

Recent Activities of the AOS

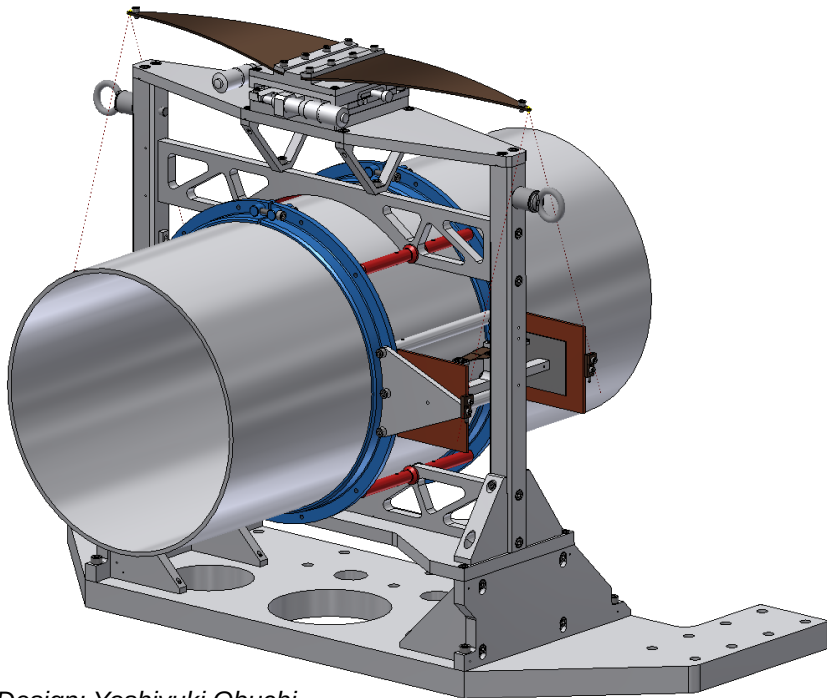
Damping Measurements of Wide-Angle-Baffle and Narrow-Angle-Baffle

