# Follow-up of actions at CERN for supporting of QD0

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Four crossed pre-stressed
Cfi straps
connected to cryostat

9 m

Stability goal
5nm vertically!
(Tom, Andrei)

# Reminder
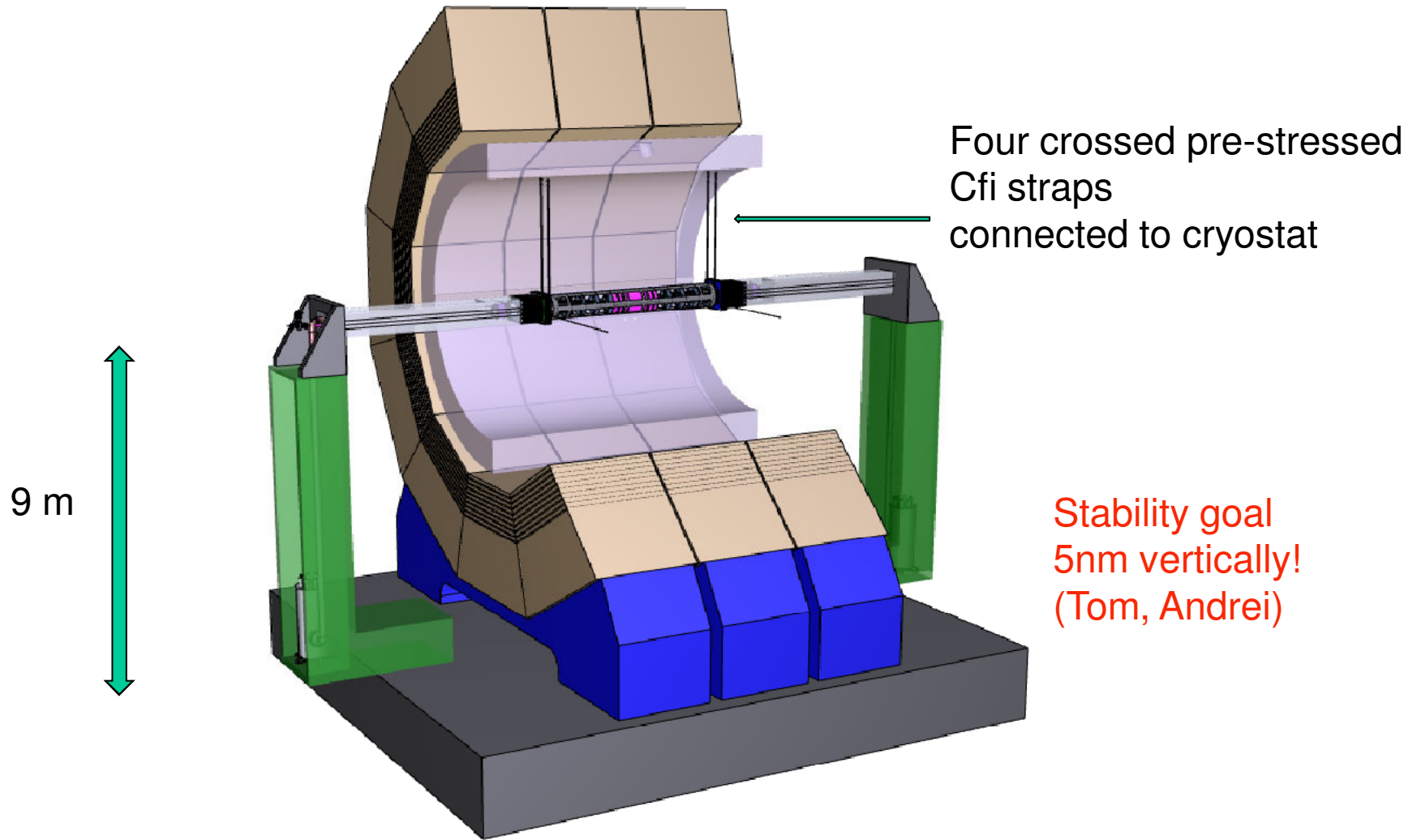
- At our last webex meeting I proposed:

- *to start mechnical modelling of ILD, to understand the vibration performance of QD0 supporting scheme, and our Japanese colleagues volonteered for this.*

- *to perform measurements around CMS which is fairly representative of ILD.*

- *to start looking at an alternative scheme to support QD0.*

• Measurements have been performed last week and this week taking advantage of a general cooling stop.

