

# KAGRA OMC suspension

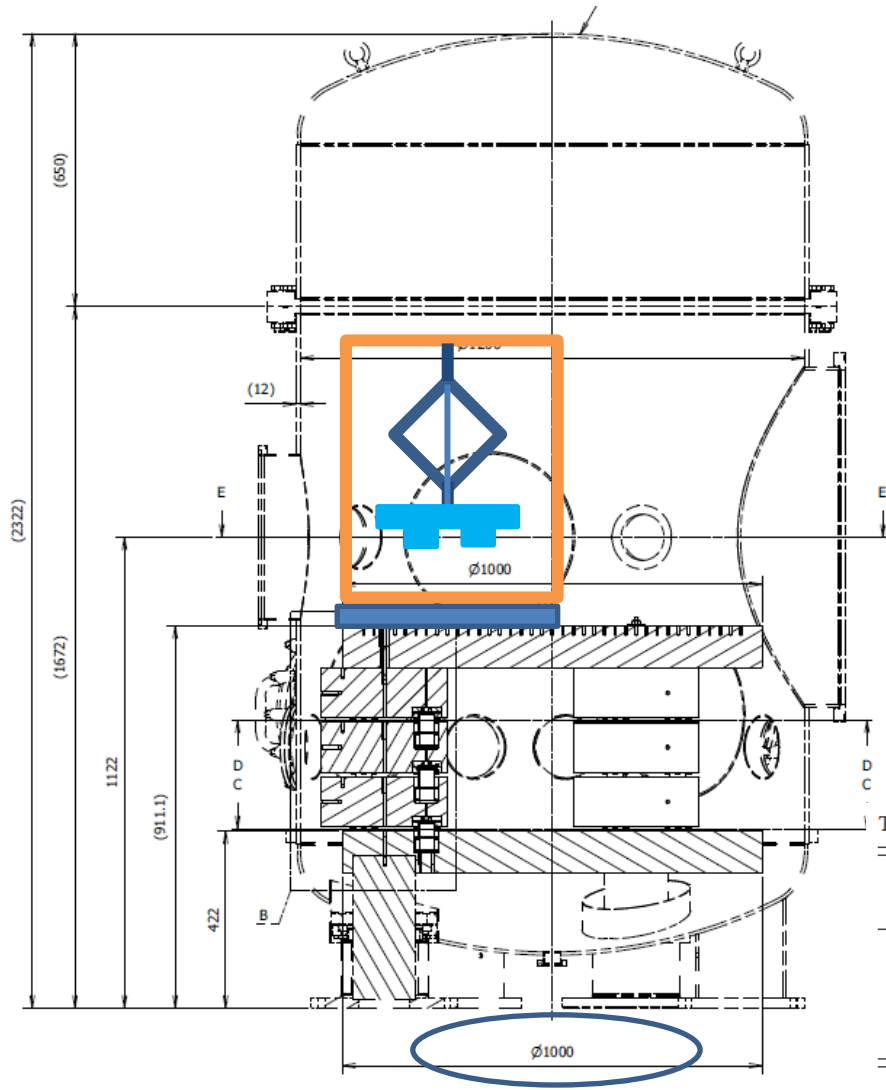
2015.10.26

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# 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

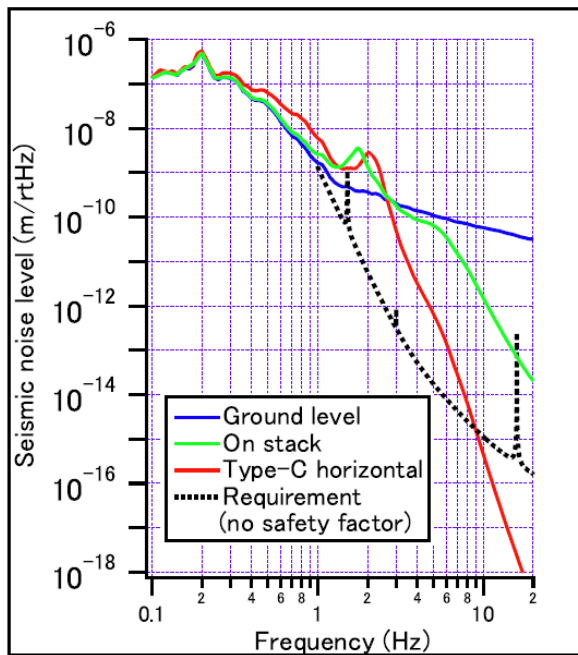
Hopefully a single suspension works.