Simon ZEIDLER*, Tomotada AKUTSU

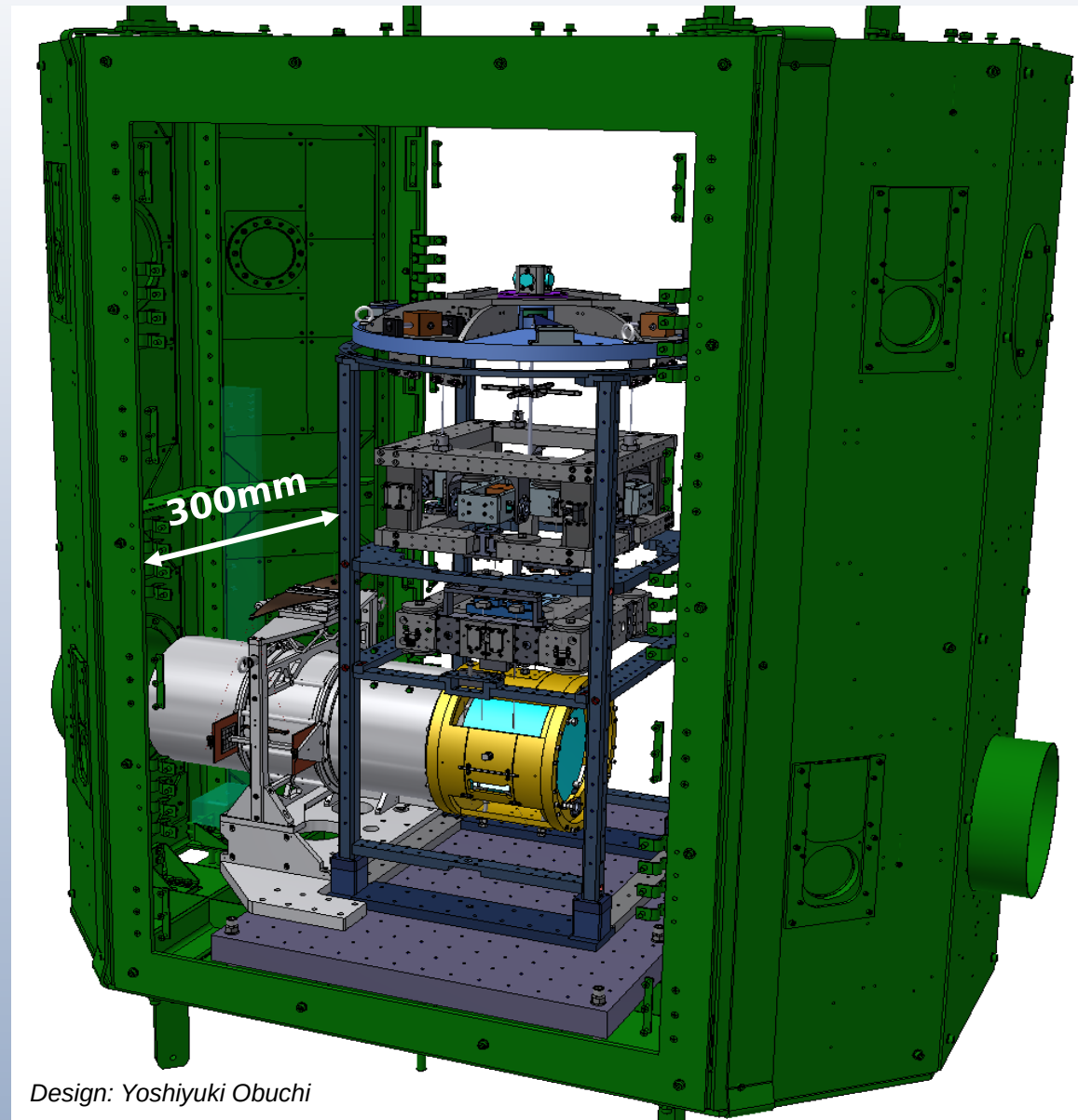
Wide-Angle-Baffle

Wide-Angle-Baffle

- Block scattering coming from the Sapphire test masses on the cavity-side