- • On top of a barrel yoke ring
- • On top of an endcap ring
- • On top of the HF tower
- • At the extremity of the Rotating Shielding (pacman)
- • On and around the plug.

- •All wrt to local ground vibration .
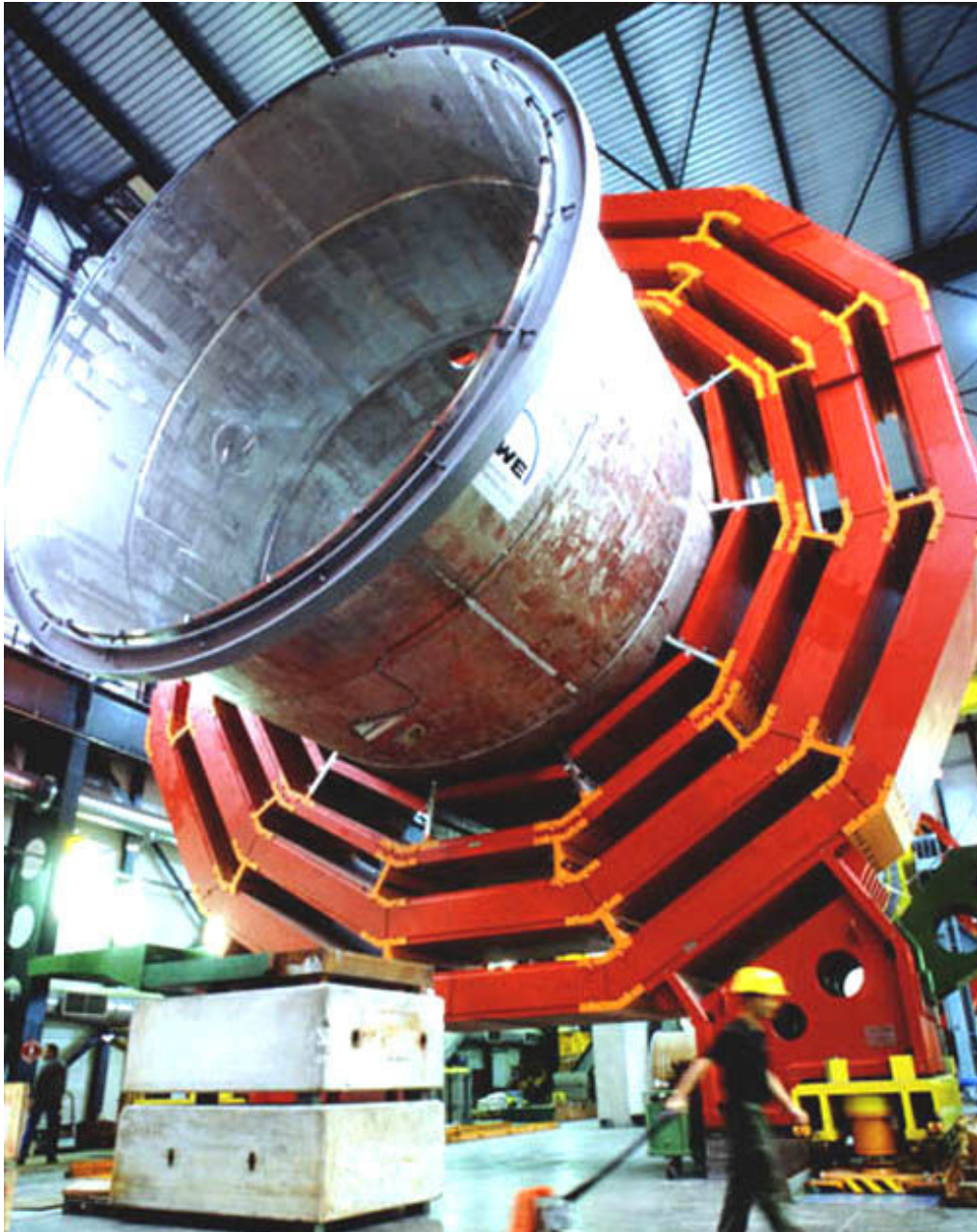
The barrel ring is fairly representative, also the cryostat.