## Stack system

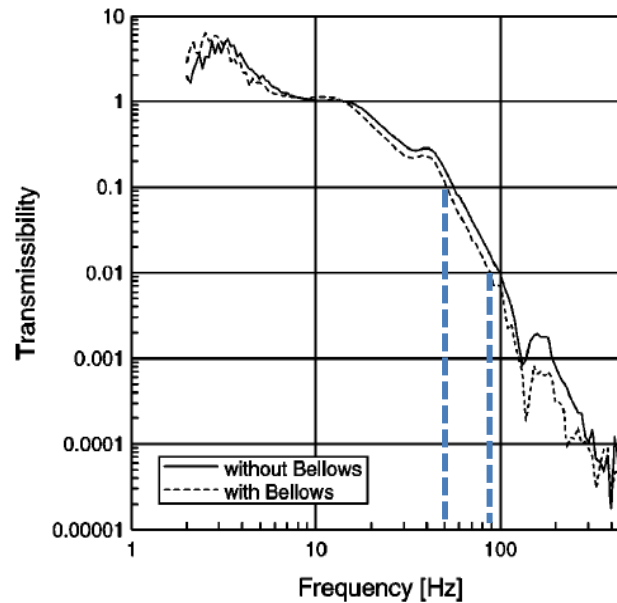
TABLE I. Specifications of stack components.