- Scattering may harm goal sensitivity without WAB



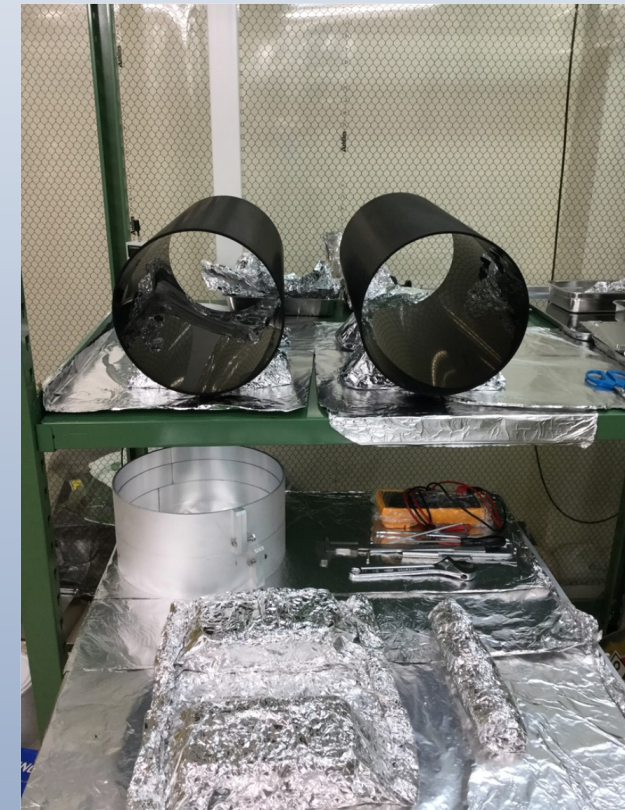
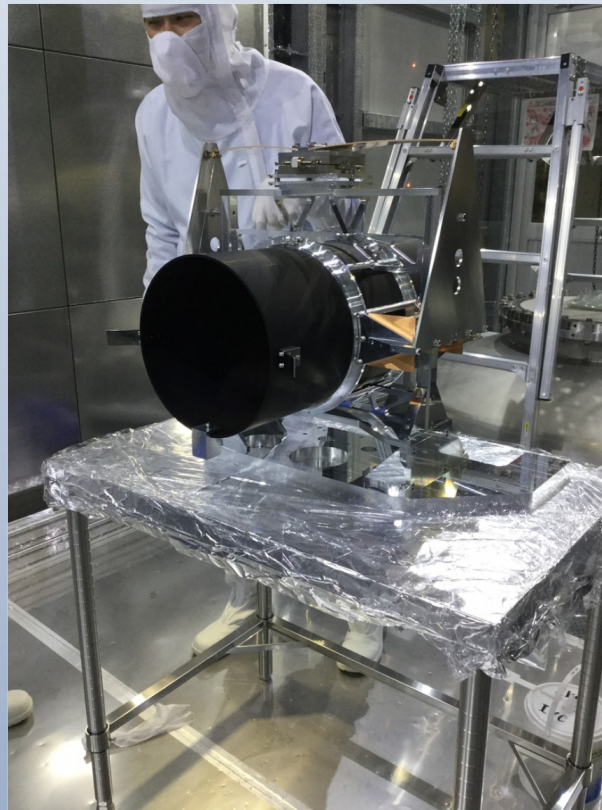
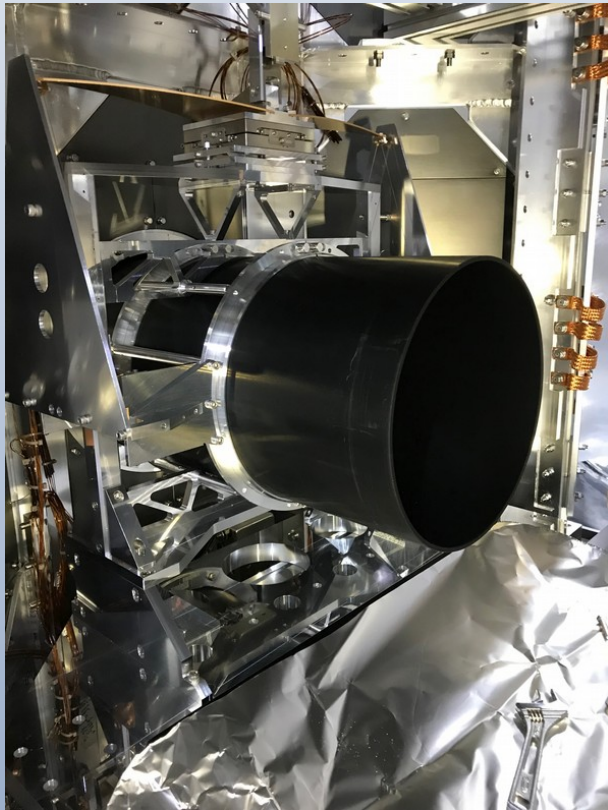
Design: Yoshiyuki Obuchi



