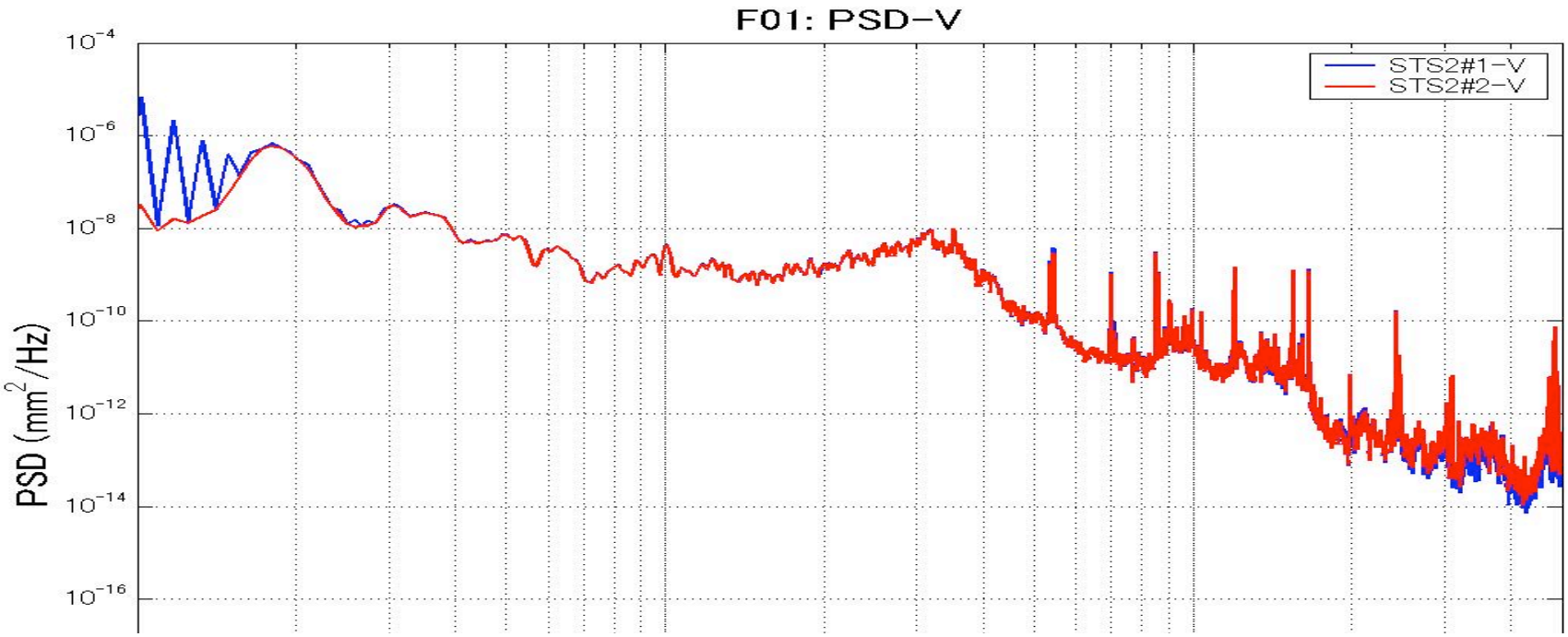
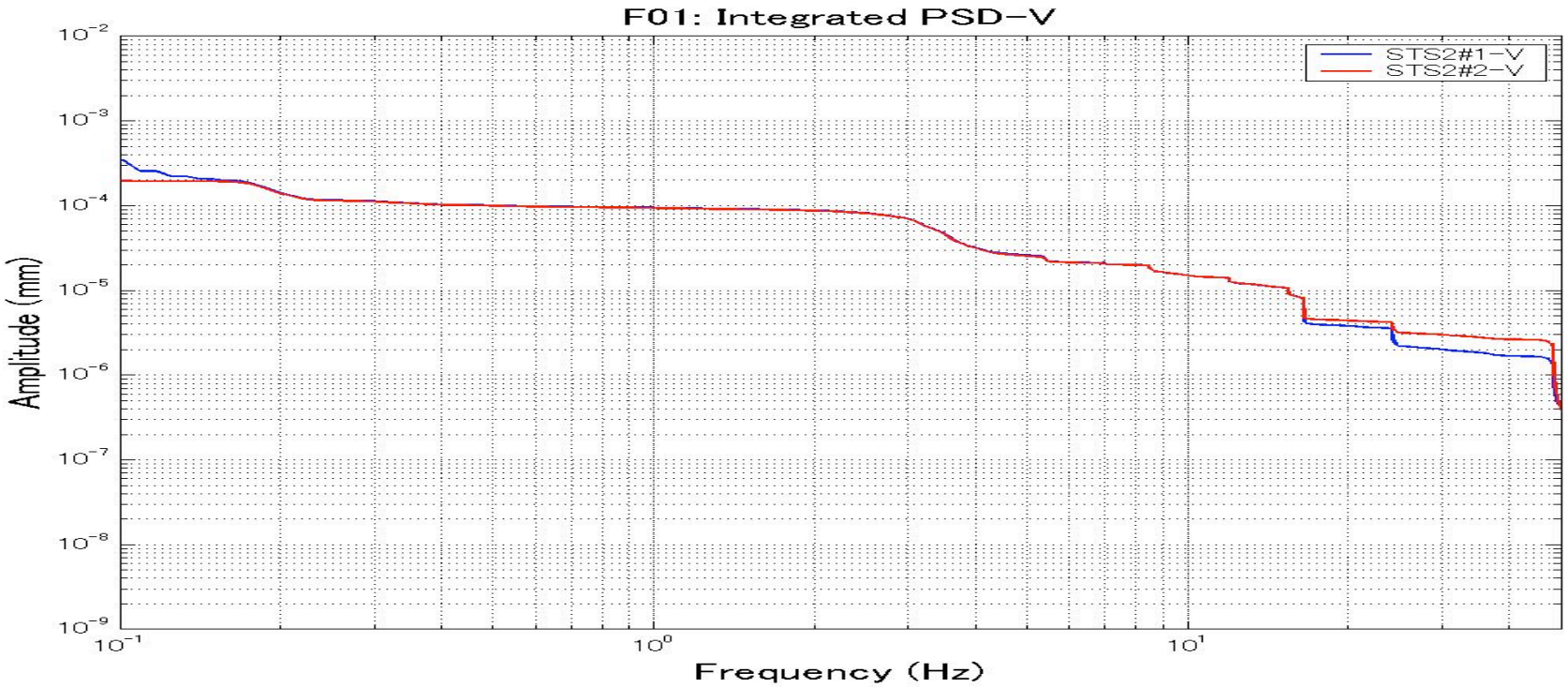
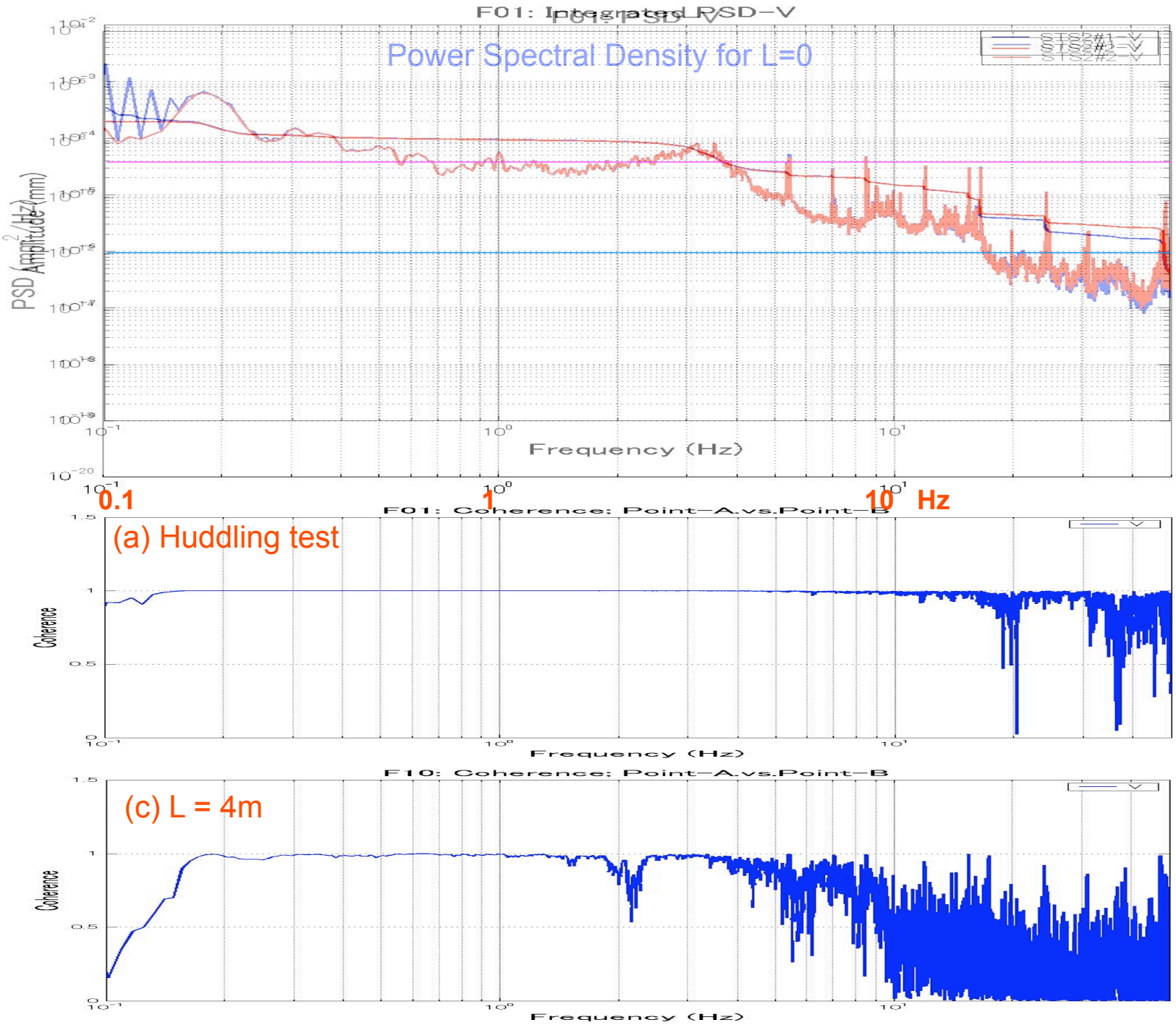
Updates

