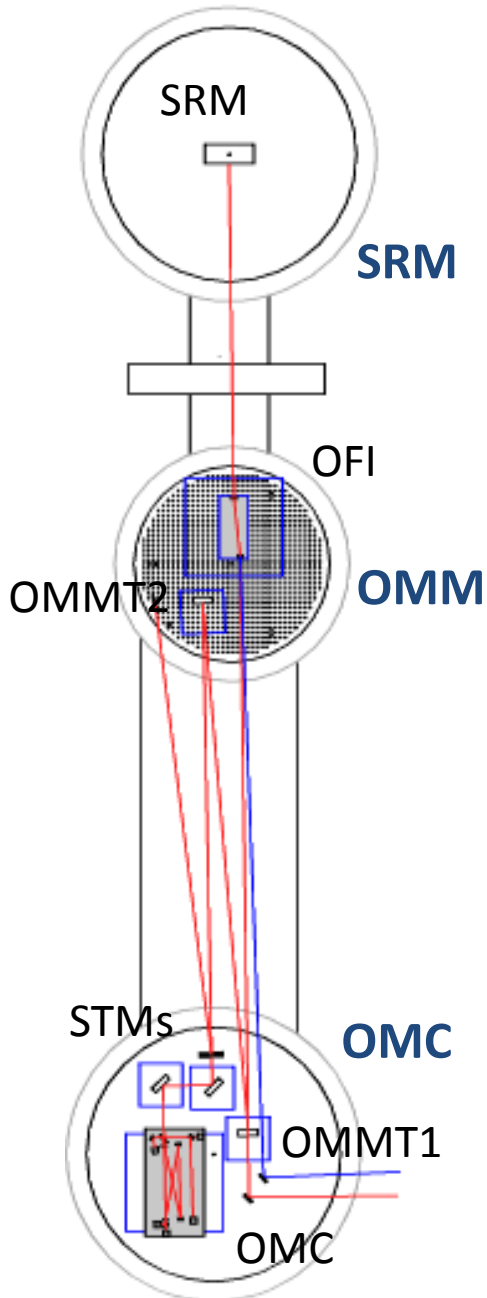


# KAGRA OMC suspension

2015.10.26

K.Somiya

# Layout



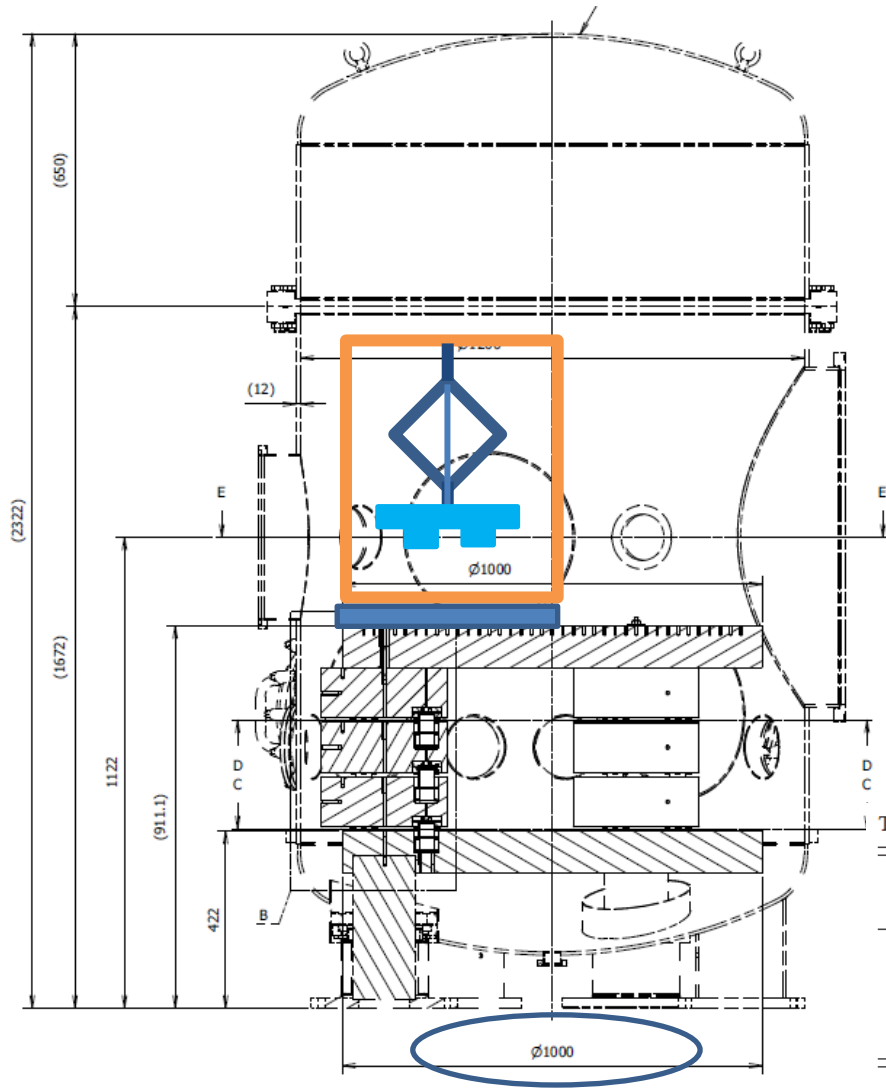
X	Y	SRM t=100mm
0.265280360	-19.326452760	SRMHR (center)
0.2652804	-19.32643571	SRMHR (chord)
0.265061891	-19.426435468	SRMAR
0.265171126	-19.376444114	HR/AR 中間
0.26517115	-19.37643559	SRM c. of mass
0.288119760	-21.130000000	CWP1
0.321640857	-21.428121345	CWP2
0.442131364	-24.600000000	SQZ PO
0.361304180	-24.358532364	OMMT1
0.129180898	-21.668528873	OMMT2
0.177174879	-24.128060653	STM1
-0.072777537	-24.132938091	STM2
0.279180898	-21.468528873	OMM chamber
0.186001850	-24.482852441	OMC chamber