Design: Yoshiyuki Obuchi

Status:

- 2 baffles (+ suspension structure) assembled and shipped to KAGRA
 - 1 installed and finalized (partly) → IXC
 - 1 residing in EYC clean-booth → installation scheduled for early September
- 2 more baffles to be assembled



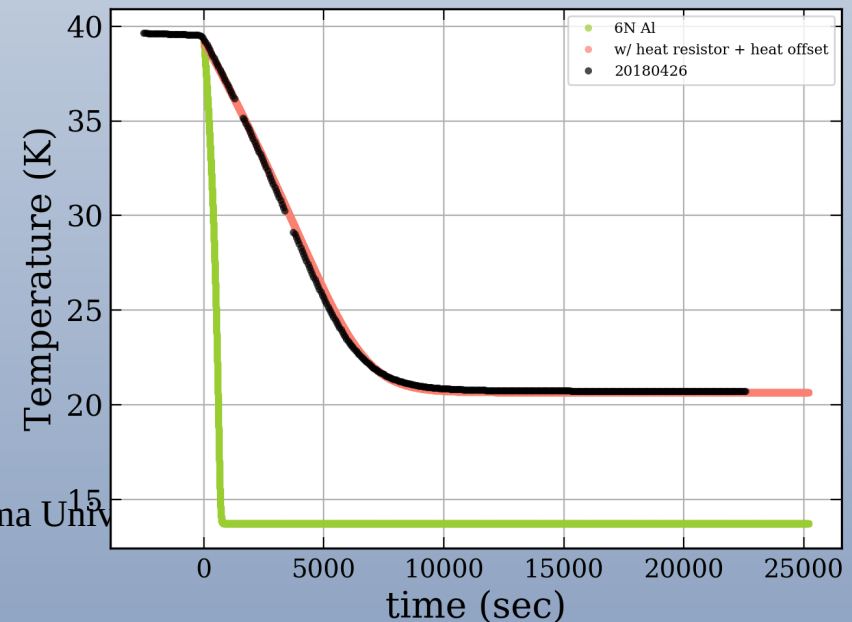
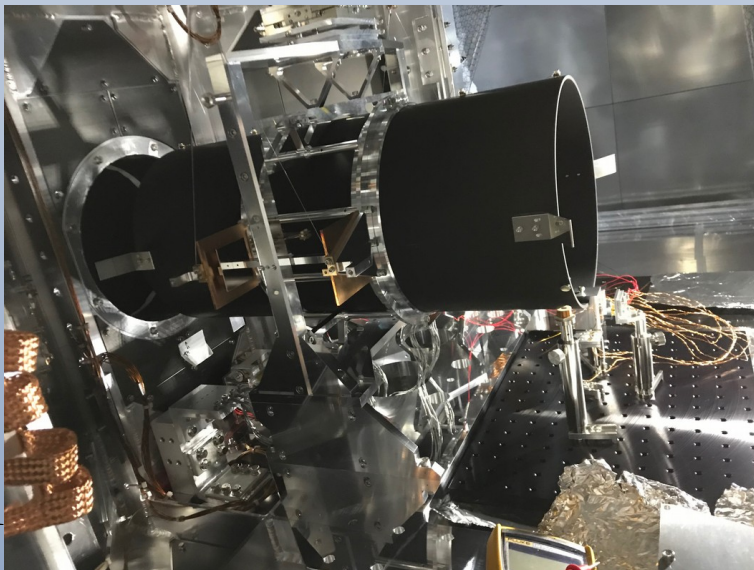
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Issues discovered during the cooling-test from February - April:

- Edges of the baffle need protection during transport
- Stocked cooling at $\sim 21\text{K}$
- Moving WAB into “saving-mode”
- Overdamping for Temperatures below 50K



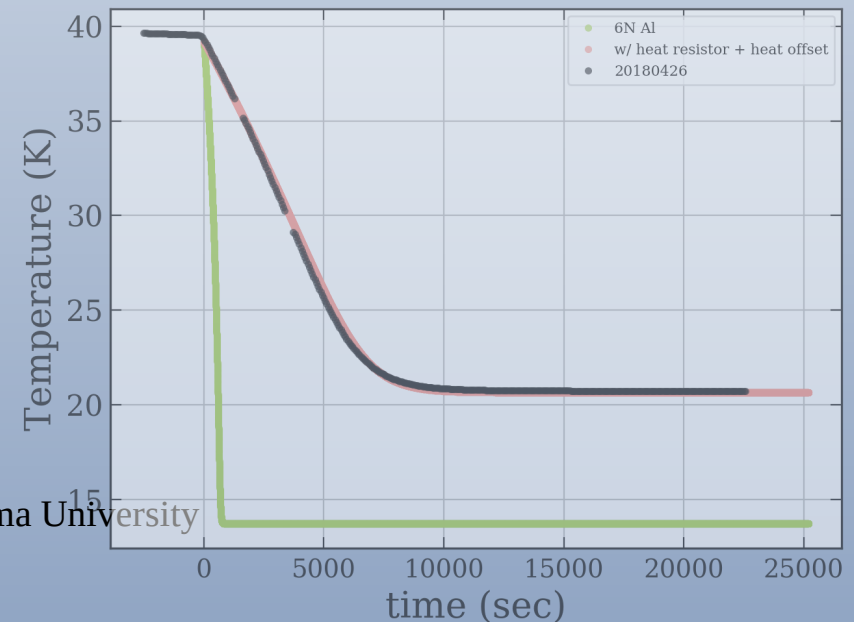
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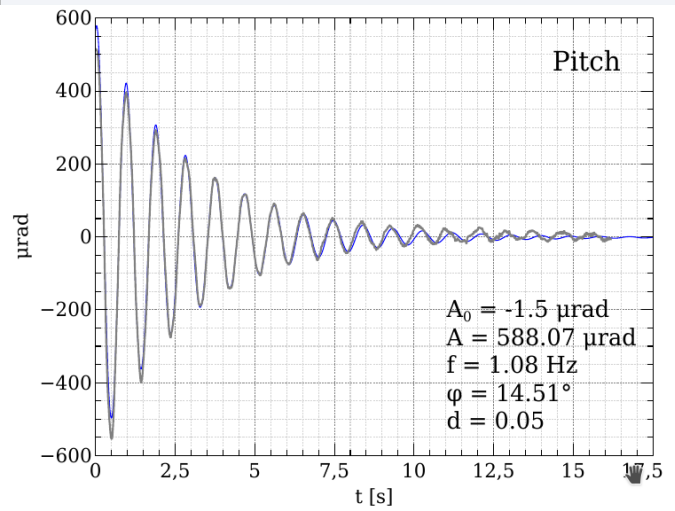
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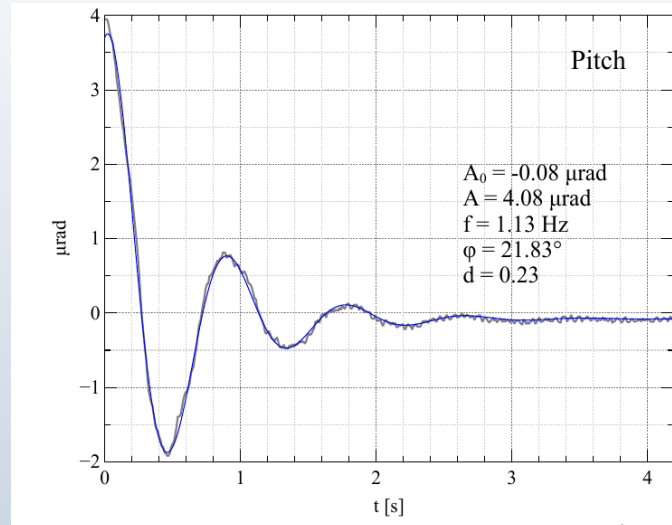
Wide-Angle-Baffle