3rd ATF2 Project Meeting, 18-20 December 2007


F01: PSD-V
STS2#1-V
STS2#2-V
PSD (mm²/Hz)
10⁻⁴
10⁻⁶
10⁻⁸
10⁻¹⁰
10⁻¹²
10⁻¹⁴
10⁻¹⁶


F01: Integrated PSD-V
STS2#1-V
STS2#2-V
Amplitude (mm)
10⁻²
10⁻³
10⁻⁴
10⁻⁵
10⁻⁶
10⁻⁷
10⁻⁸
10⁻⁹
10⁻¹
10⁰
10¹
Frequency (Hz)


F01: Integrated PSD-V
Power Spectral Density for L=0
STS2#1-V
STS2#2-V
PSD (Amplitude²/Hz/mm)
Frequency (Hz)
100 nm
40 nm
1 nm
0.1
1
10
Hz
F01: Coherence: Point-A vs. Point-B
(a) Huddling test
Coherence
Frequency (Hz)
F10: Coherence: Point-A vs. Point-B
(c) L = 4m
Coherence
Frequency (Hz)

S.Redaelli

Table 14: Technical specifications of the stiff isolation system `Stacis2000` by `TMC`.

Parameter	Specification
Number of isolators	3 or 4
Active degrees of freedom	6
Active bandwidth	0.3 Hz to 250 Hz
Resonant frequency (active system)	$\approx$ 0.2 Hz
Resonant transmissibility	1.1
Dynamics range	$>$ 60 dB
Static load capacity per isolator	182 kg to 1590 kg
Maximum displacement	12 μm below 10 Hz (peak-to-peak)

B.Bolzon

Active Degrees of Freedom	6
Active Bandwidth	0.5 to >100Hz
Peak in Transmissibility (active system)	0.4Hz
Resonant Transmissibility	1.1
Isolation Margin	>90% above 2Hz
Settling Time (90% down from peak)	200ms
Static Load Capacity/Isolator	182kg to 500kg
Number of Isolators	3 or 4
Maximum Displacement	15μm peak-peak below 10Hz

1. Introduction

Presentation of the system

Active Degrees of Freedom	6
Active Bandwidth	0.5 to >100Hz
Peak in Transmissibility (active system)	0.4Hz
Resonant Transmissibility	1.1
Isolation Margin	>90% above 2Hz
Settling Time (90% down from peak)	200ms
Static Load Capacity/Isolator	182kg to 500kg
Number of Isolators	3 or 4
Maximum Displacement	15µm peak-peak below 10Hz

- ✓ **Active degrees of Freedom:** X, Y, Z directions, roll, pitch and yaw

- ✓ **Advantage/Disadvantage of the use of 3 isolators instead of 4:**

  → Better ground-to-table transverse and longitudinal transmission

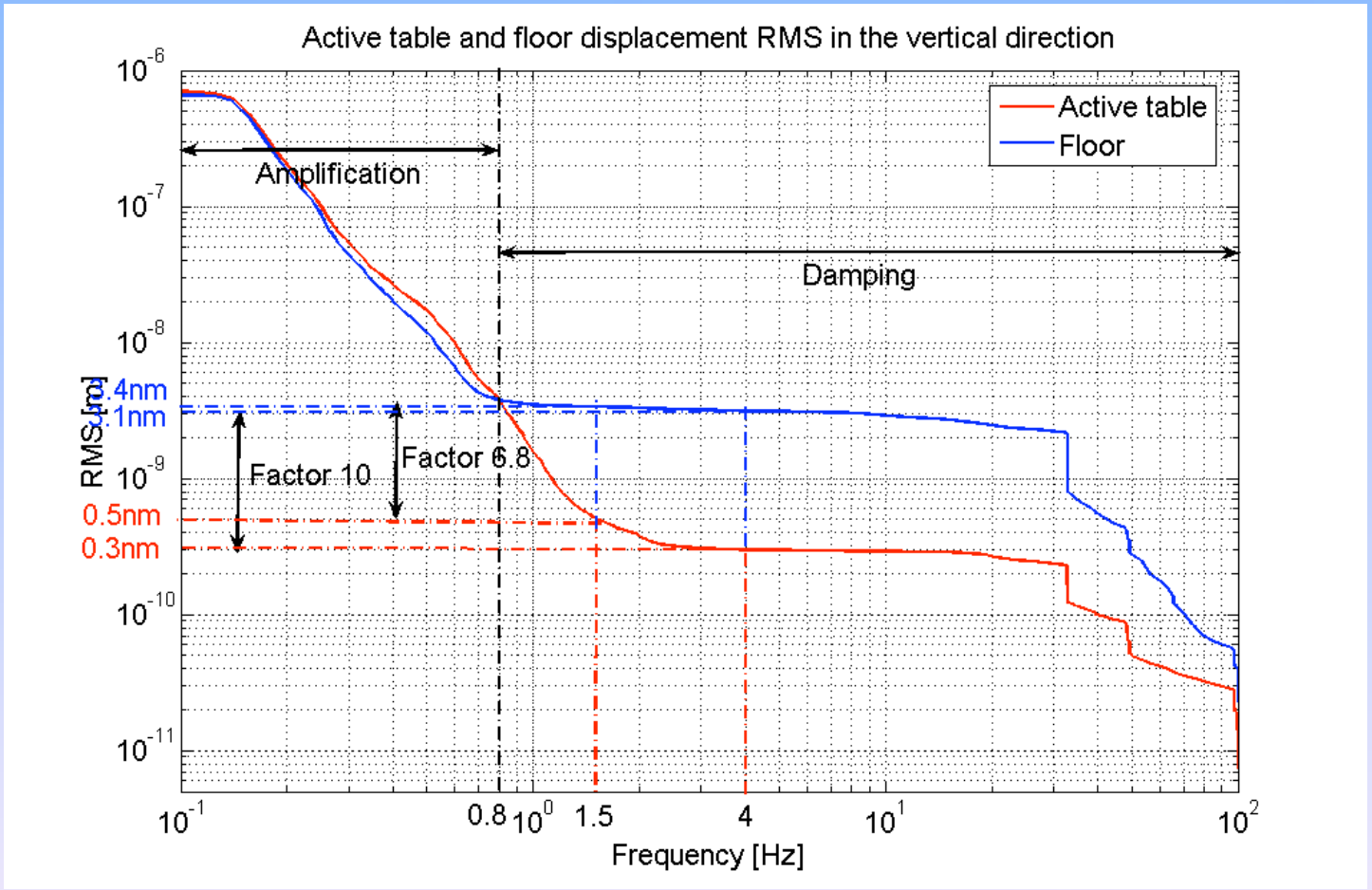
  → Slightly worse vertical stability

  ⇨ Adopt the four feet system because vertical tolerances tighter than the horizontal ones

