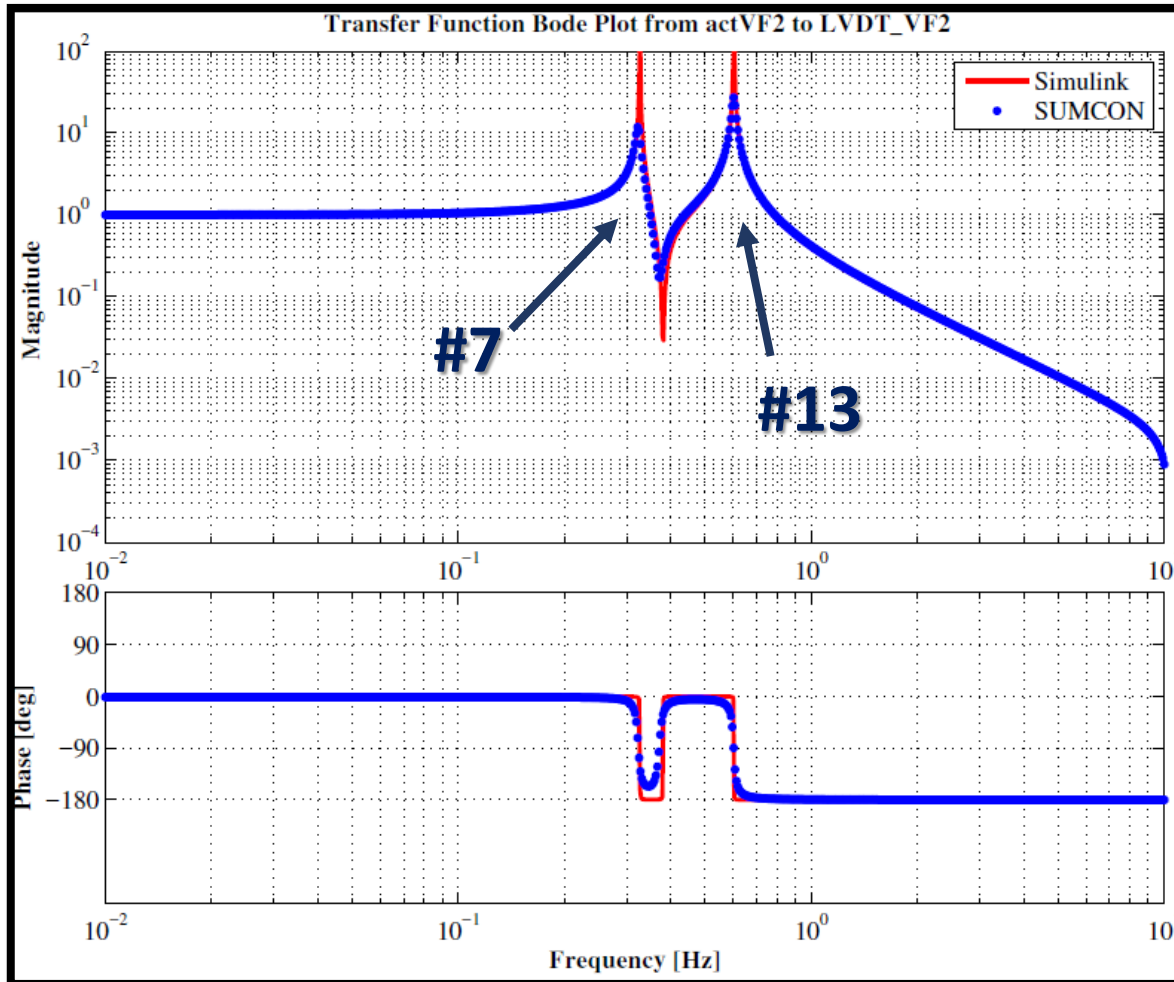
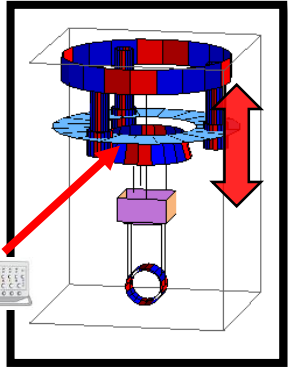
Force Transfer Function

LVDT_VF1 / actVF1



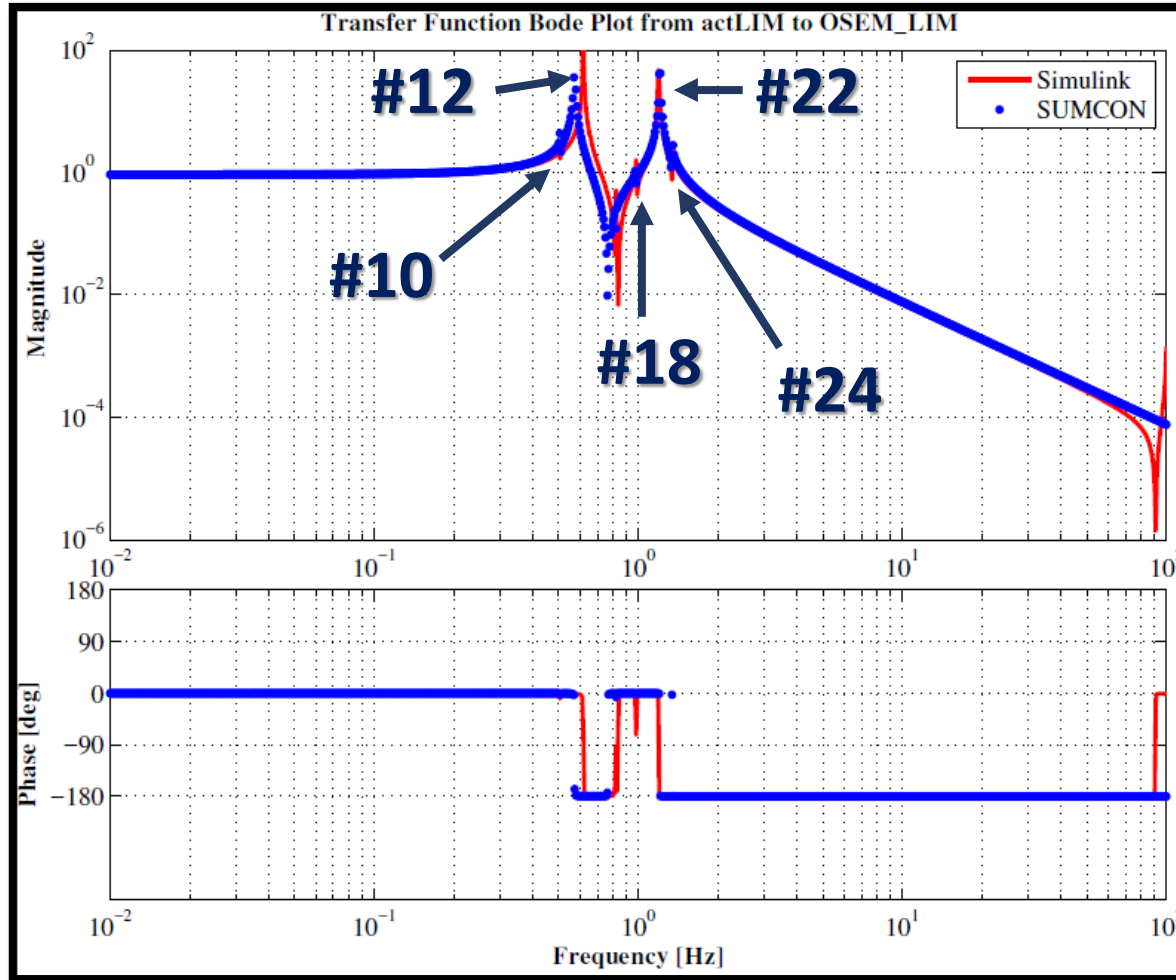
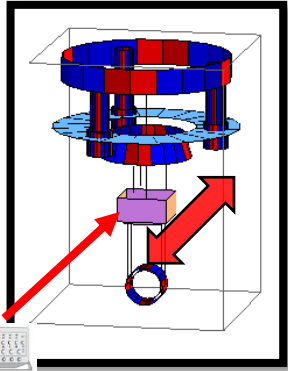
Force Transfer Function