300K



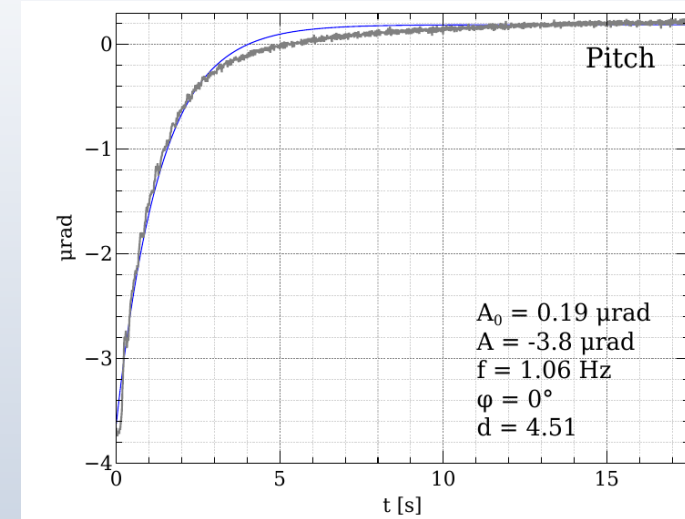
$Q = 20$

76K

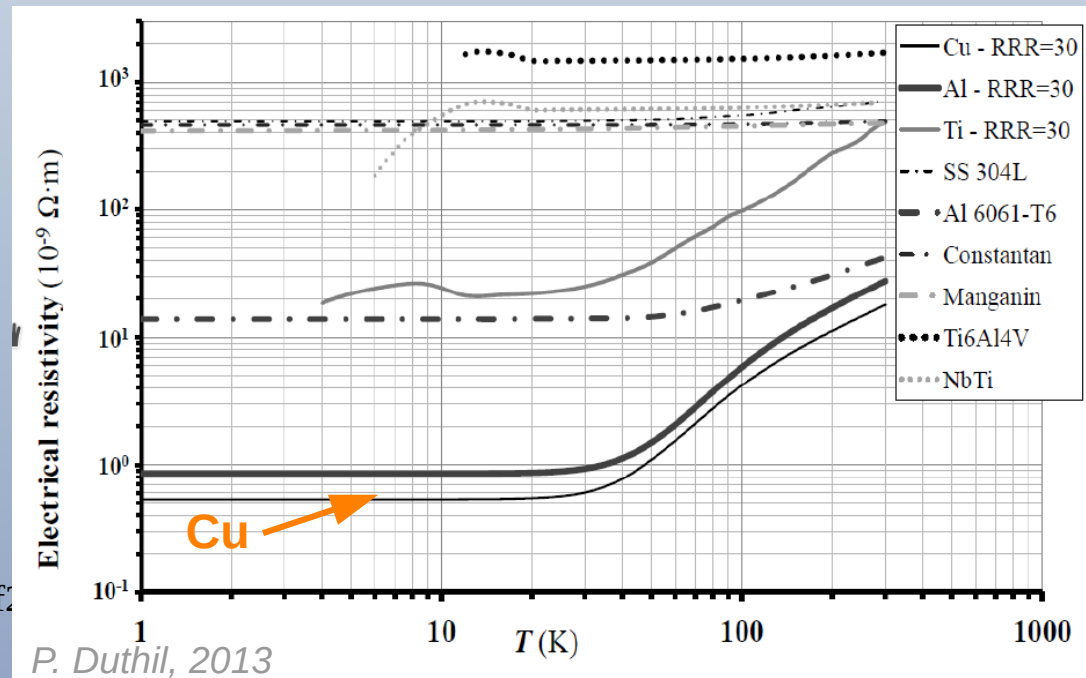
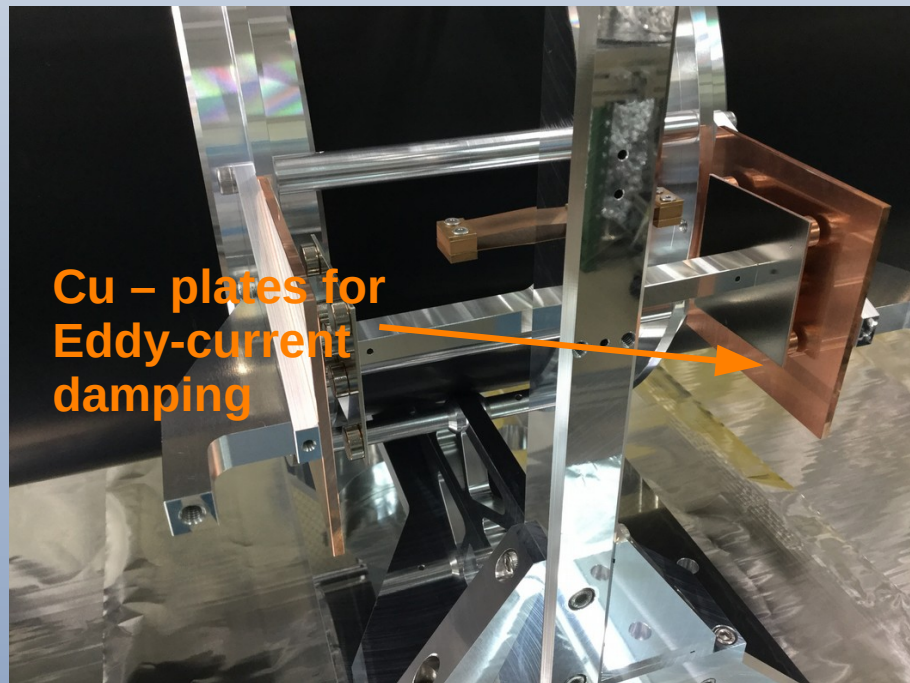