- ✓ **Resonant frequency (active system):** 0.4Hz but depends on the load

3. Vibrations of the active table

Vertical direction: integrated RMS



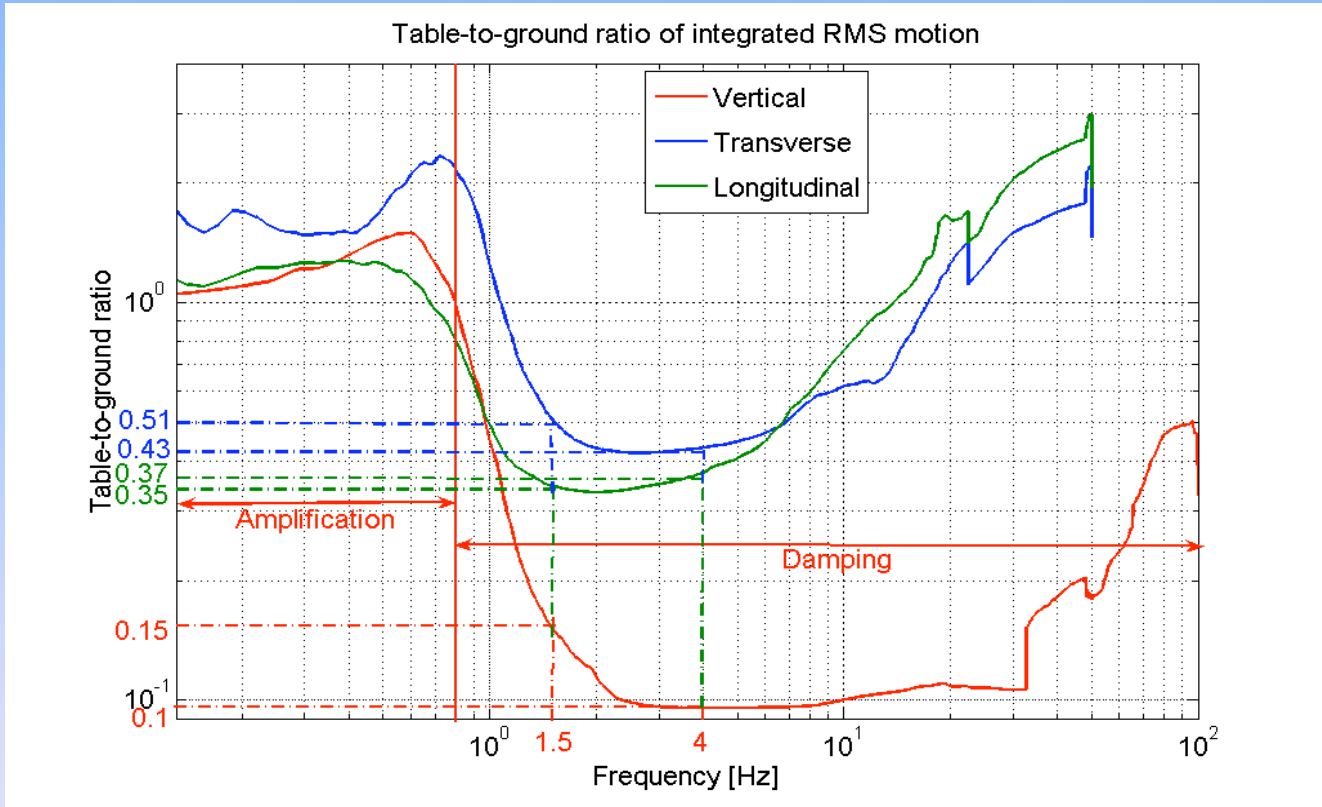
✓ **Below 0.8Hz:** Amplification on the table

✓ **Above 0.8Hz:** Damping on the table

→ Factor 7 of damping above 1.5Hz

3. Vibrations of the active table

Summary: Transfer function of the table integrated RMS



✓ **From 0.1Hz to ~0.8Hz: Amplification** on the table in the 3 directions

→ Vertical direction: up to a factor 1.5 of amplification (at 0.6Hz)