LVDT_VF2 / actVF2



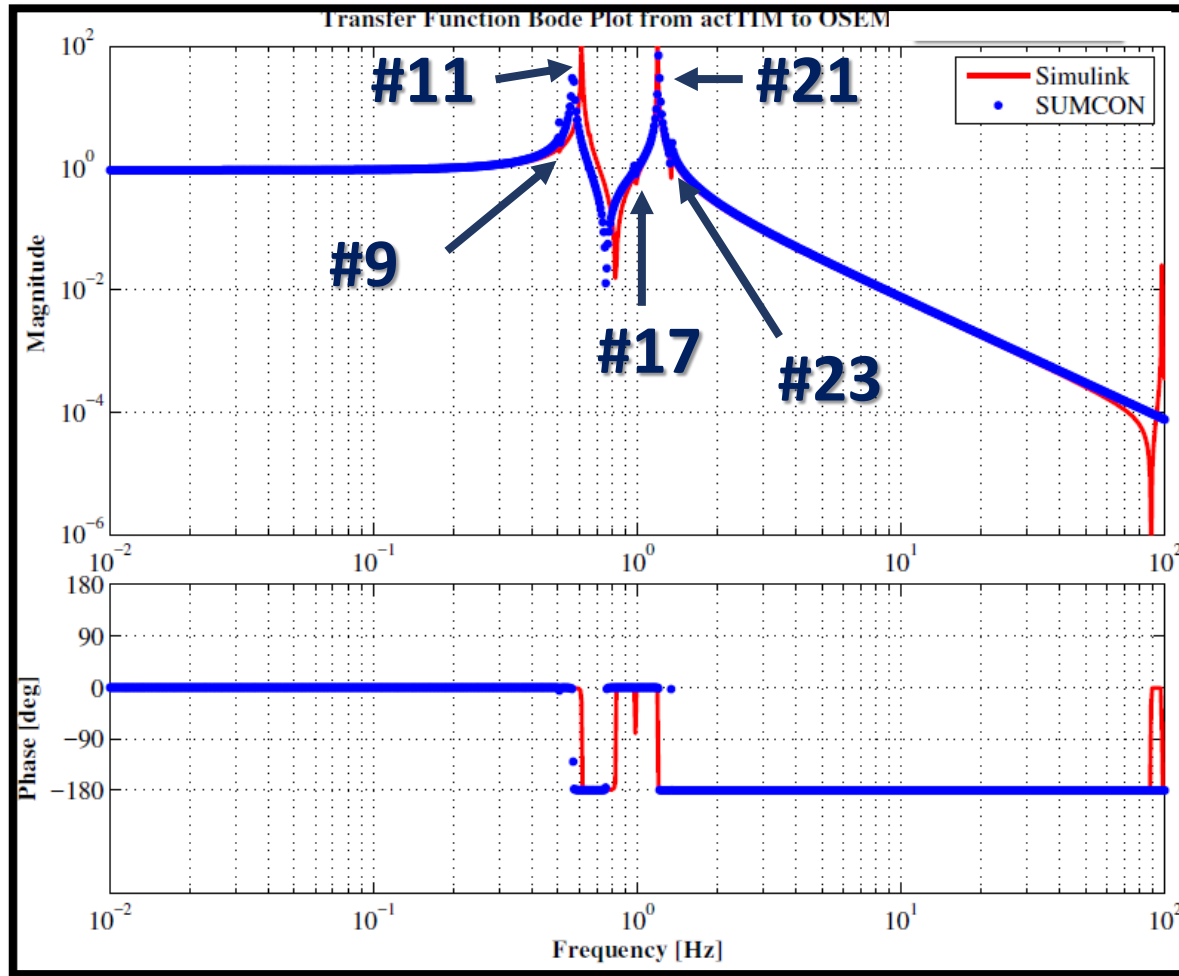
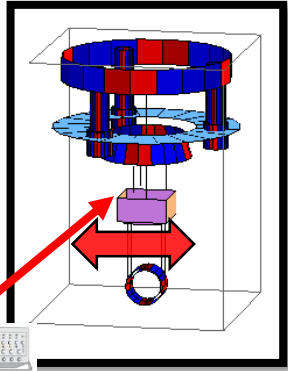
Force Transfer Function

OSEM_LIM / actLIM



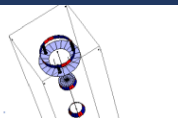
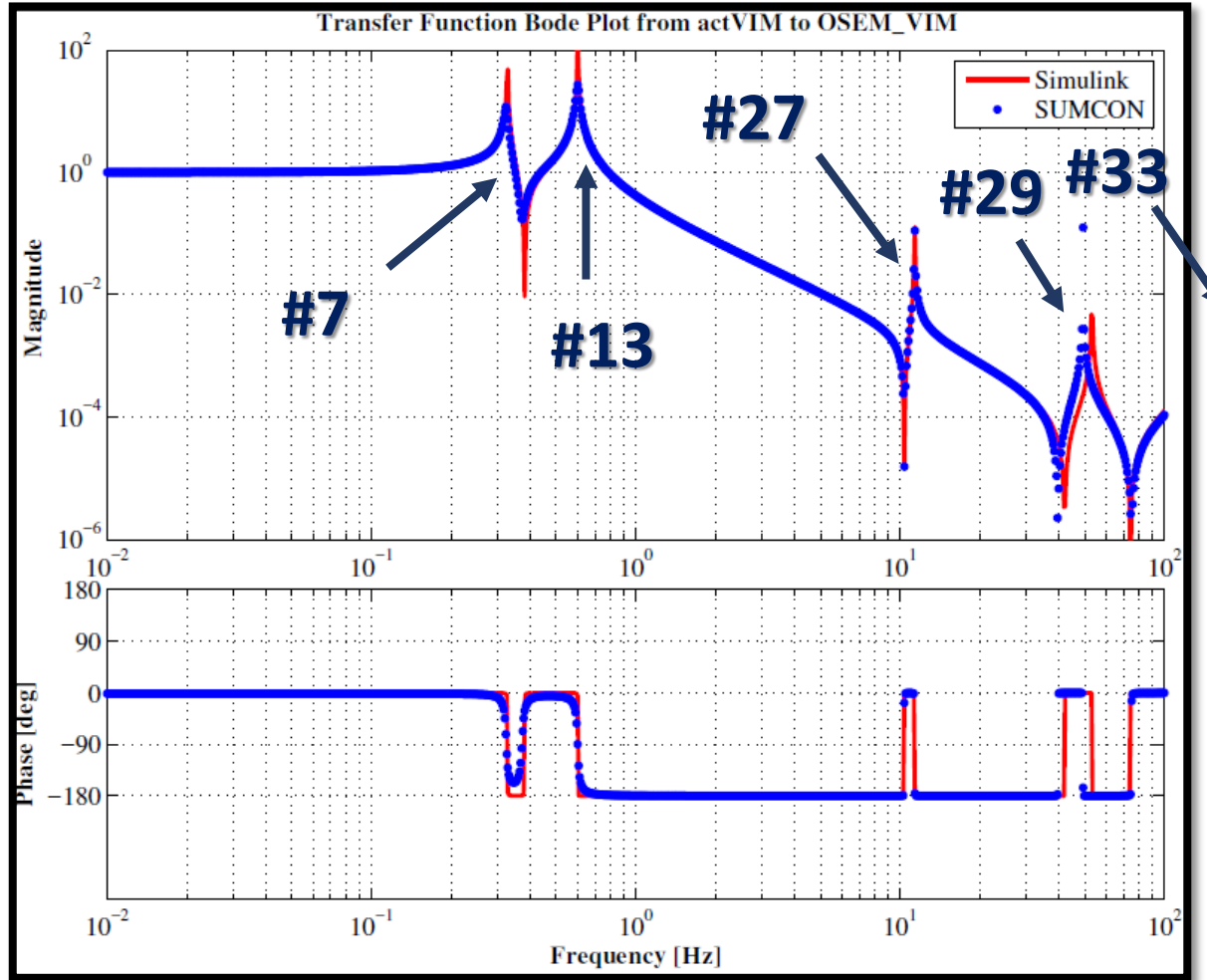
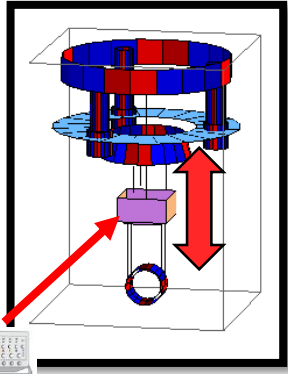
Force Transfer Function

OSEM_TIM / actTIM



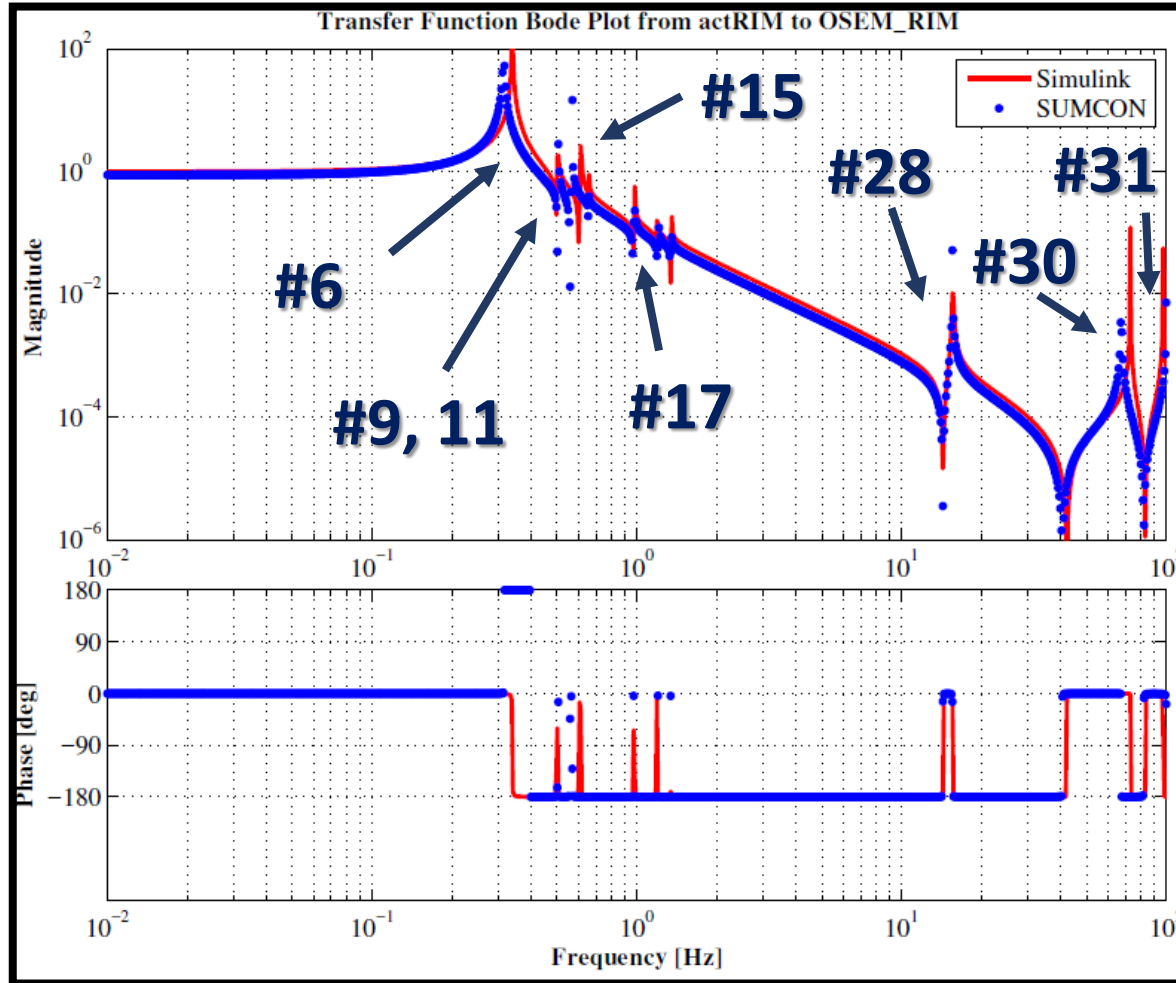
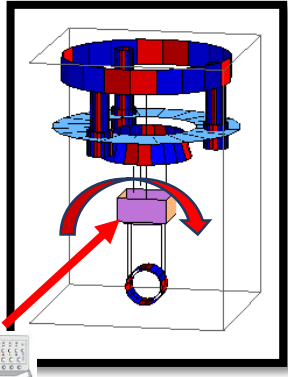
Force Transfer Function