However, it was not possible to measure the inside of the cryostat wrt. to ground because CMS is presently closed, but this can be organized for the next opening.

• It is foreseen to repeat some measurements on the yoke once the cooling is restarted to make sure we obtain the same transfer function, and to understand the normal vibration level.

• Completely independent measurements are foreseen on machine tunnel on both sides of a typical LEP EA to understand if coherence of vibrations still exists in spite of the cavern cut-out.

• Data reduction needs Fast Fourier Transfer techniques.

• First results may be available end of next week.

- When my request for measurements was known it generated a tremendous interest by the CLIC project.

- CLIC needs an order of magnitude more in stability of QD0s and some parameters are less favorable, in particular rep rate and the necessity of water cooling.

- Thus even if QD0 supporting is marginally acceptable for ILC experiments it is certainly not acceptable for CLIC experiments.

• An alternative way of supporting QD0 directly from the machine tunnel without touching the experiment is needed, and I have started to look at it using ILD as a model.

• This can be done at the expense of abandoning the opening on beam (anyway push-pull operation is supposed to be quickly done).

• If this is not sufficient, then QD0 must be installed further away in the machine tunnel at the expense of luminosity as proposed by Andrei two years ago.

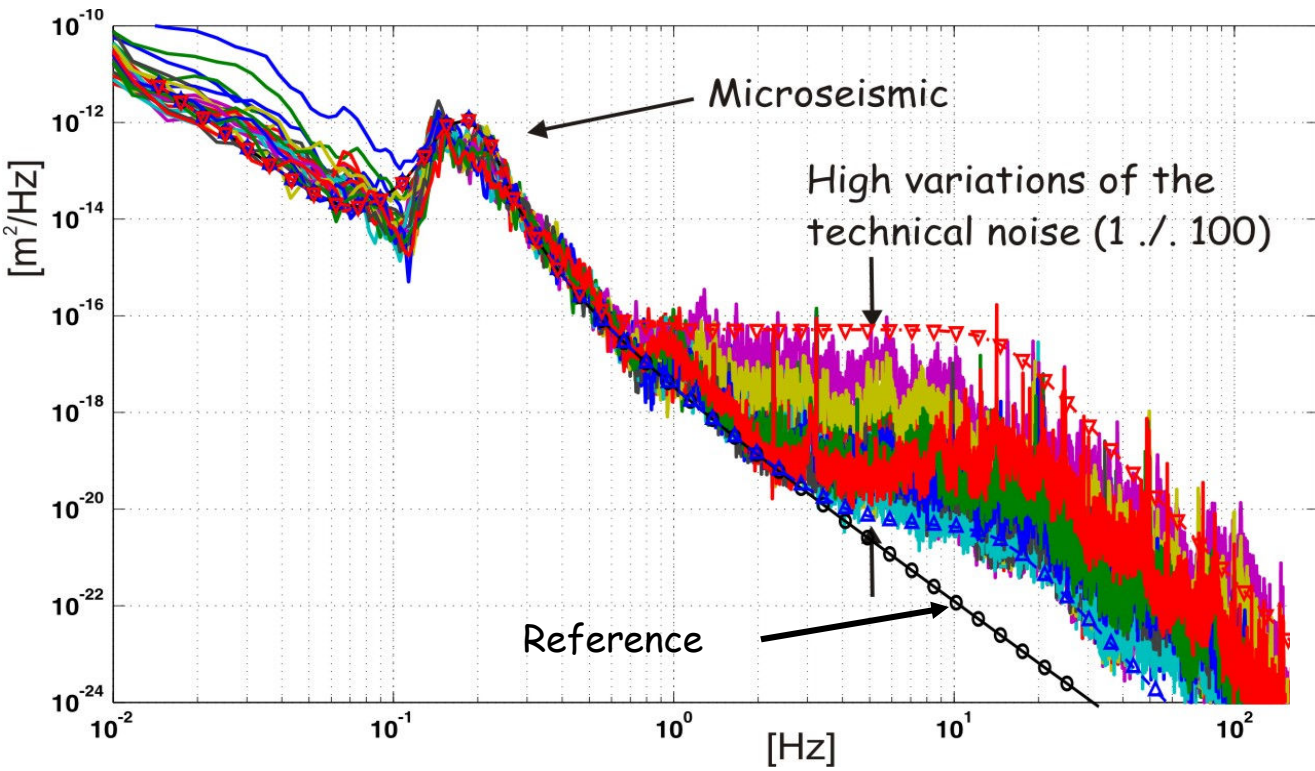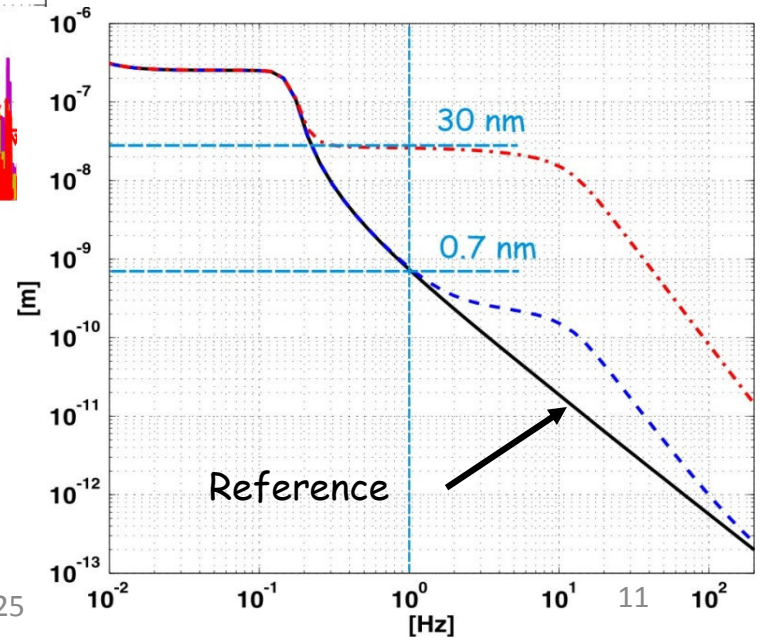# Back-up transparencies

CERN 17 Sept. 2009

## Local excitations

<span style="color:red">Vertical</span> ground motion



Microseismic

High variations of the technical noise (1 ./. 100)

Reference

Additional technical noise:

$$N(\omega) = \frac{N_0}{1 + (\frac{\omega}{\omega_0})^6}$$

$$f_0 = 2\pi (Hz)$$

30 nm

0.7 nm

Reference

Low technical noise: $N_0 = 5*10^{-3}(nm^2/Hz)$

High technical noise: $N_0 = 50(nm^2/Hz)$

Ref.: $A = 10^{-4} \ (\mu m^2 s^{-1} m^{-1}); B = 10^{-4} \ (\mu m^2 s^{-3});$

$\omega_1 = 2\pi * 0.14 \ (rad/s); d_1 = 5; a_1 = 0.1 \ (\mu m^2/Hz); v_1 = 1000 \ (m/s)$

Then only after look at the effect of the platform on the vibration response

M g

Supports with adjusted elastic constant