✓ **Above ~0.8Hz: Damping on the table in the 3 directions**

→ Vertical direction: factor 0.15 of damping at 1.5Hz

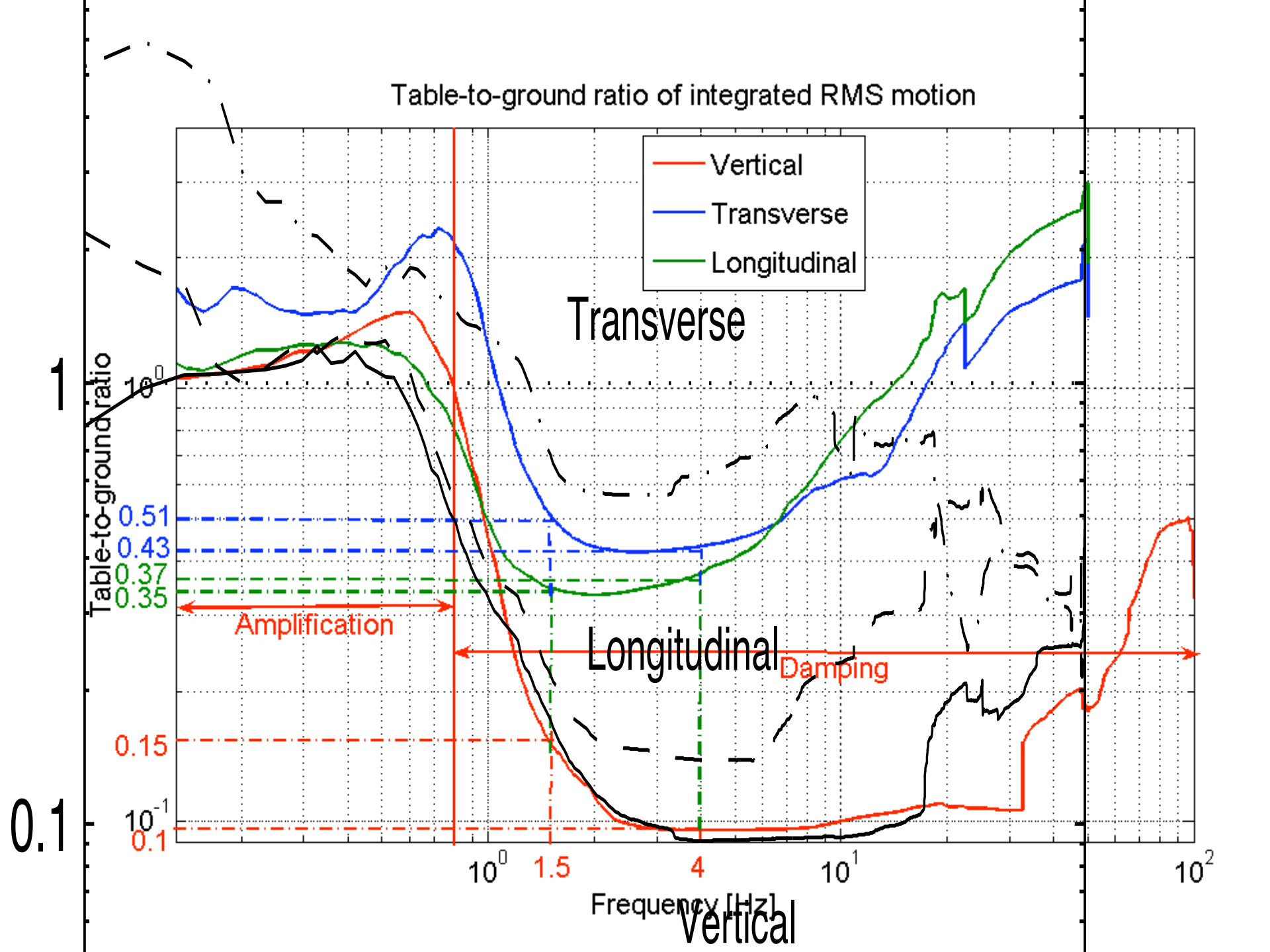
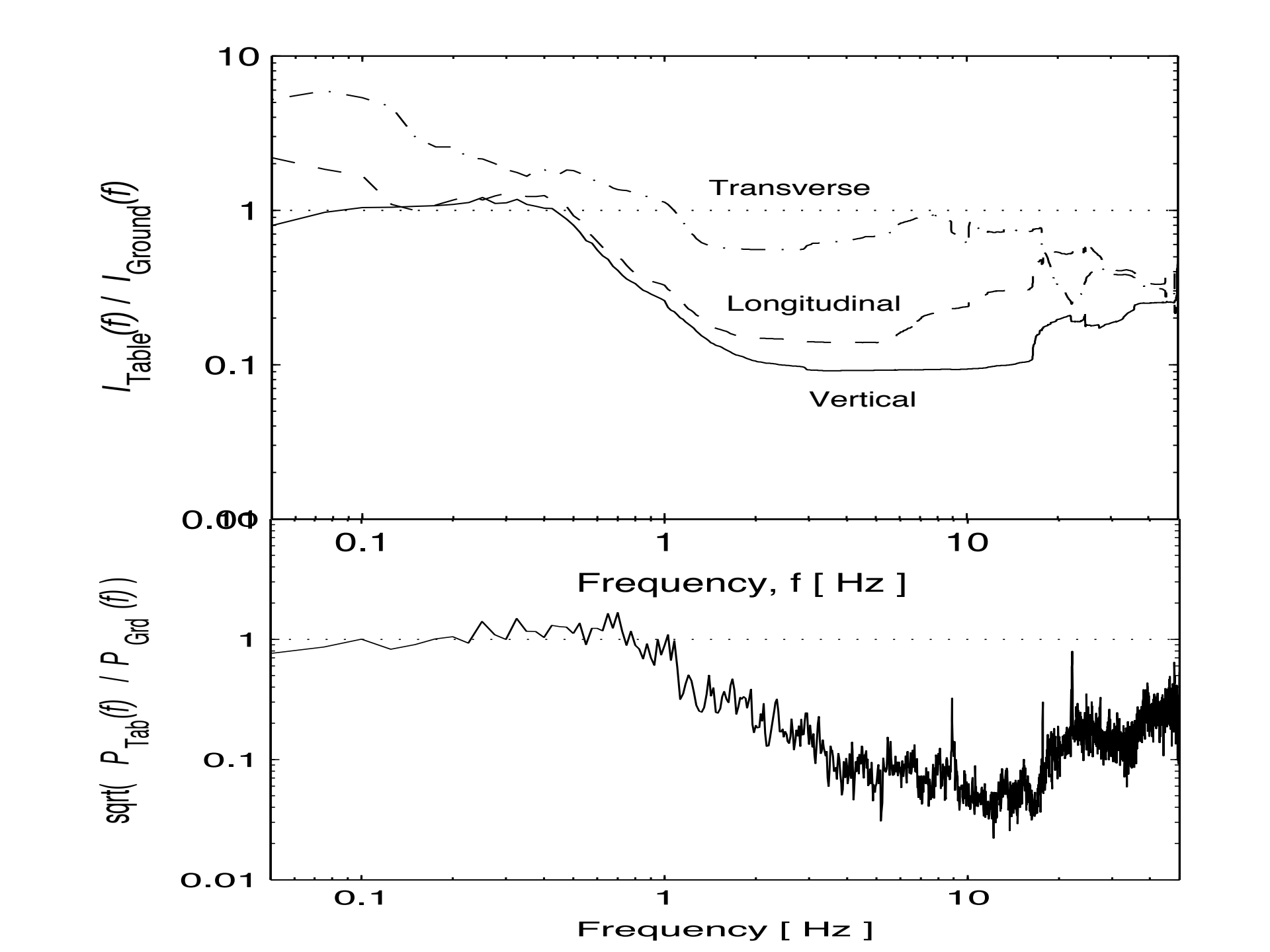
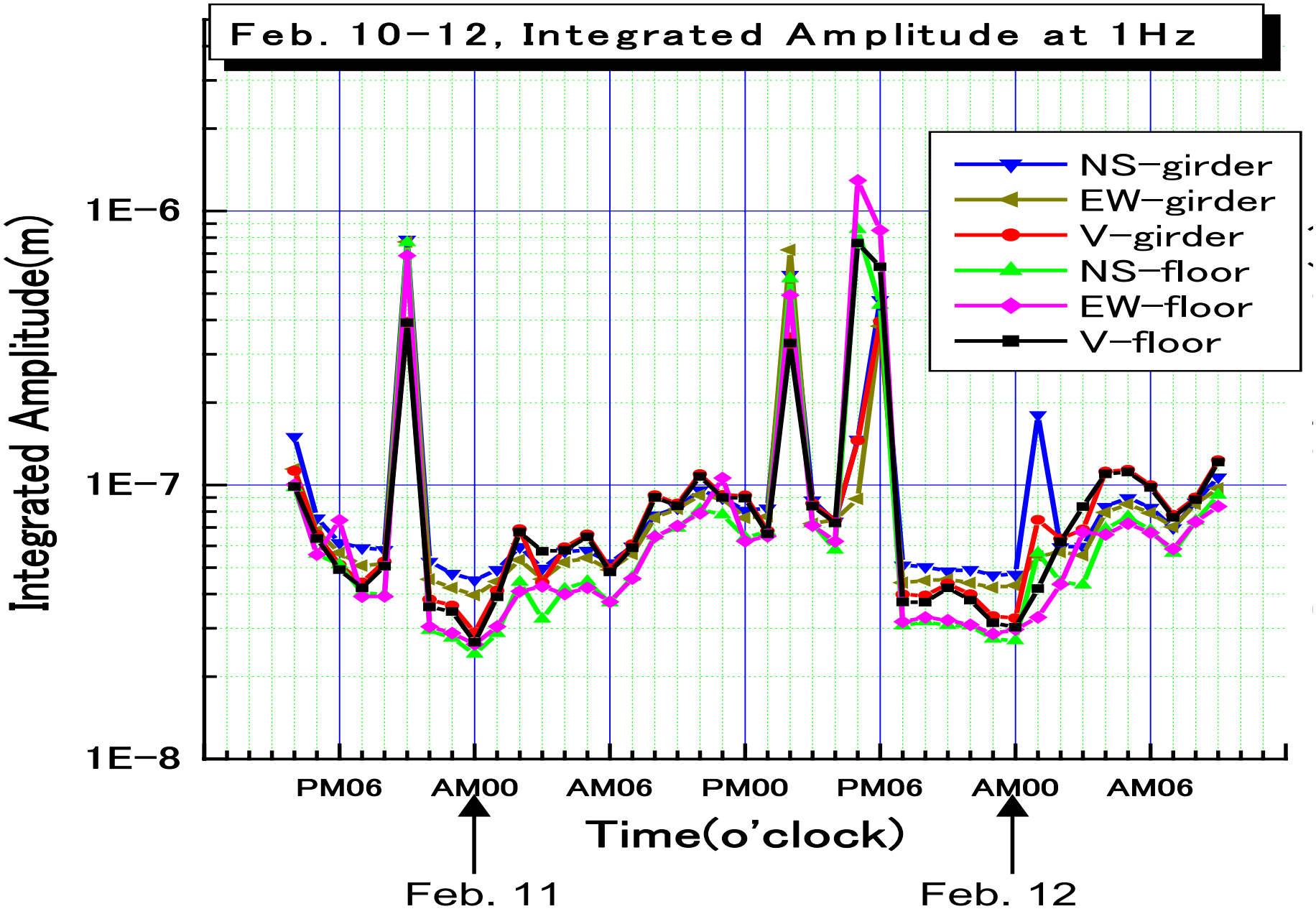