$Q = 4.3$

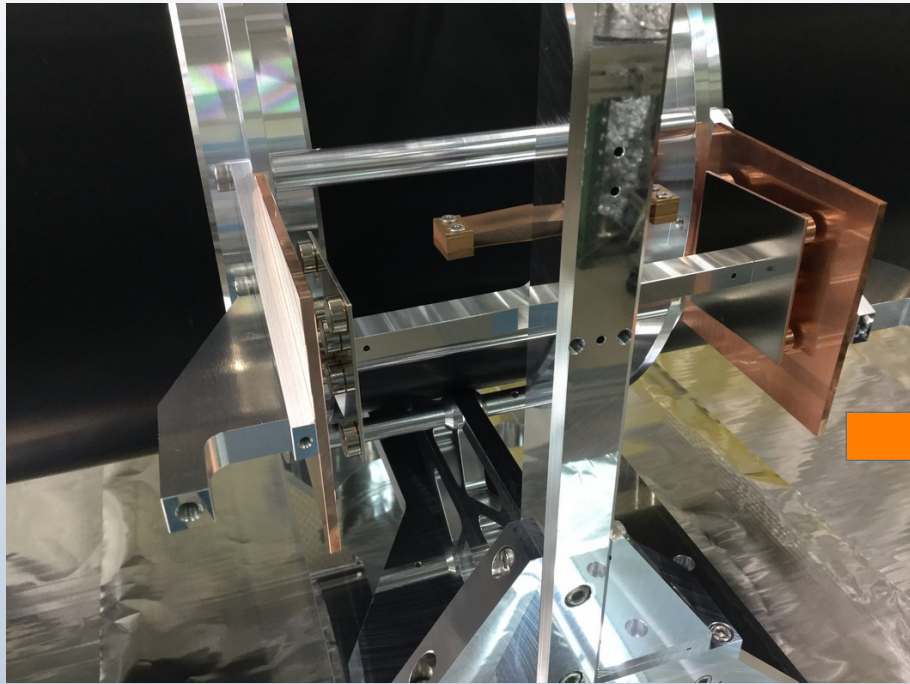
21K



$Q = 0.2$



Wide-Angle-Baffle



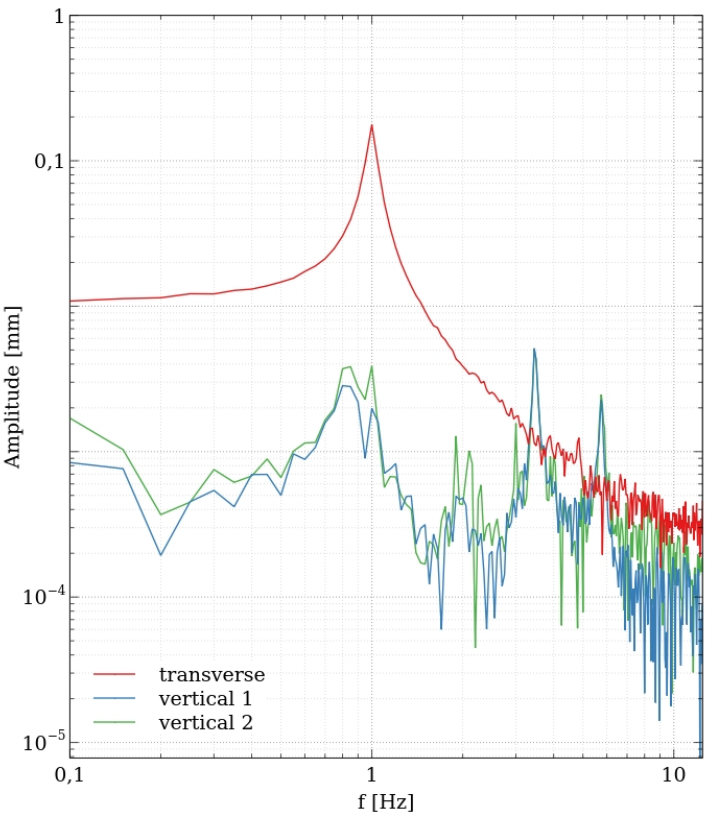
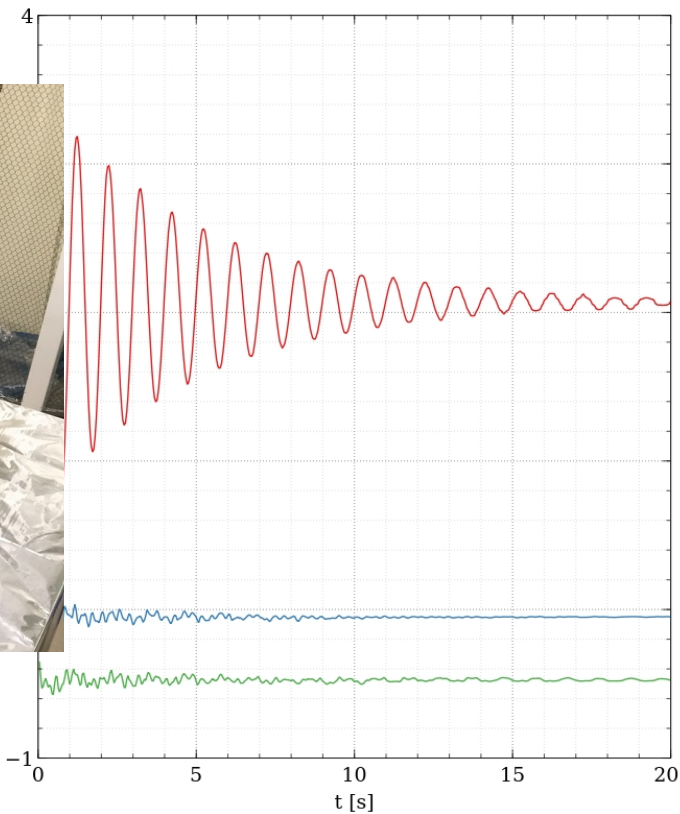
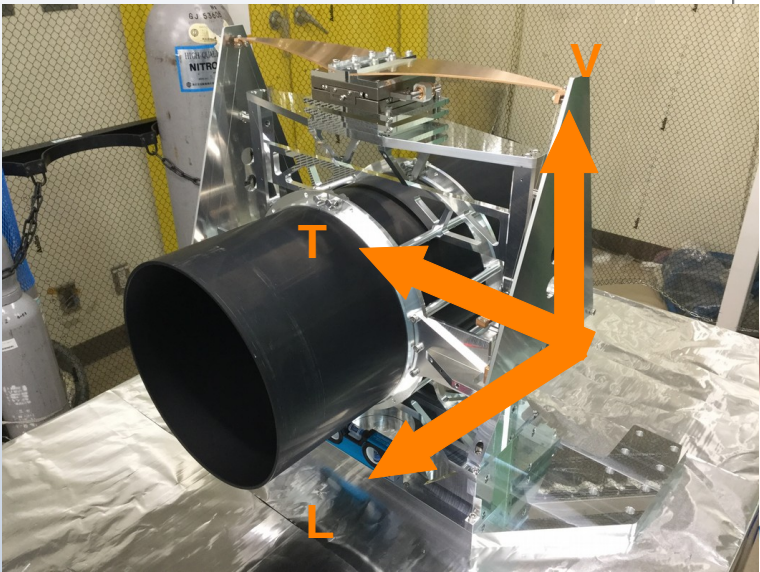
Exchanged Cu-plates with Al (6061)-plates