OSEM_VIM / actVIM



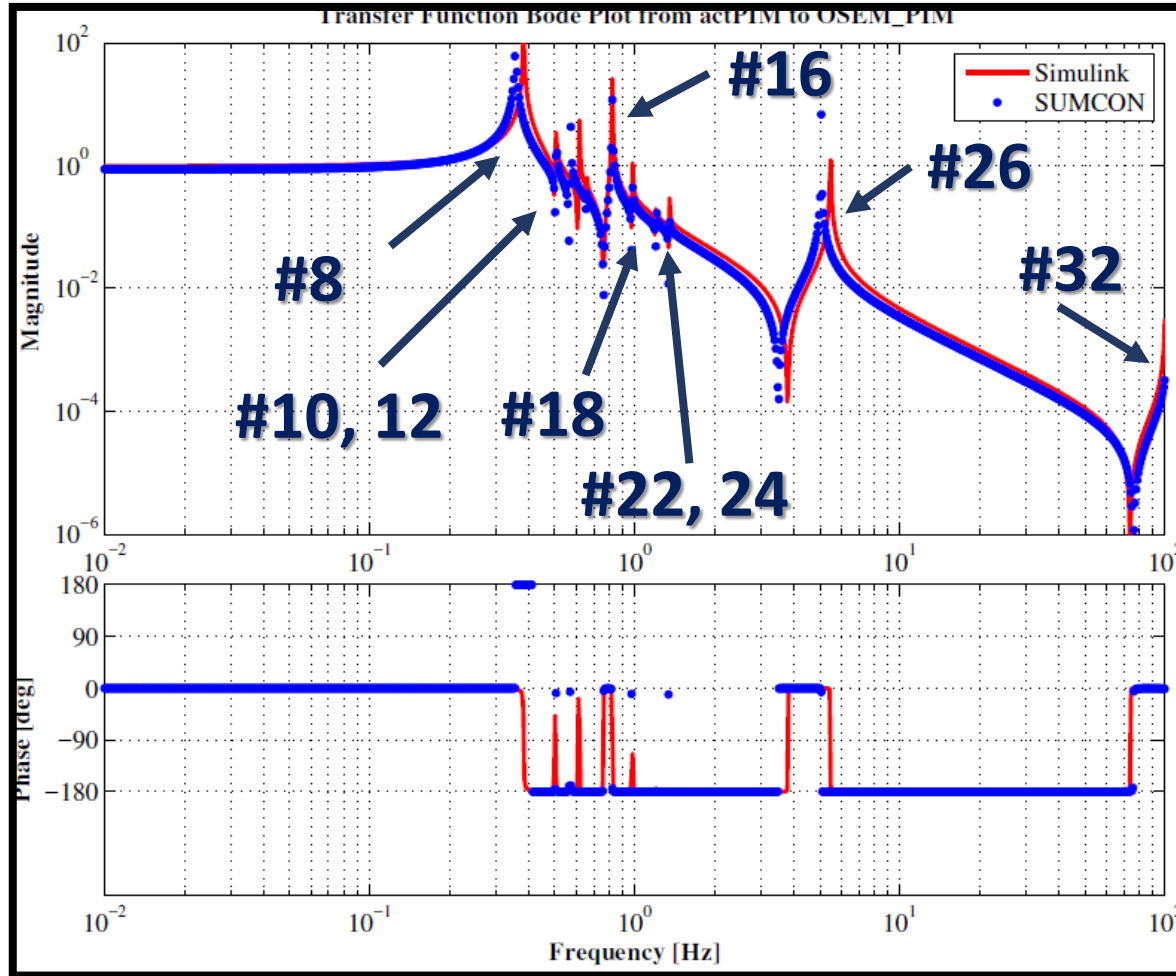
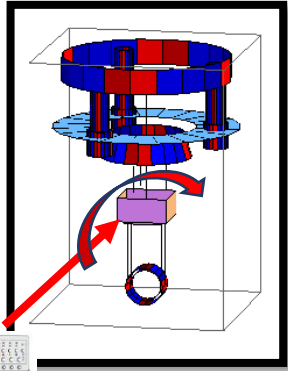
Force Transfer Function

OSEM_RIM / actRIM



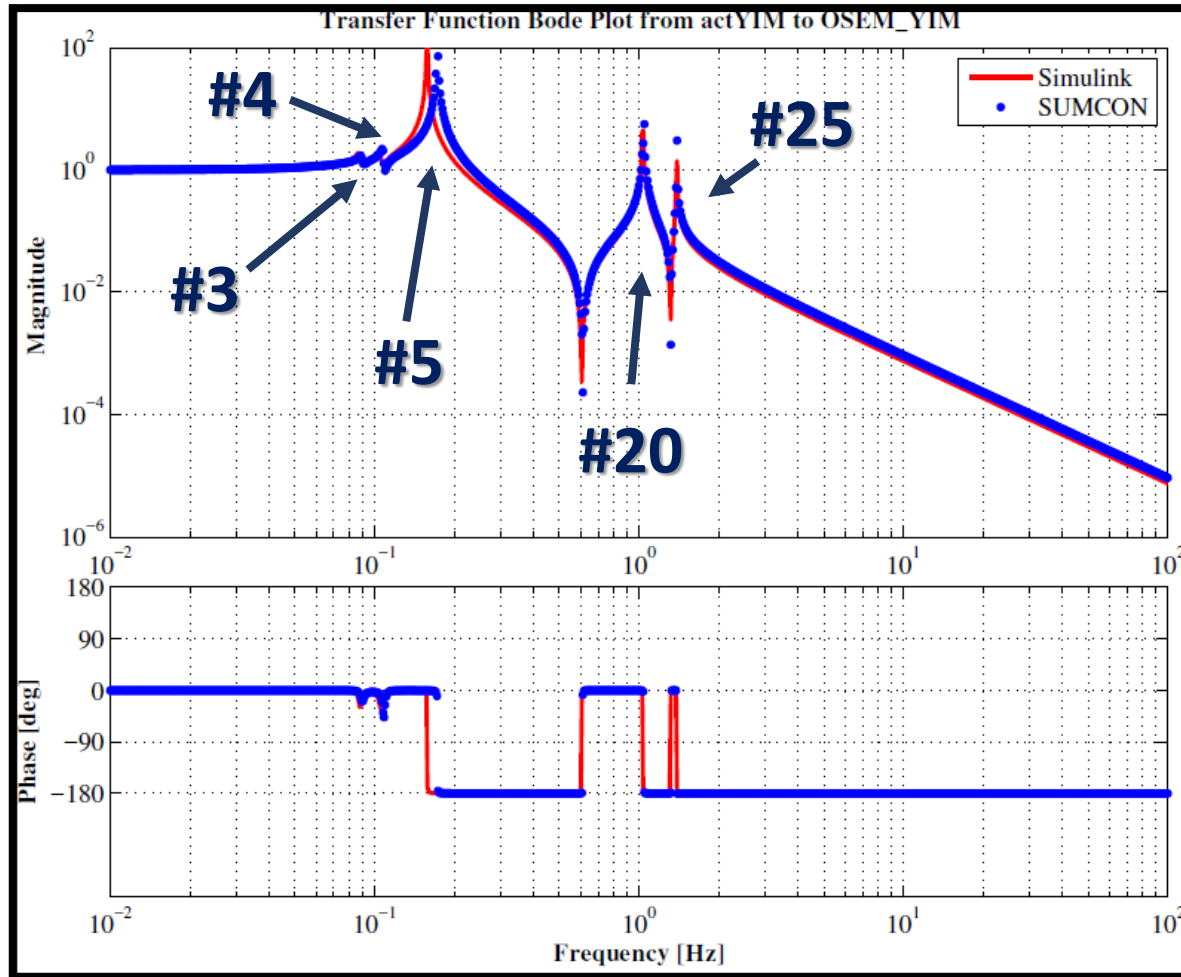
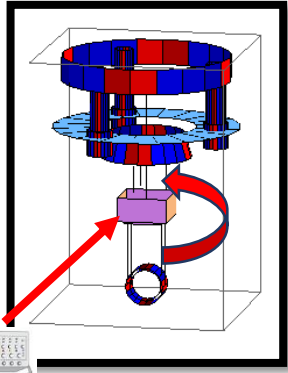
Force Transfer Function