- SRM HR/AR are the same with Aso coordinates
- OFI and OMMTs are to be suspended by Type-C
- Requirements to OFI/OMMTs/STMs are to be calculated
- OMC suspension requirement has been calculated

# Facts

- **Same requirement for horizontal and vertical**
- **HAM-SUS table alone is not sufficient at  $f > \sim 50\text{Hz}$**
- **Stack+single/double suspension would work**
- **Low-mass spring would be better to reduce creep noise that can be a problem for OMC**
- **UWA people are ready to collaborate with us**

# OMC chamber (plan)



This will be  $\phi 1500$

Beam line to the chamber top: 1200mm

Euler spring height: ~30cm

Suspension frame height: 50~70cm

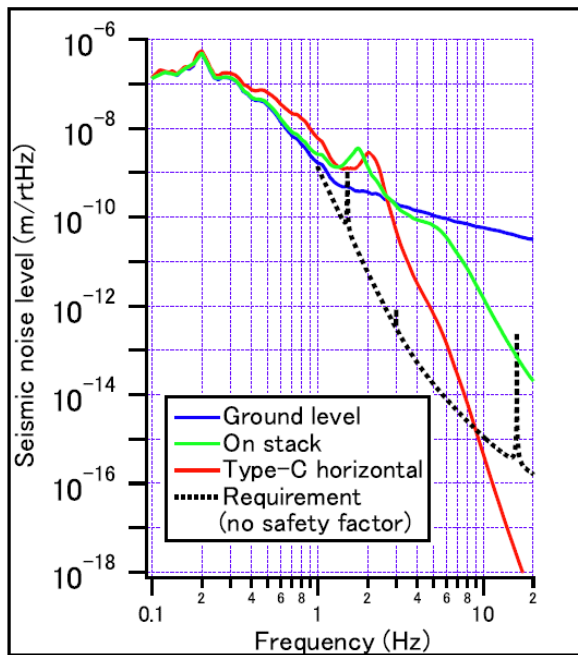
Hopefully a single suspension works.