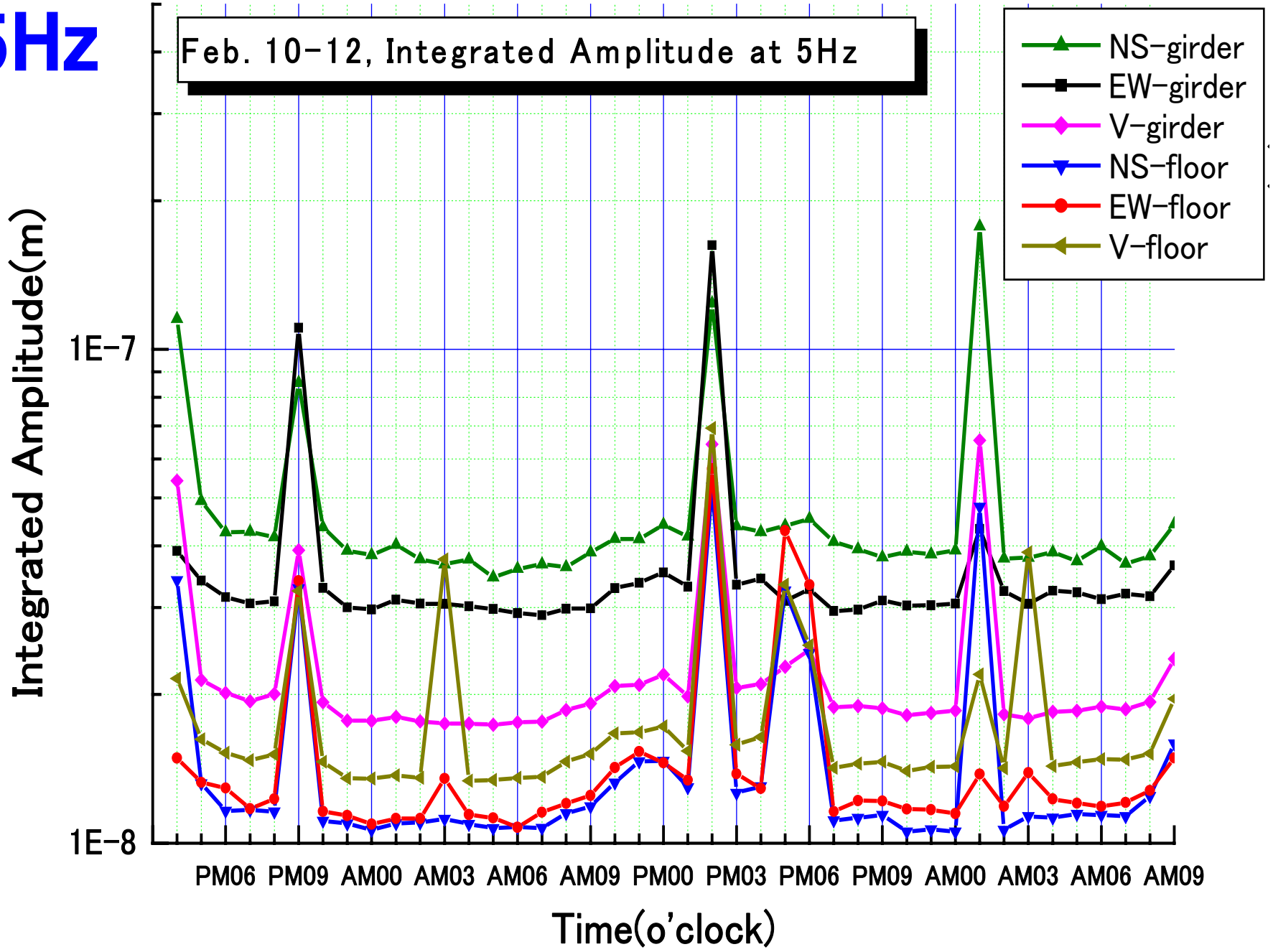
Table-to-ground ratio of integrated RMS motion
Vertical
Transverse
Longitudinal
Transverse
Table-to-ground ratio
1
10^0
0.51
0.43
0.37
0.35
Amplification
Longitudinal
Damping
0.15
0.1
10^{-1}
0.1
10^0
1.5
4
10^1
10^2
Frequency [Hz]
Vertical