OSEM_PIM / actPIM



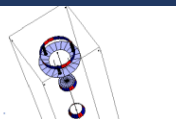
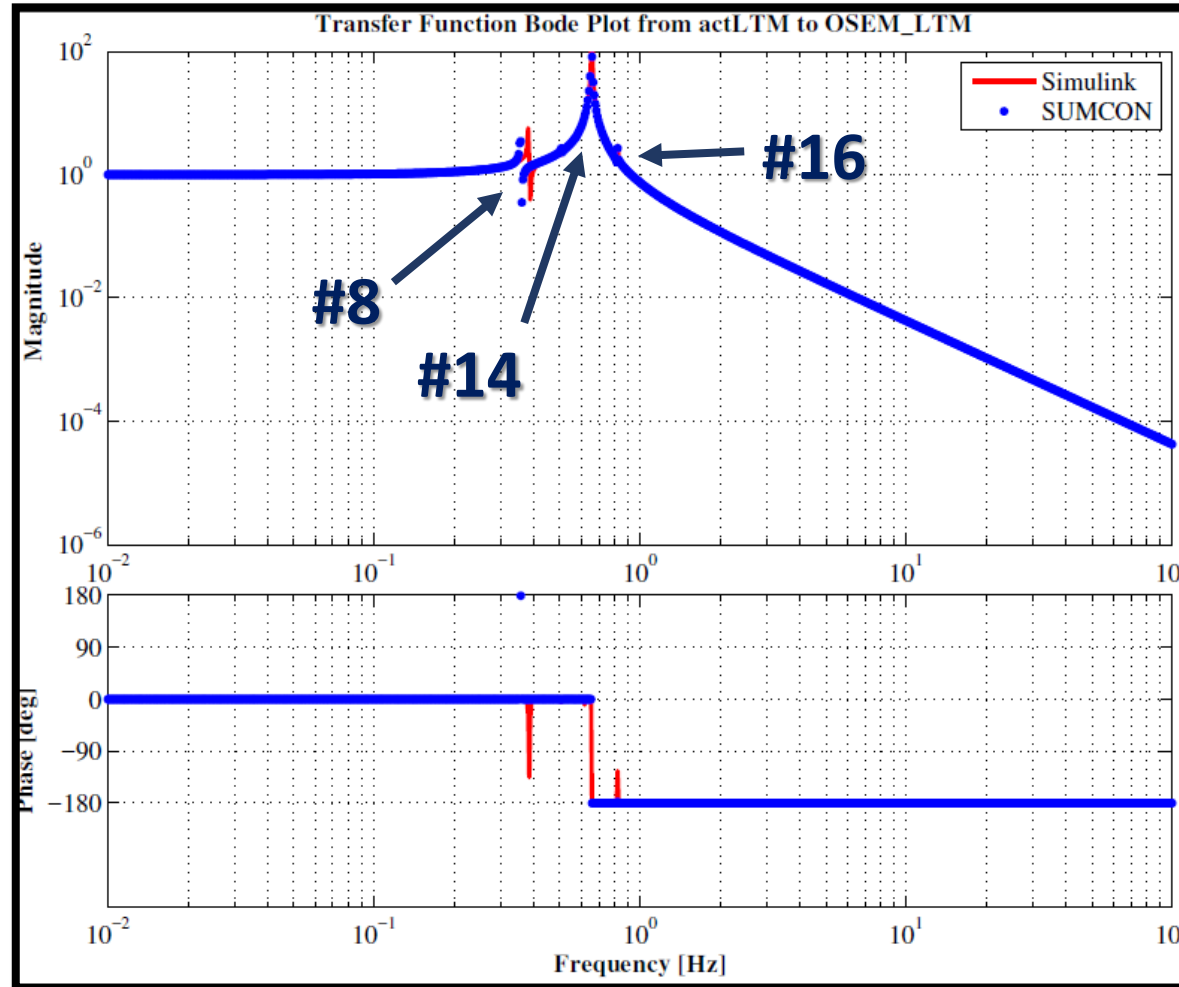
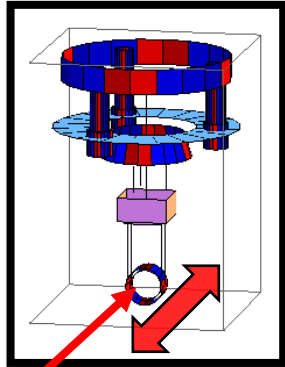
Force Transfer Function

OSEM_YIM / actYIM



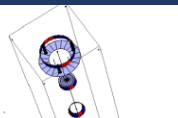
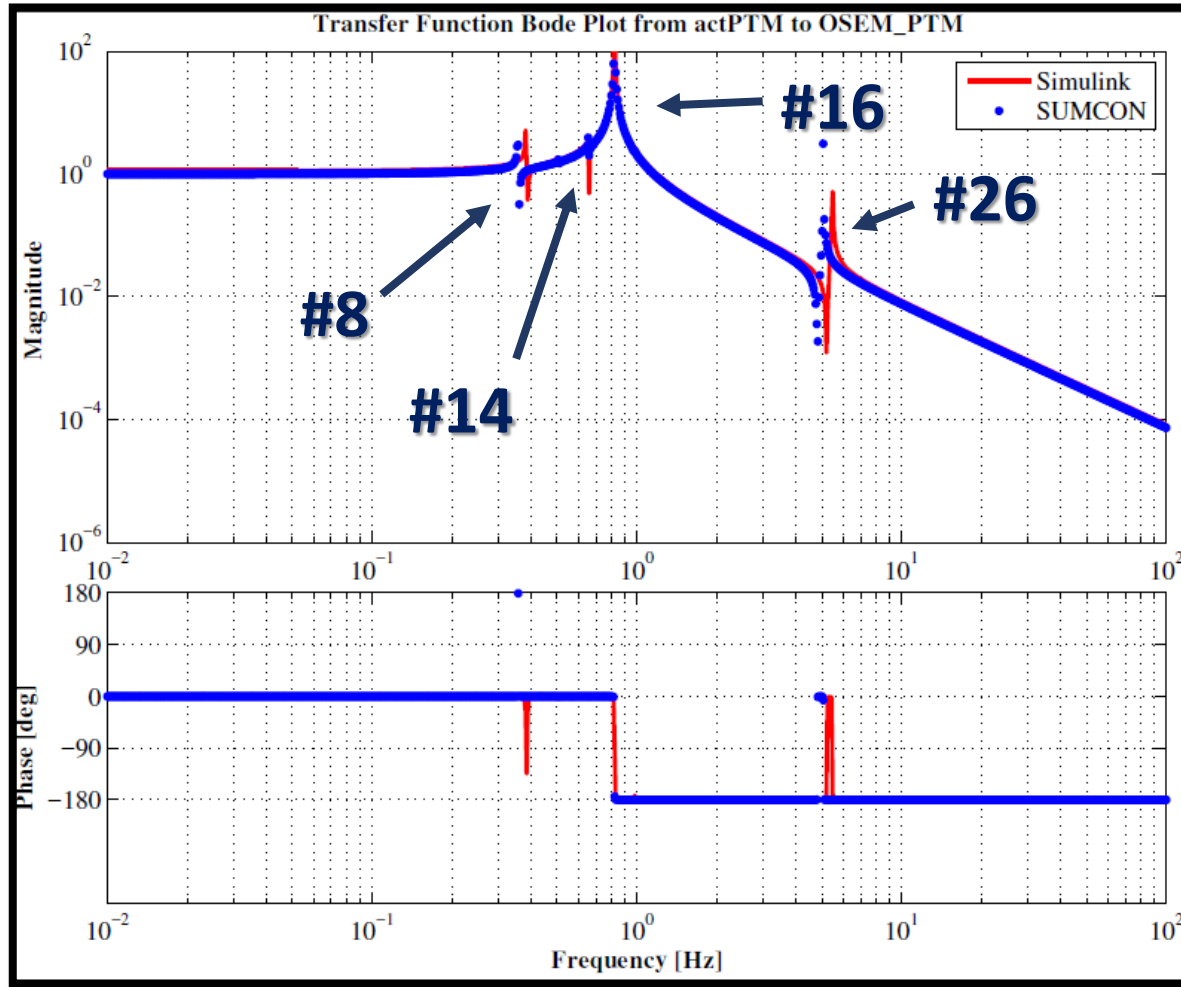
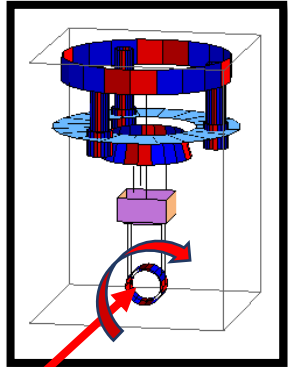
Force Transfer Function