## Stack system

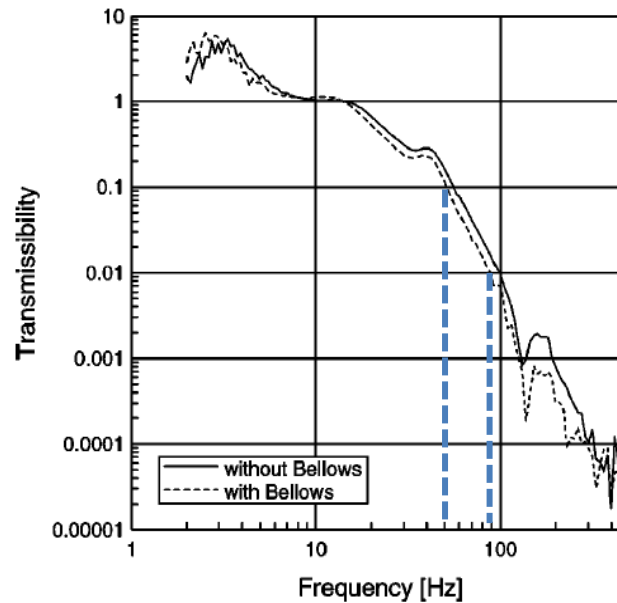
TABLE I. Specifications of stack components.

	Metal block	Surface process	Size (mm)	Weight (kg)	Rubber block	Size (mm)	G (MPa)
First stage	SS	ECB	$300\phi \times 120$	64	Chloroprene	$28\phi \times 20$	4.2
Second stage	SS	ECB	$300\phi \times 120$	64	Chloroprene	$28\phi \times 20$	3.0
Third stage	SS	ECB	$300\phi \times 120$	67	Chloroprene	$28\phi \times 20$	1.9
(Breadboard)	Al	EI	$800\phi \times 100$	134			

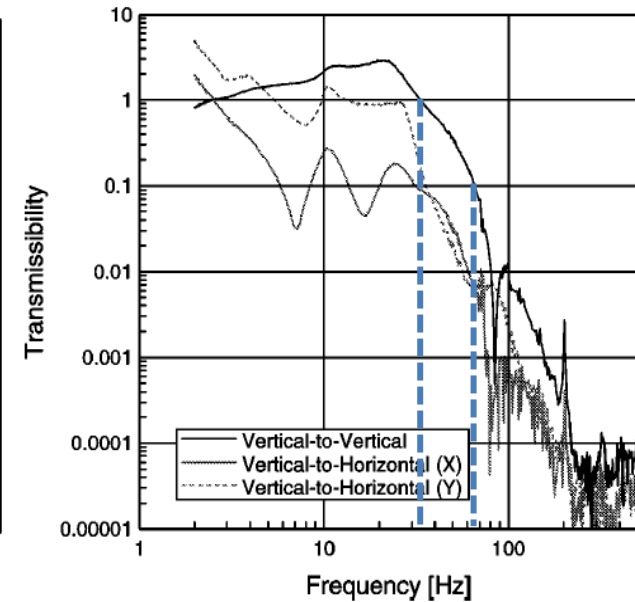
# Stack isolation ratio



Calculated isolation ratio of the new stack shows  $\sim 40\text{dB}$  isolation at 10Hz (ratio from blue to green).