10
1
0.1
0.01
Transverse
Longitudinal
Vertical
$I_{Table}(f) / I_{Ground}(f)$
0.1
1
10
Frequency, f [Hz]
sqrt($P_{Tab}(f) / P_{Grd}(f)$)
1
0.1
0.01
0.1
1
10
Frequency [Hz]

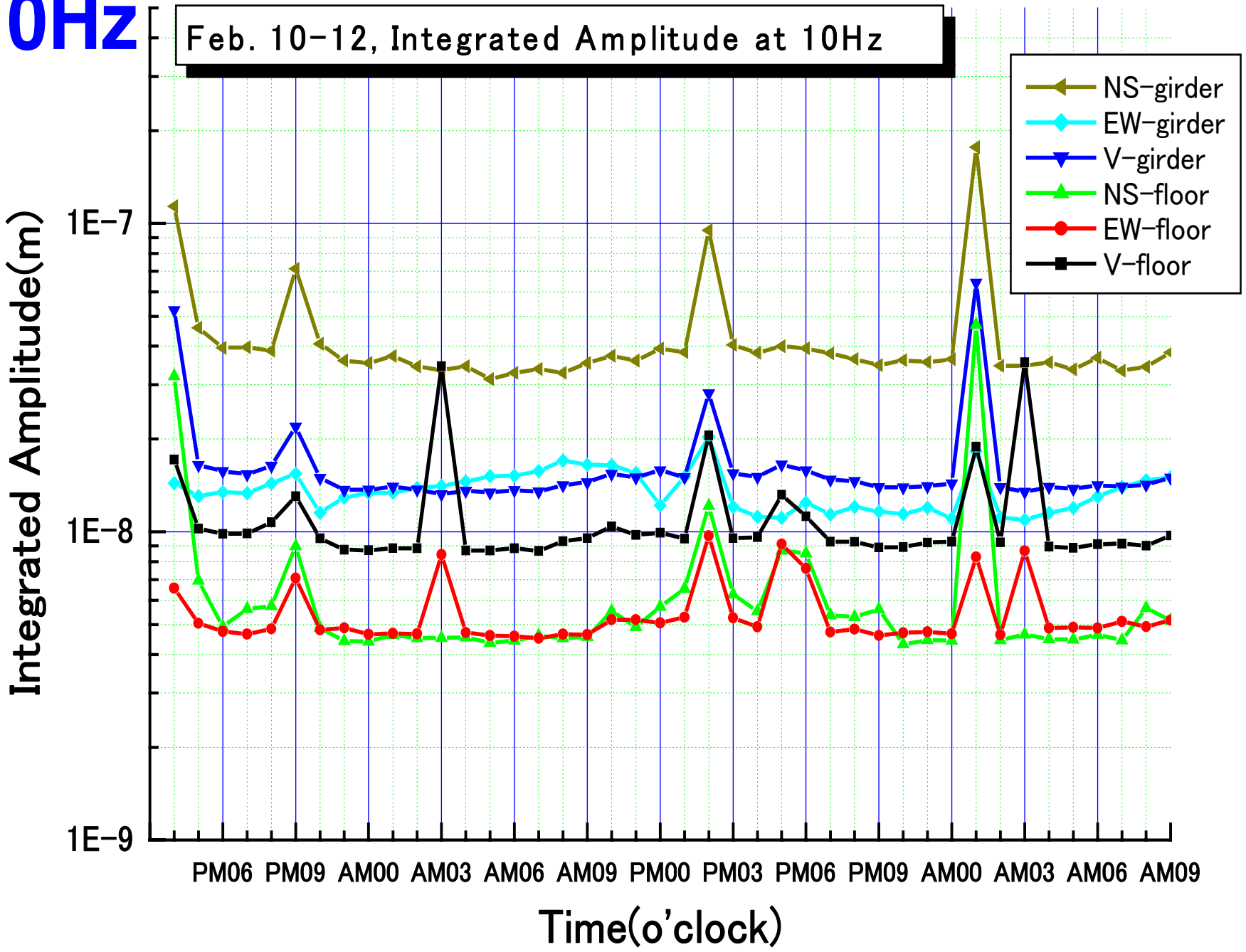
> 1Hz


Feb. 10–12, Integrated Amplitude at 1Hz
NS–girder
EW–girder
V–girder
NS–floor
EW–floor
V–floor
Integrated Amplitude(m)
1E–6
1E–7
1E–8
PM06
AM00
AM06
PM00
PM06
AM00
AM06
Time(o'clock)
Feb. 11
Feb. 12

> 5Hz


Feb. 10-12, Integrated Amplitude at 5Hz
NS-girder
EW-girder
V-girder
NS-floor
EW-floor
V-floor
Integrated Amplitude(m)
1E-7
1E-8
PM06 PM09 AM00 AM03 AM06 AM09 PM00 PM03 PM06 PM09 AM00 AM03 AM06 AM09
Time(o'clock)

> 10Hz

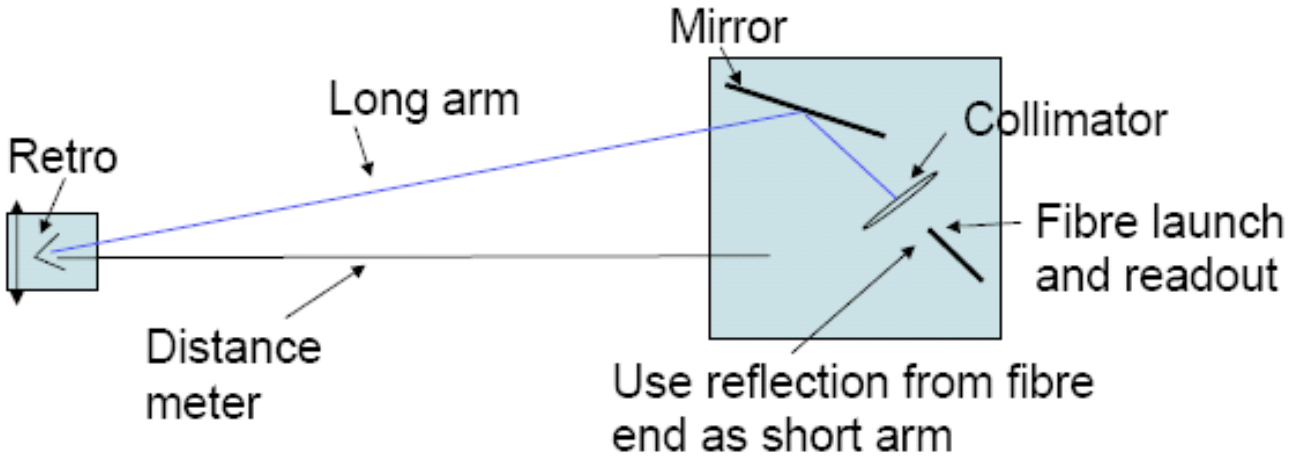

Feb. 10-12, Integrated Amplitude at 10Hz
NS-girder
EW-girder
V-girder
NS-floor
EW-floor
V-floor
Integrated Amplitude(m)
1E-7
1E-8
1E-9
PM06 PM09 AM00 AM03 AM06 AM09 PM00 PM03 PM06 PM09 AM00 AM03 AM06 AM09
Time(o'clock)