OSEM_LTM / actLTM



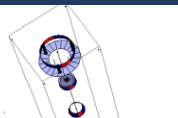
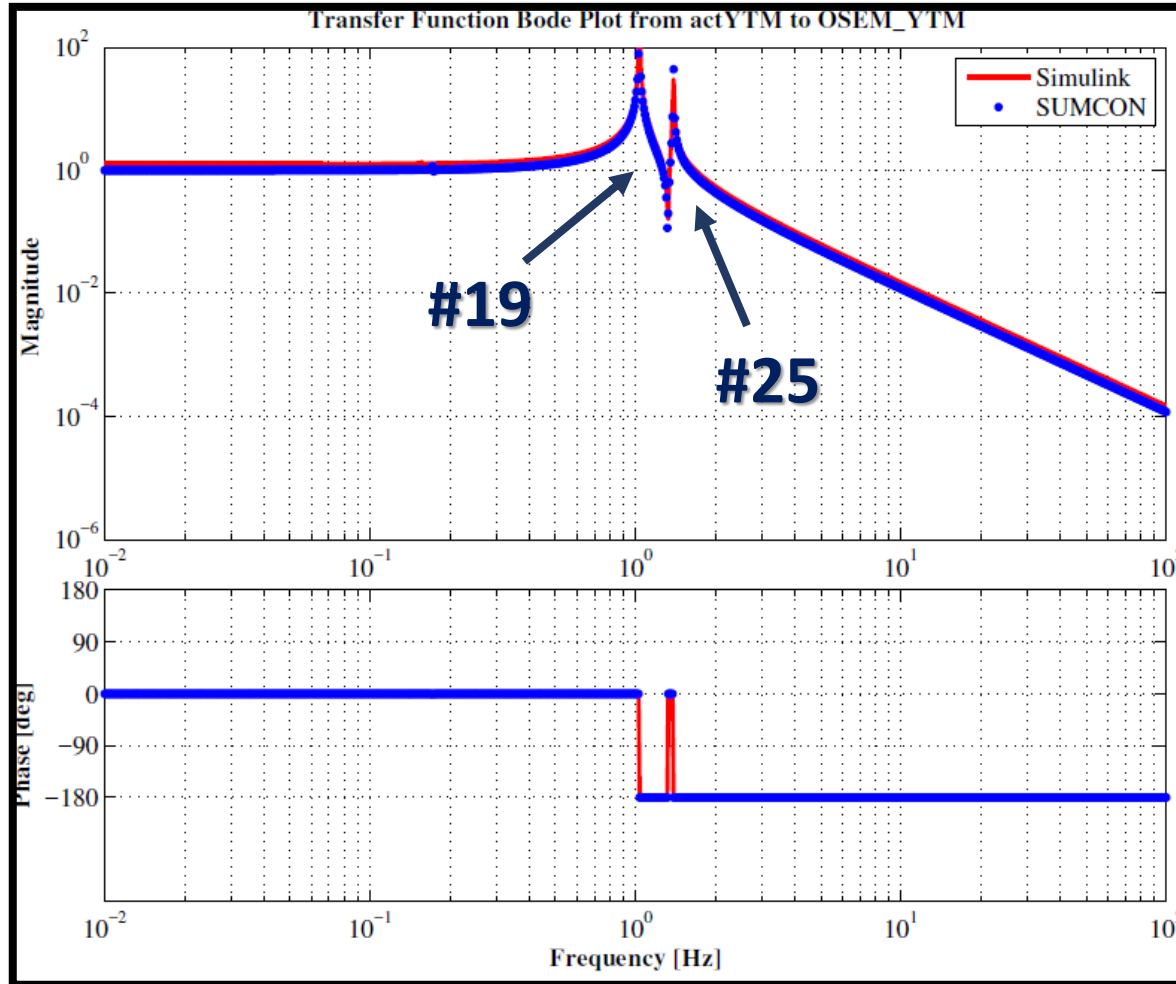
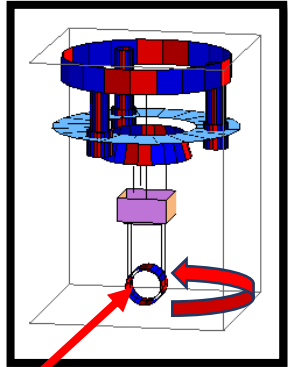
Force Transfer Function

OSEM_PT_M / actPT_M



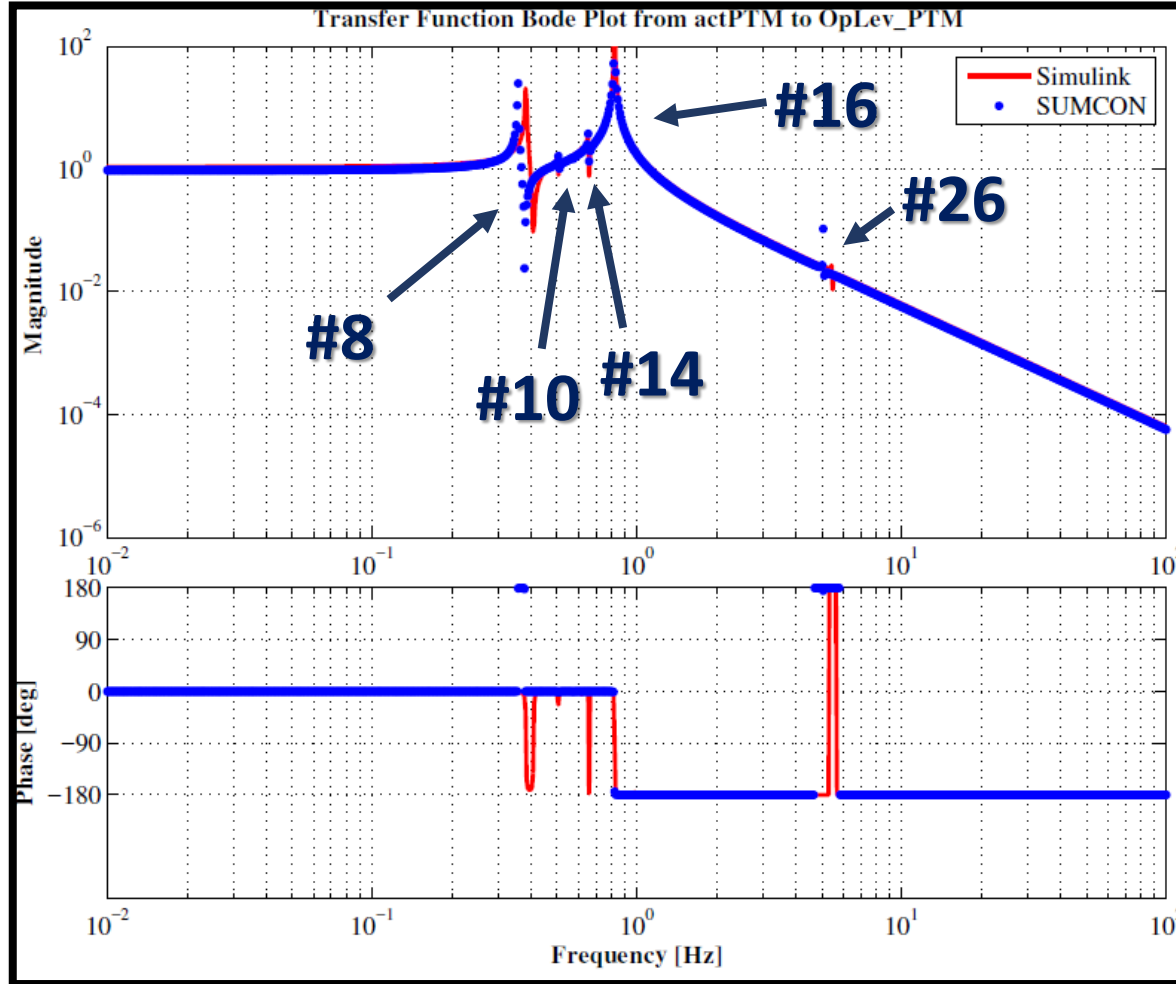
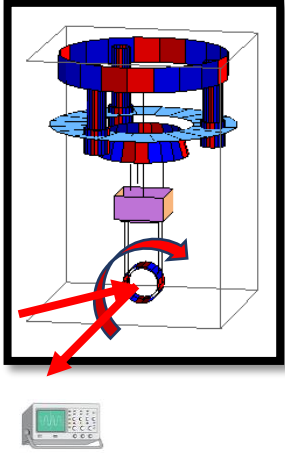
Force Transfer Function

OSEM_YTM / actYTM



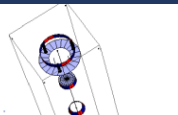
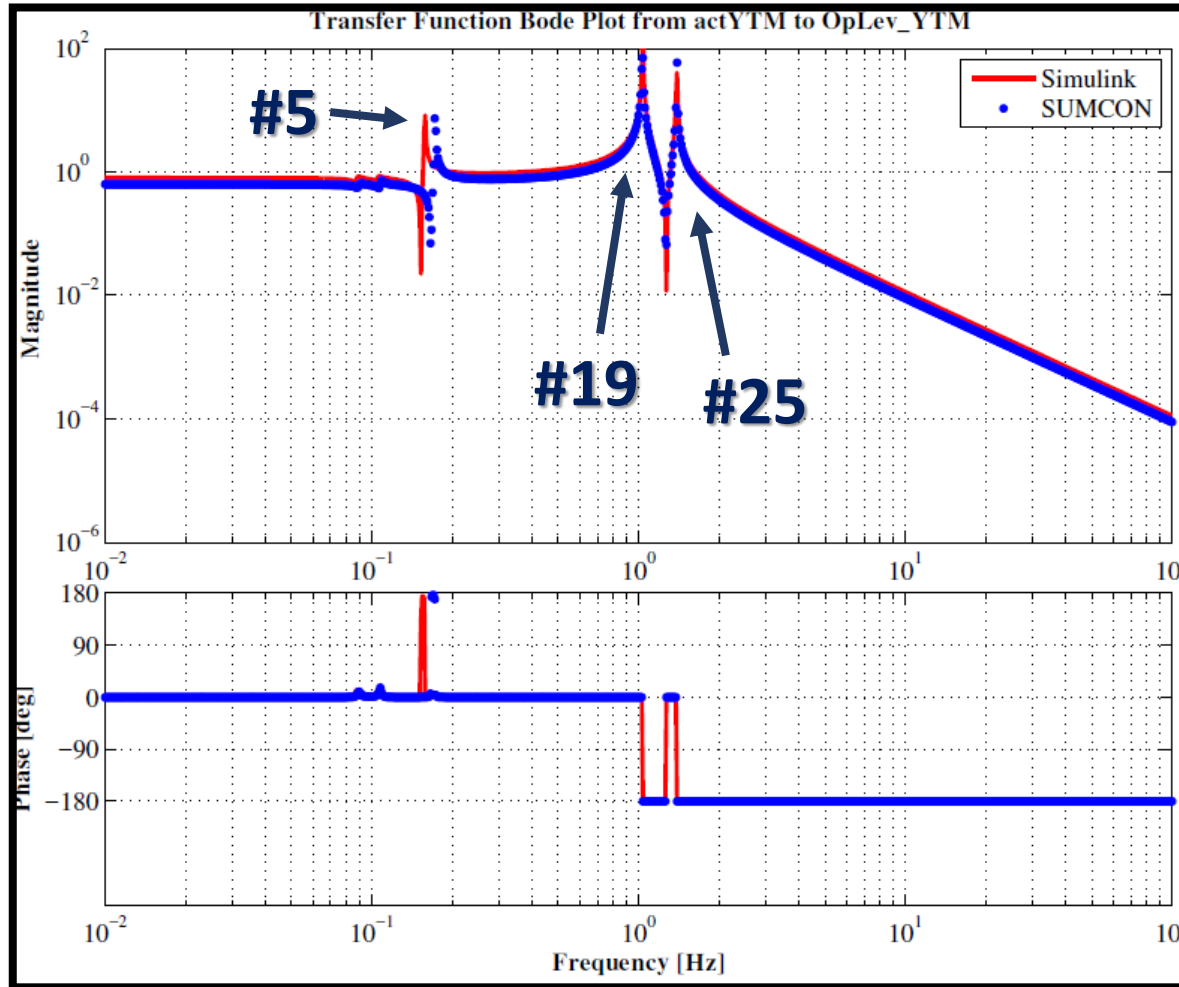
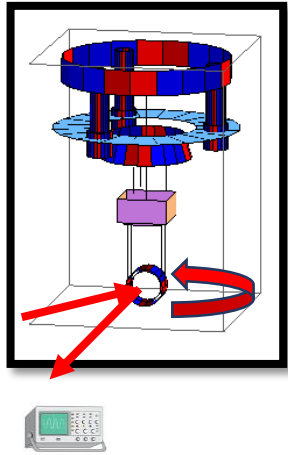
Force Transfer Function