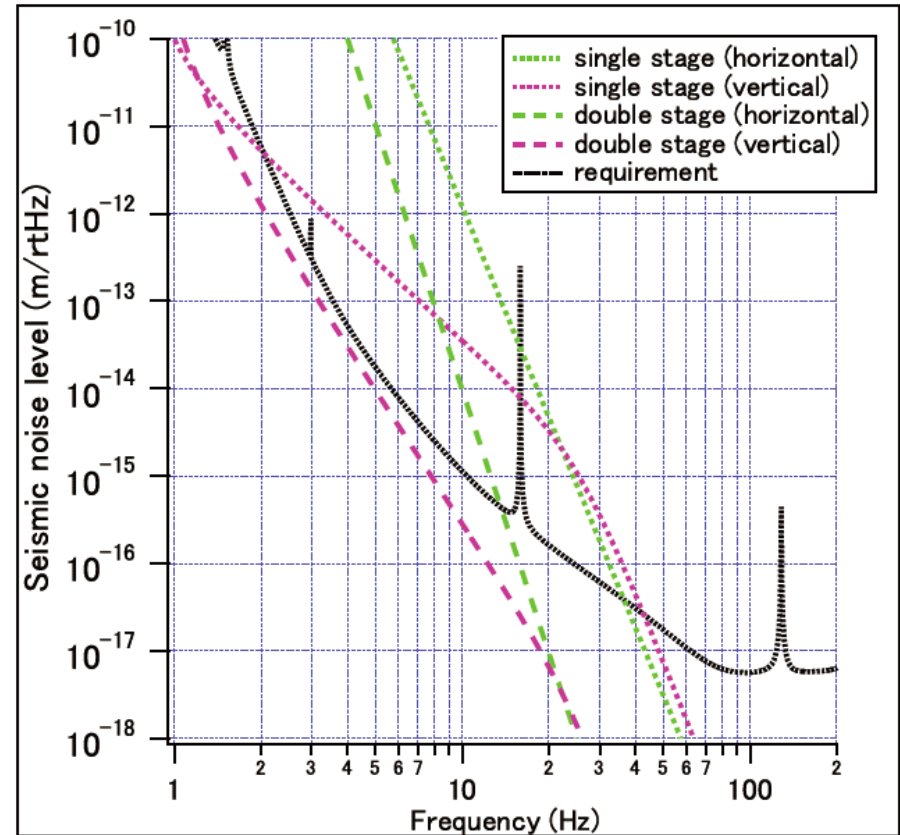
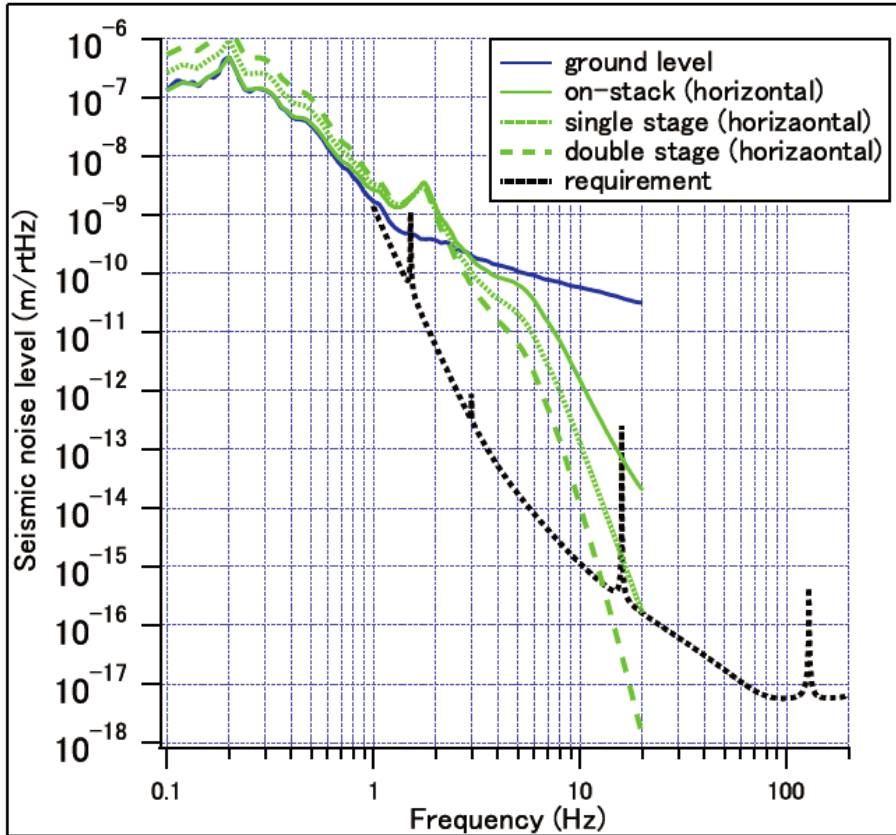


Measured isolation ratio of the TAMA stack showed  $\sim 0\text{dB}$  isolation at 10Hz ( $-20\text{dB}$  at 50Hz) for horizontal.



**Takahashi-san says the isolation ratio of the 1300mm stack would be x10 better than the one for TAMA at 10Hz (horizontal). The vertical would be a little worse than horizontal.**

# Requirement



**Left (modelled isolation): a single-stage suspension of  $f_0=0.8\text{Hz}$  is ok.**  
**Right (measured): a double-stage suspension of  $f_0=0.8\text{Hz}$  is needed.**