MONALISA

Oxford university

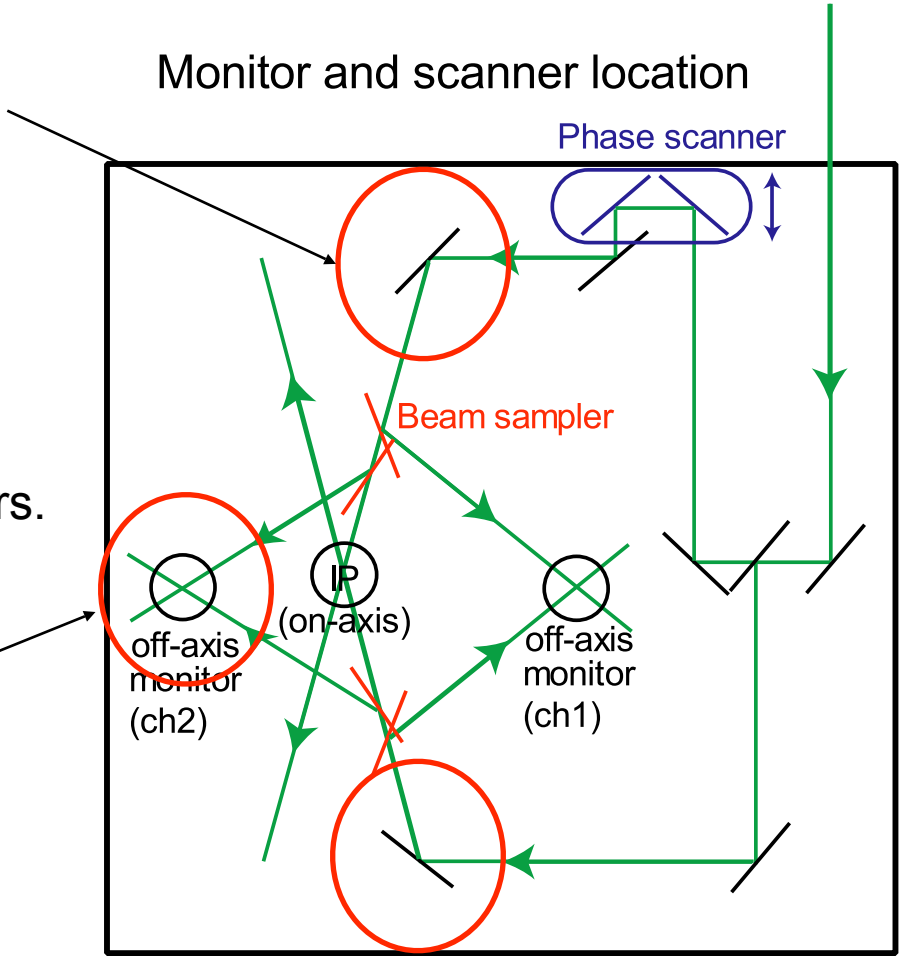
ATF2: Measuring Motion of Shintake Monitor with Respect to Final Doublet

- Idea of Compact Straightness Monitor (CSM) presented in May:



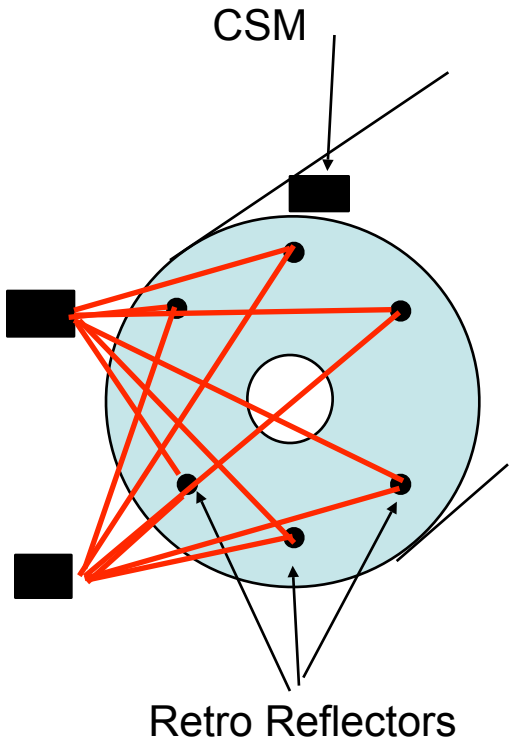
Attaching CSM: Shintake Monitor

- What do we want to monitor:
- Monitor motion (angular vibrations) of “intersection mirrors”
  - Its already a mirror
  - Has to be done in air (Requires close distance monitor)
  - Needs to correlate the motion measurements of the two mirrors.
- Monitor off-axis camera
  - Easier setup
  - Mor indirect measurement



Attaching CSM: Focusing Magnet

- Unsolved Problem on how to monitor magnetic centre of focusing magnet.
  - Attach CSM to one point of magnet
  - Use several distance metres to monitor breathing of magnet
  - Correlate with temperature measurements



installation schedule

- Oct. 2008 ~ Mar. 2009
  - beam line comissioning
  - Shintake monitor comissioning
  - continue IP-BPM development at the device test section
- Apr. 2009 ~
  - move to IP area
    - a new alignment mover is needed because the FFTB mover will be used for a magnet
  - IP-BPM mode
    - shift the IP at the center of IPBPM quartet
  - Shintake mode
    - calibrate (check resolution) BPM inside the collision chamber using the IPBPM