OpLev_PTМ / actPTM



Force Transfer Function

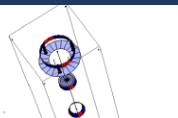
OpLev_YTM / actYTM



Spectra

without control

using 90 percentile seismic noise





2 Seismic noise level at the Kamioka site

The seismic displacement and velocity we used is shown in Fig.2 and ??[2]. This is the one called high-noise model. The seismic displacement in Kamioka is below this level for 90 % of time.

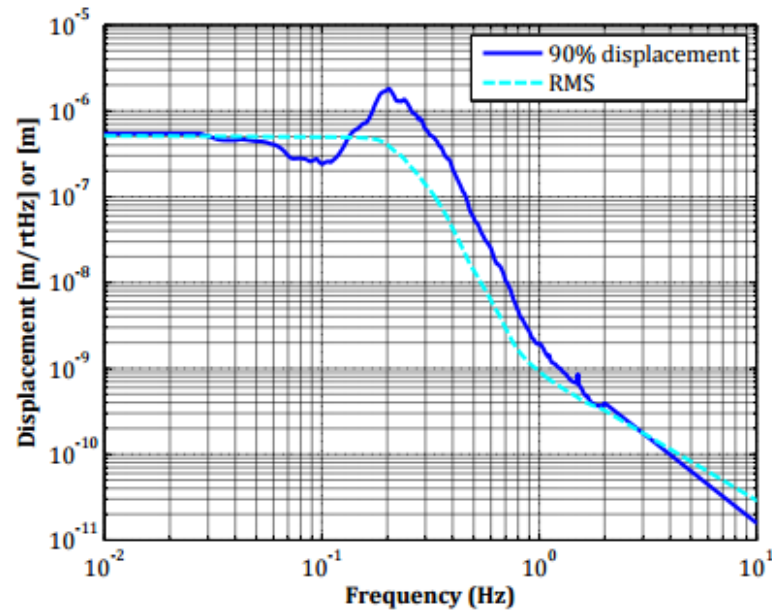


Figure 1: The high-level seismic displacement in Kamioka.

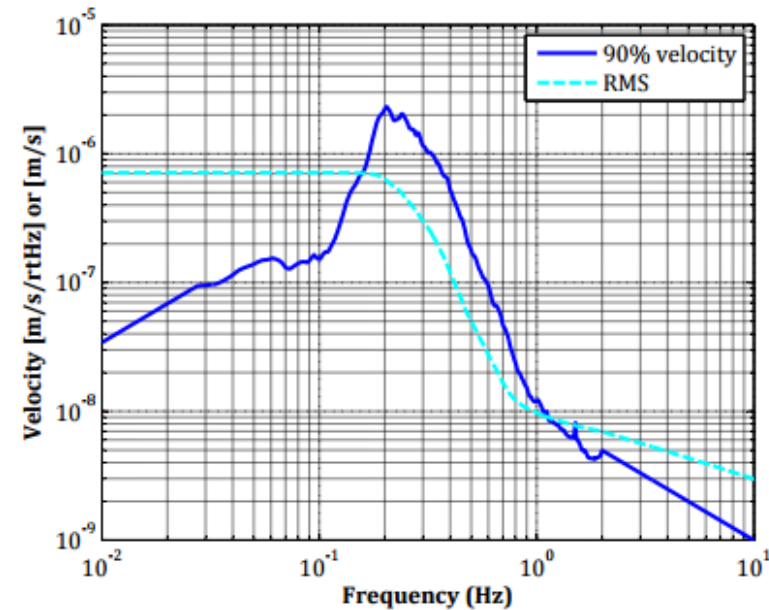
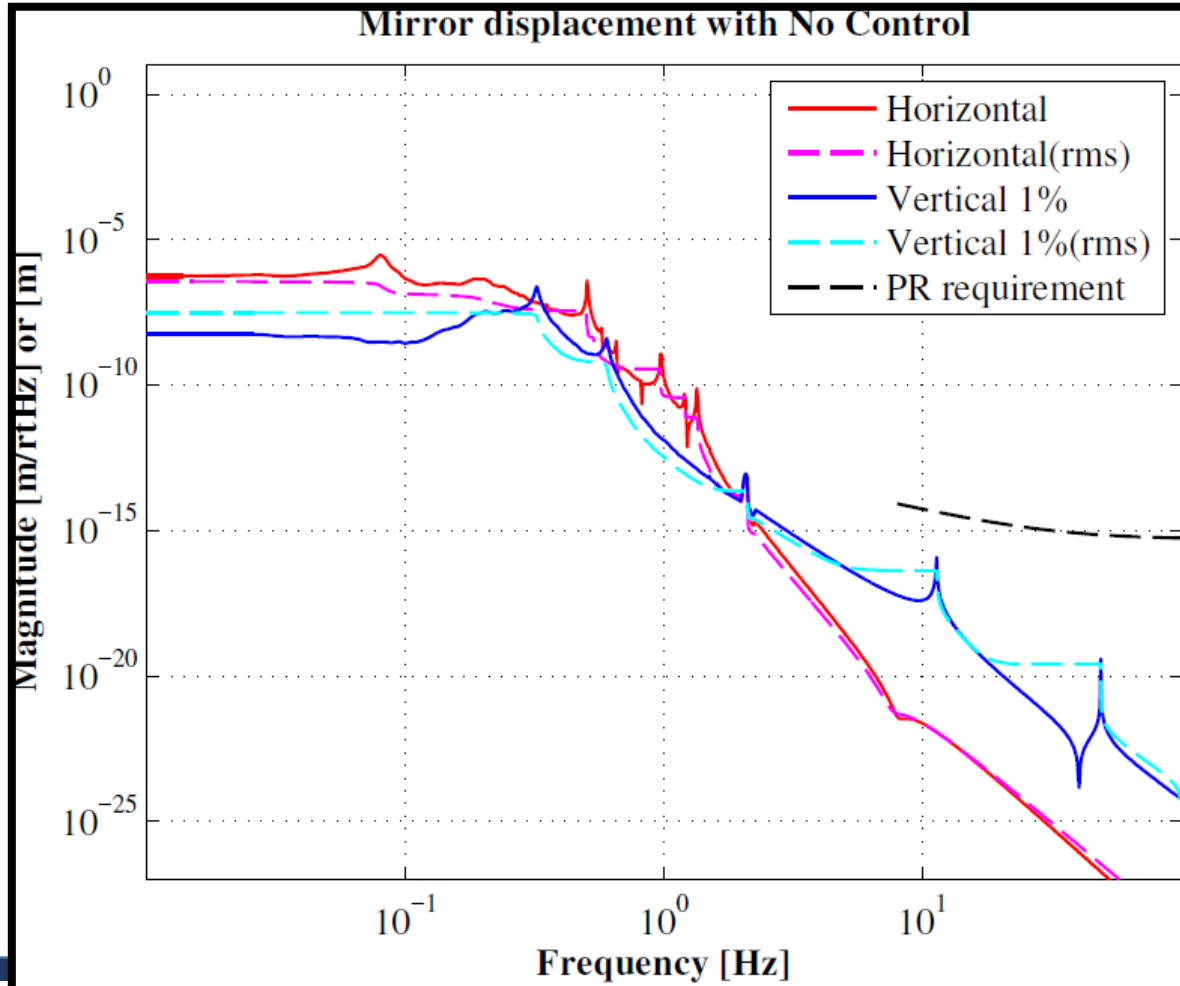