	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			

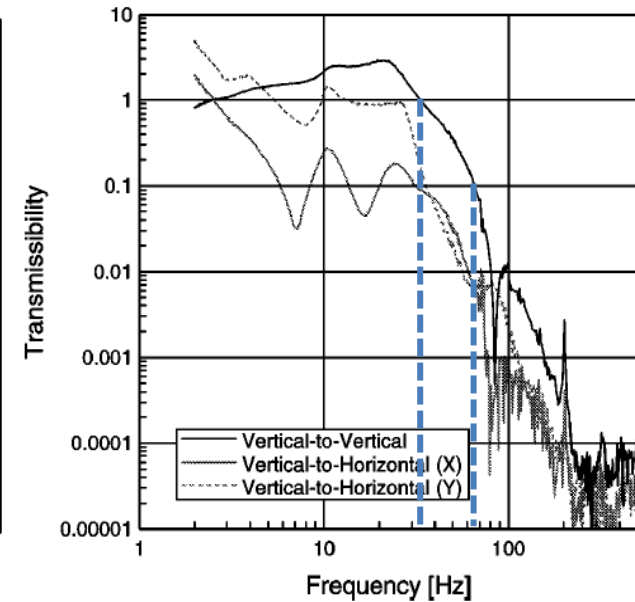
# Stack isolation ratio



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

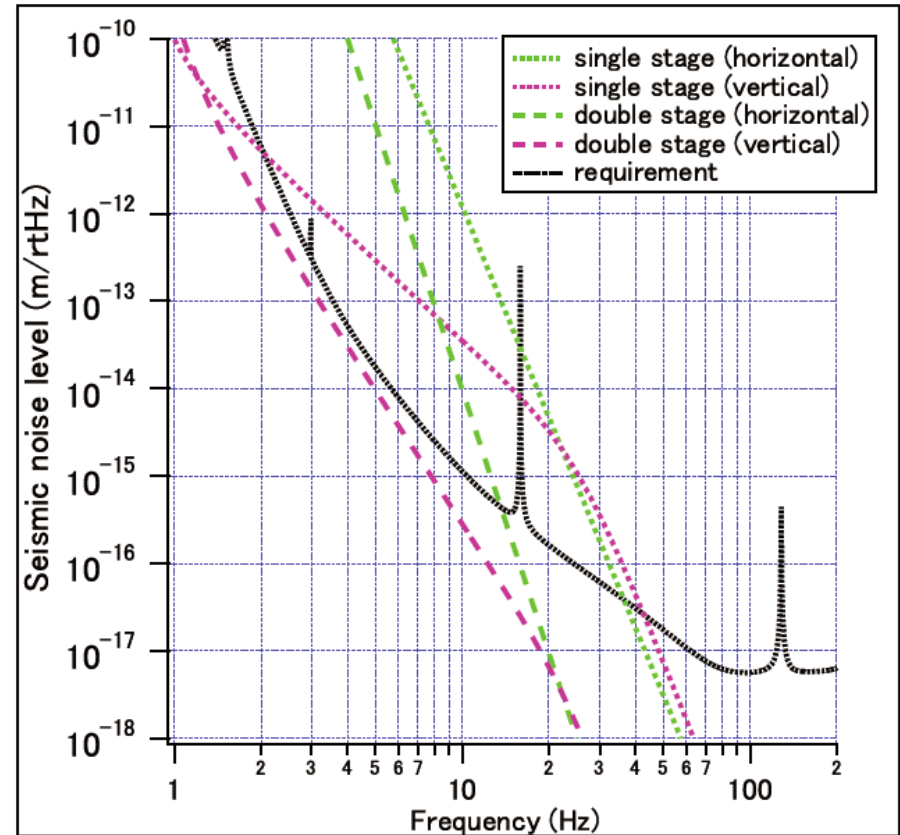
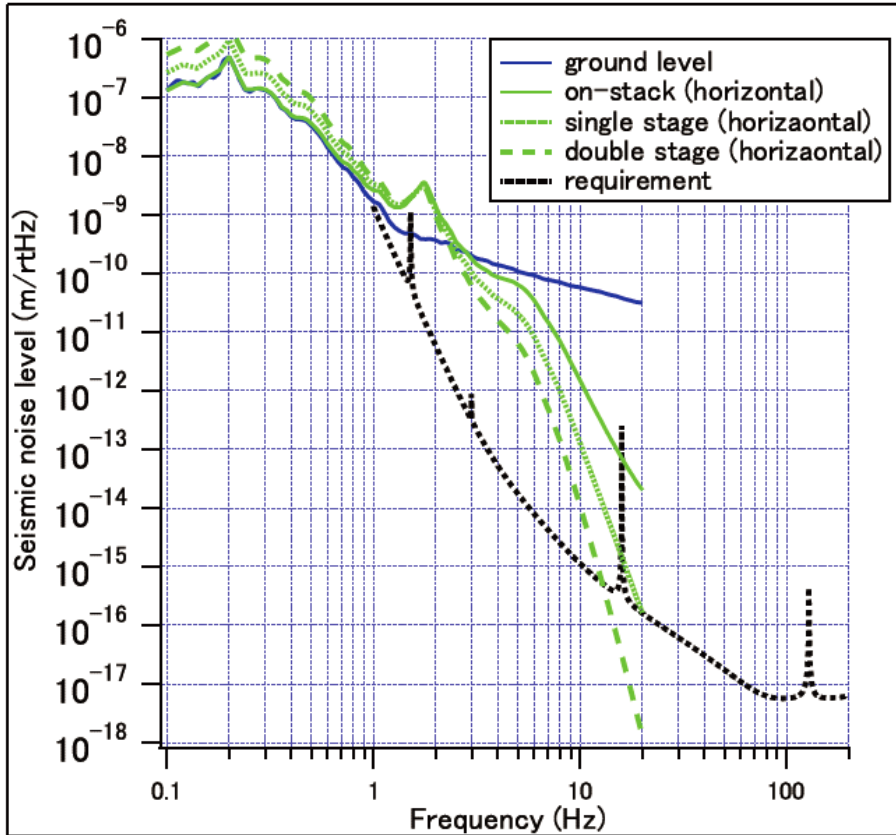


Measured isolation ratio of the TAMA stack showed  $\sim 0$ dB isolation at 10Hz ( $-20$ dB at 50Hz) for horizontal.



**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.**