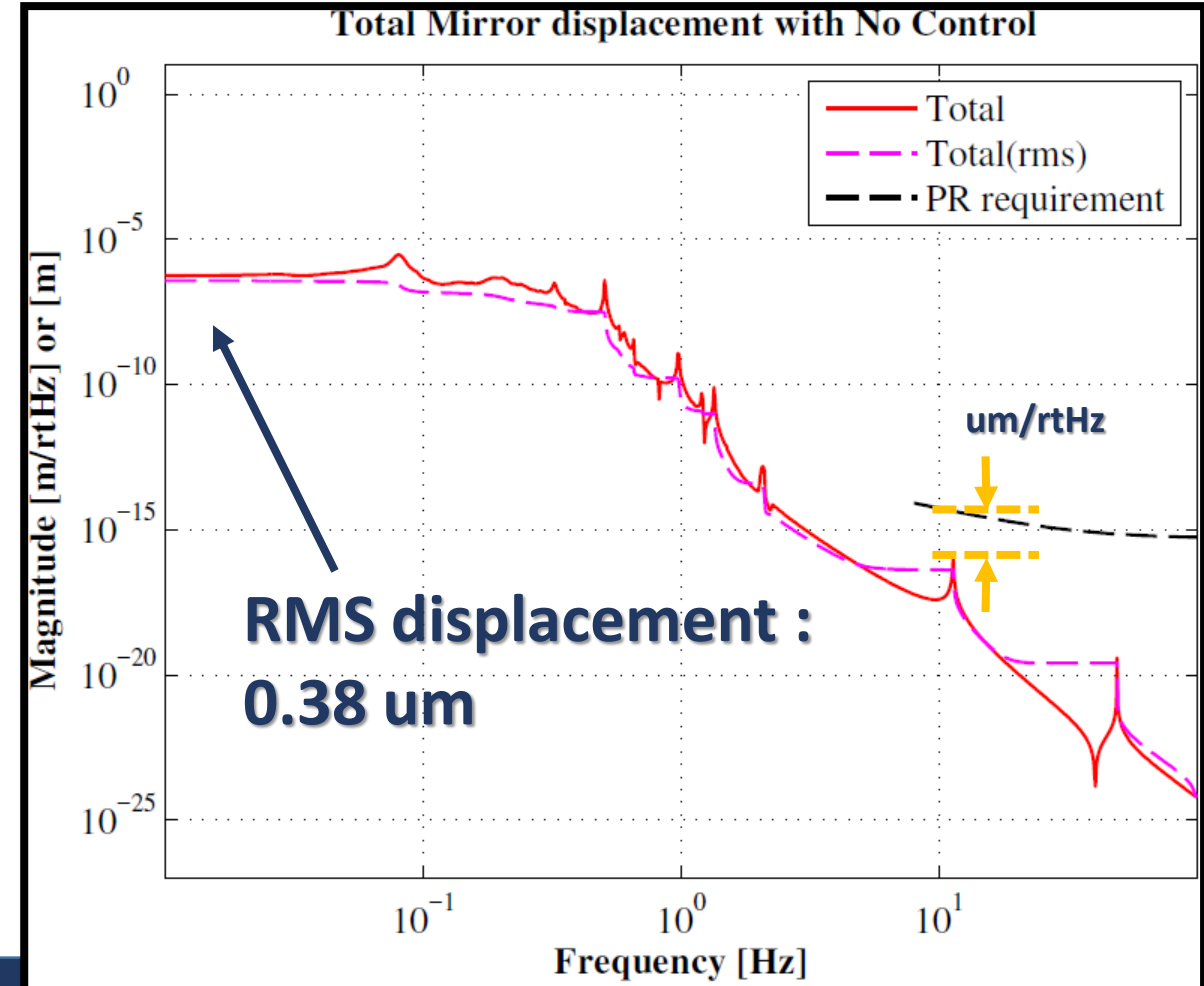
Figure 2: The high-level seismic velocity in Kamioka.

Spectra without ctrl

TM displacement : H and V 1%

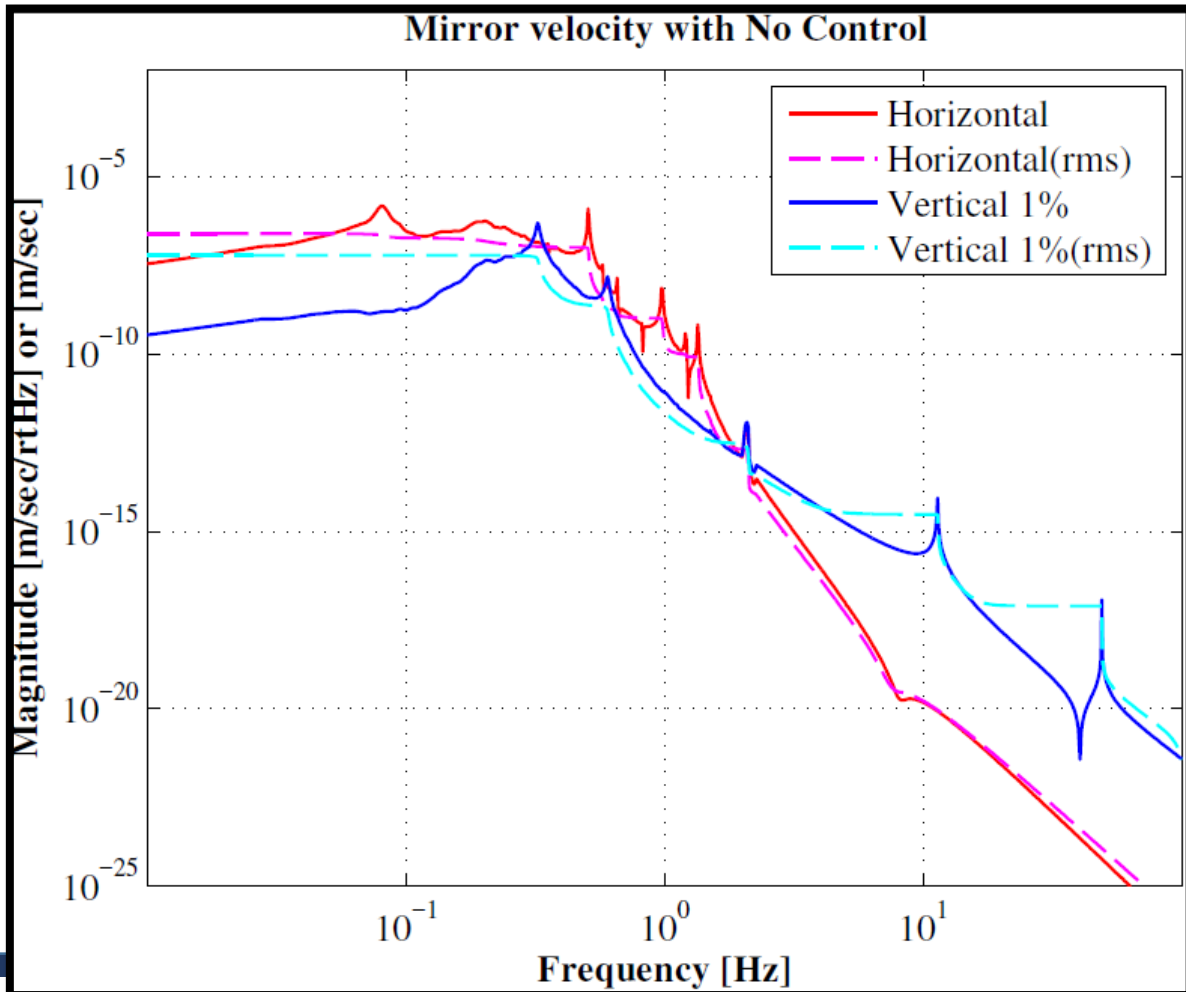


TM displacement : H + V 1%

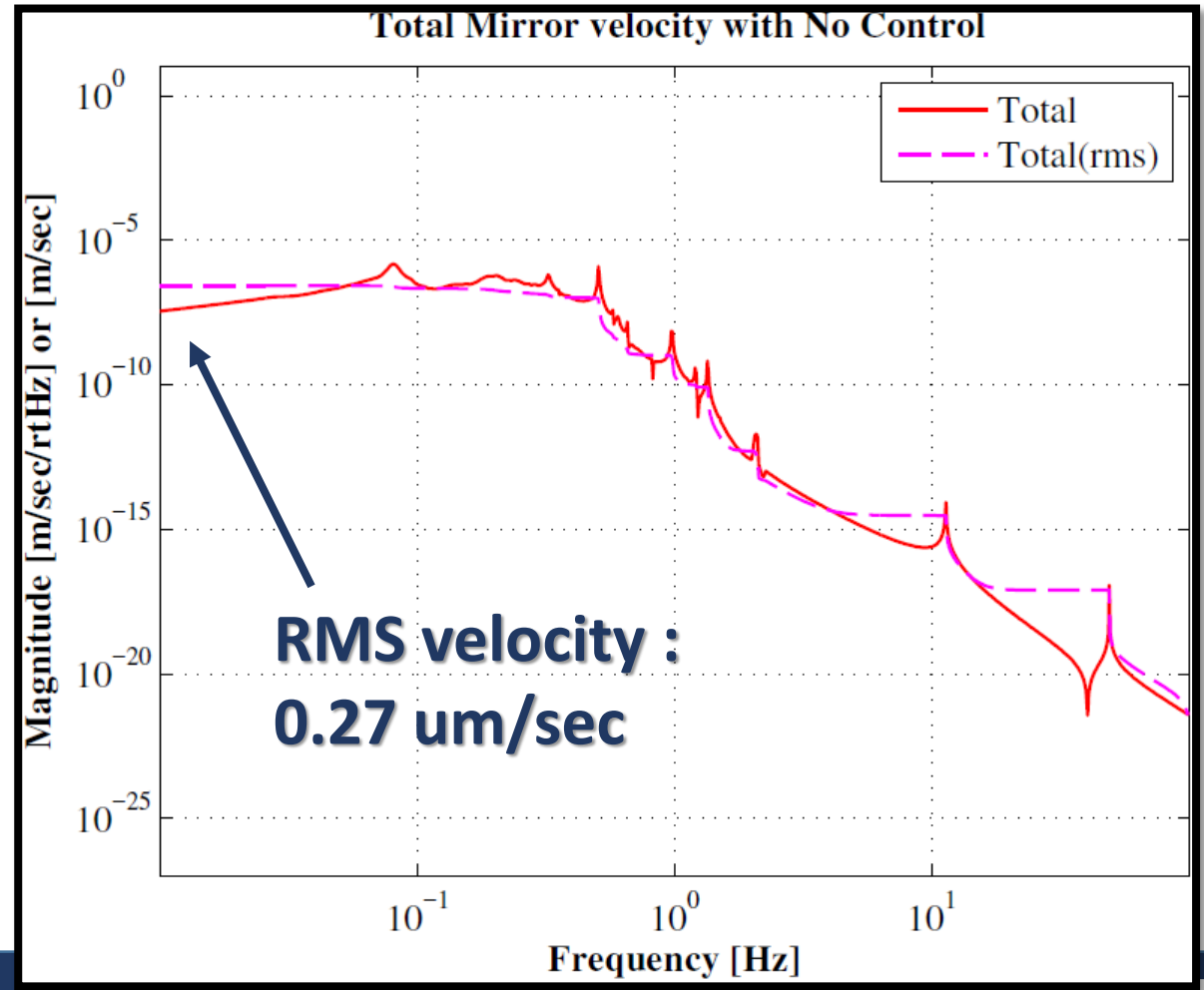


Spectra without ctrl

TM velocity : H and V 1%

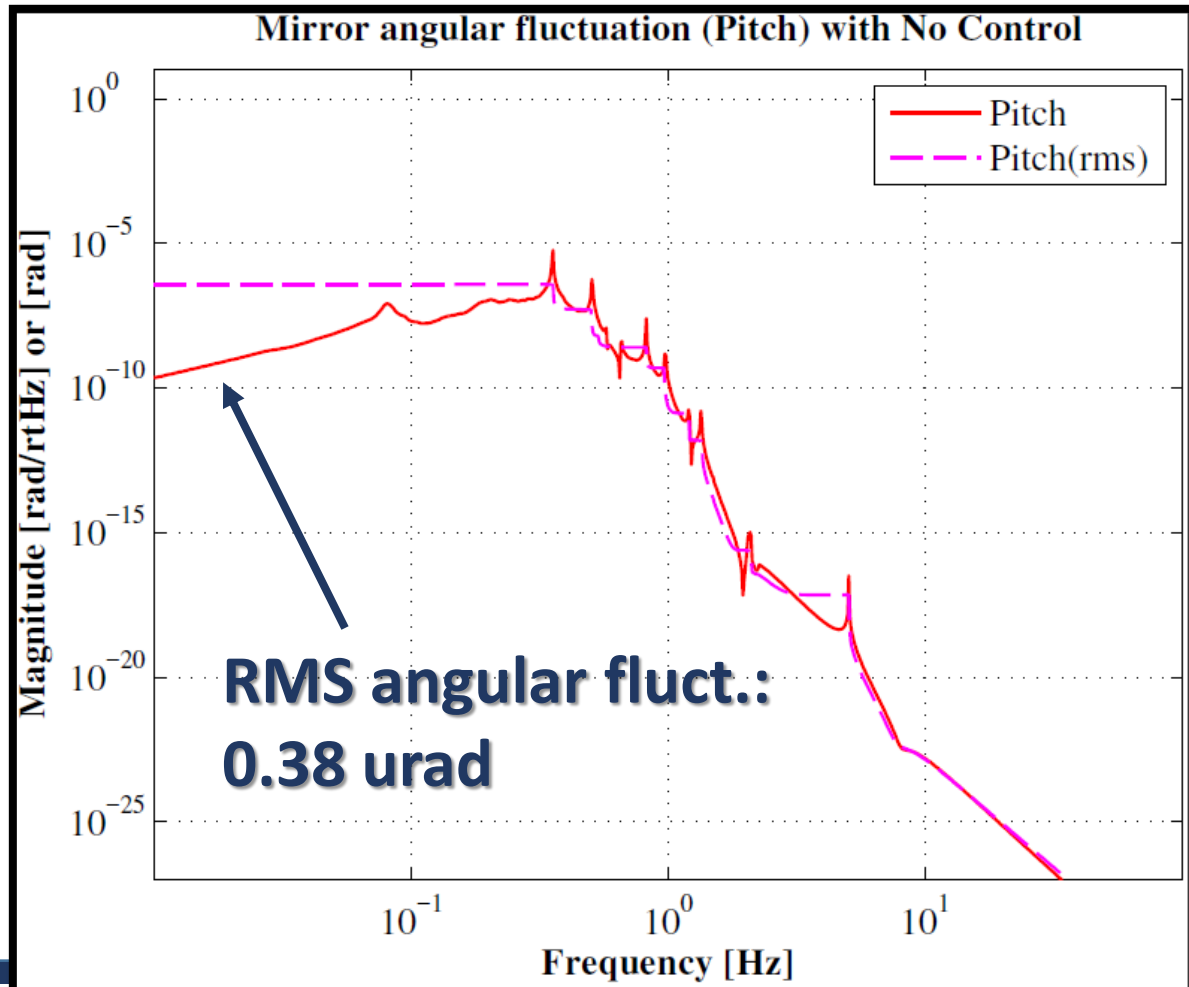


TM velocity : H + V 1%



Spectra without ctrl

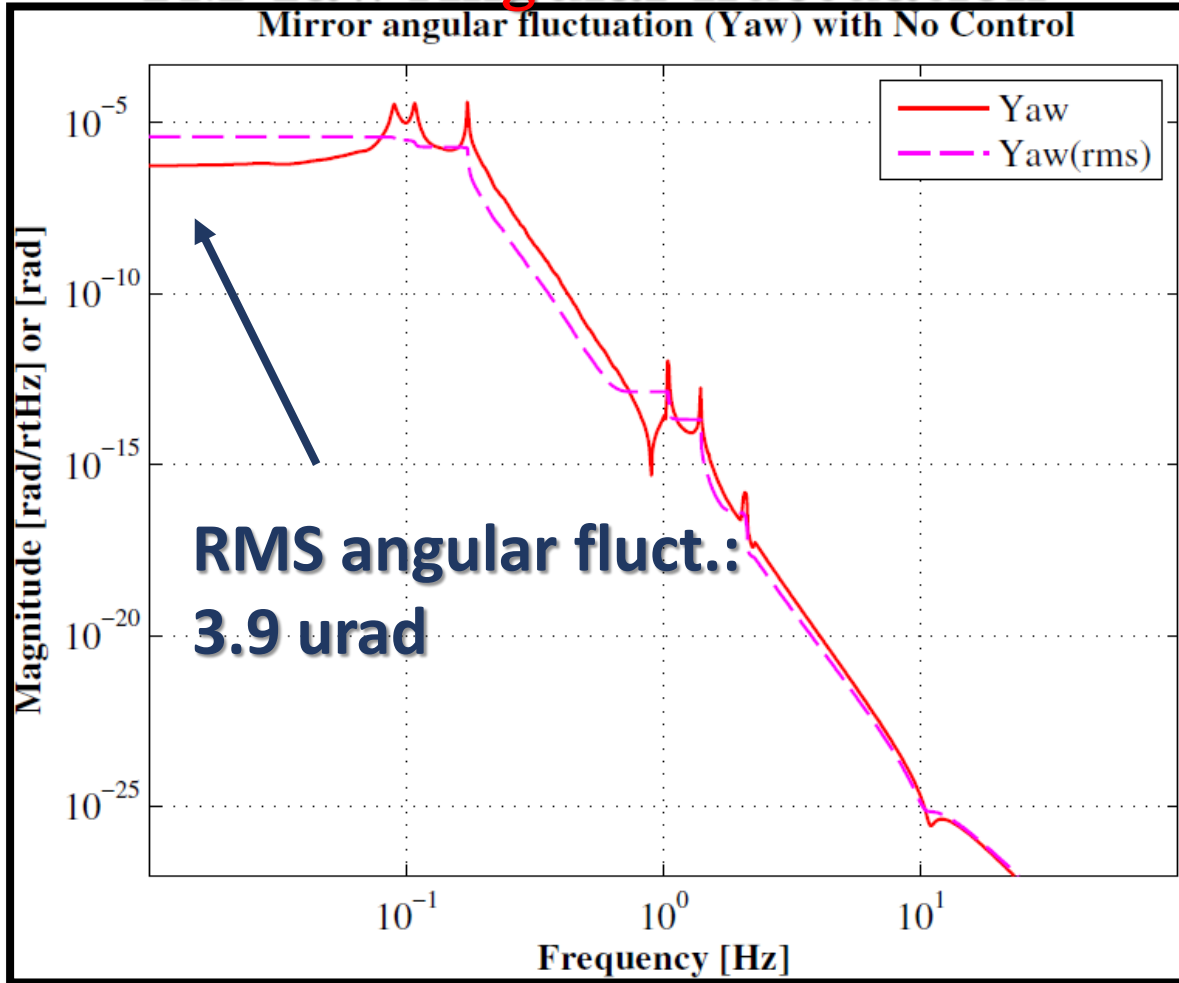
TM Pitch Angular fluctuation



TM **Pitch** fluctuation
excited by **Longitudinal** GND motion

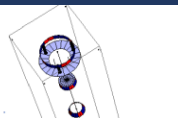
Spectra without ctrl

TM Yaw Angular fluctuation



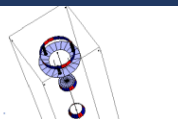
TM **Yaw** fluctuation
excited by **Yaw** GND motion

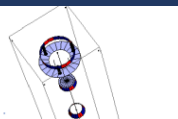
Control Simulation Results



Filter shape

OLTF





Q factor in damping control



Impulse response