- shows much less increase of electric conductivity during cool-down



Wide-Angle-Baffle

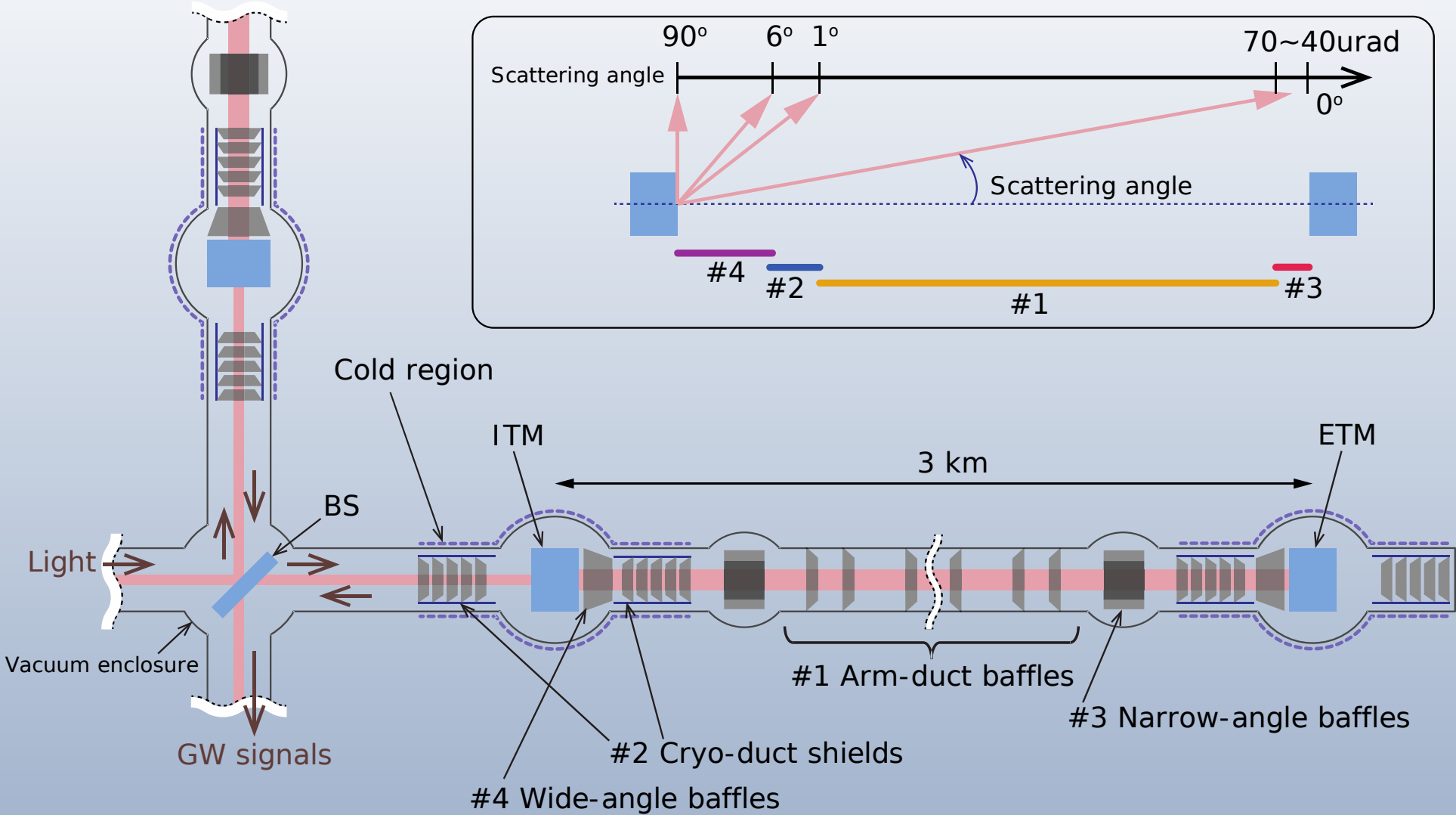
WAB-IYC, Al-damper with 8 magnets, transverse excitation



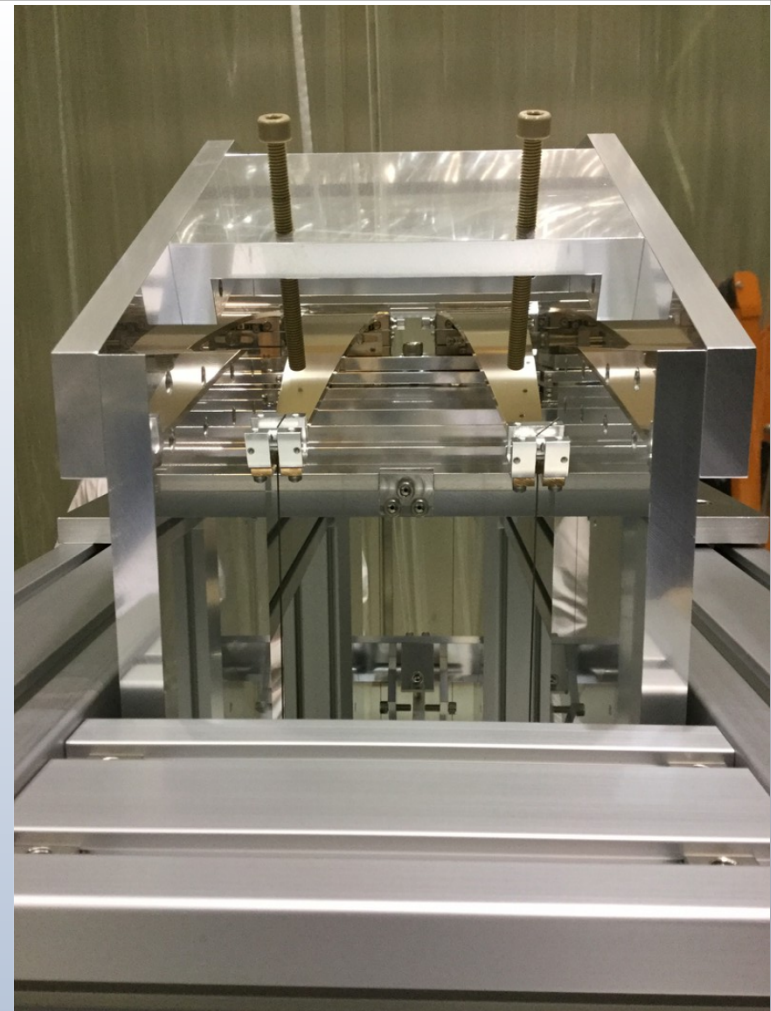
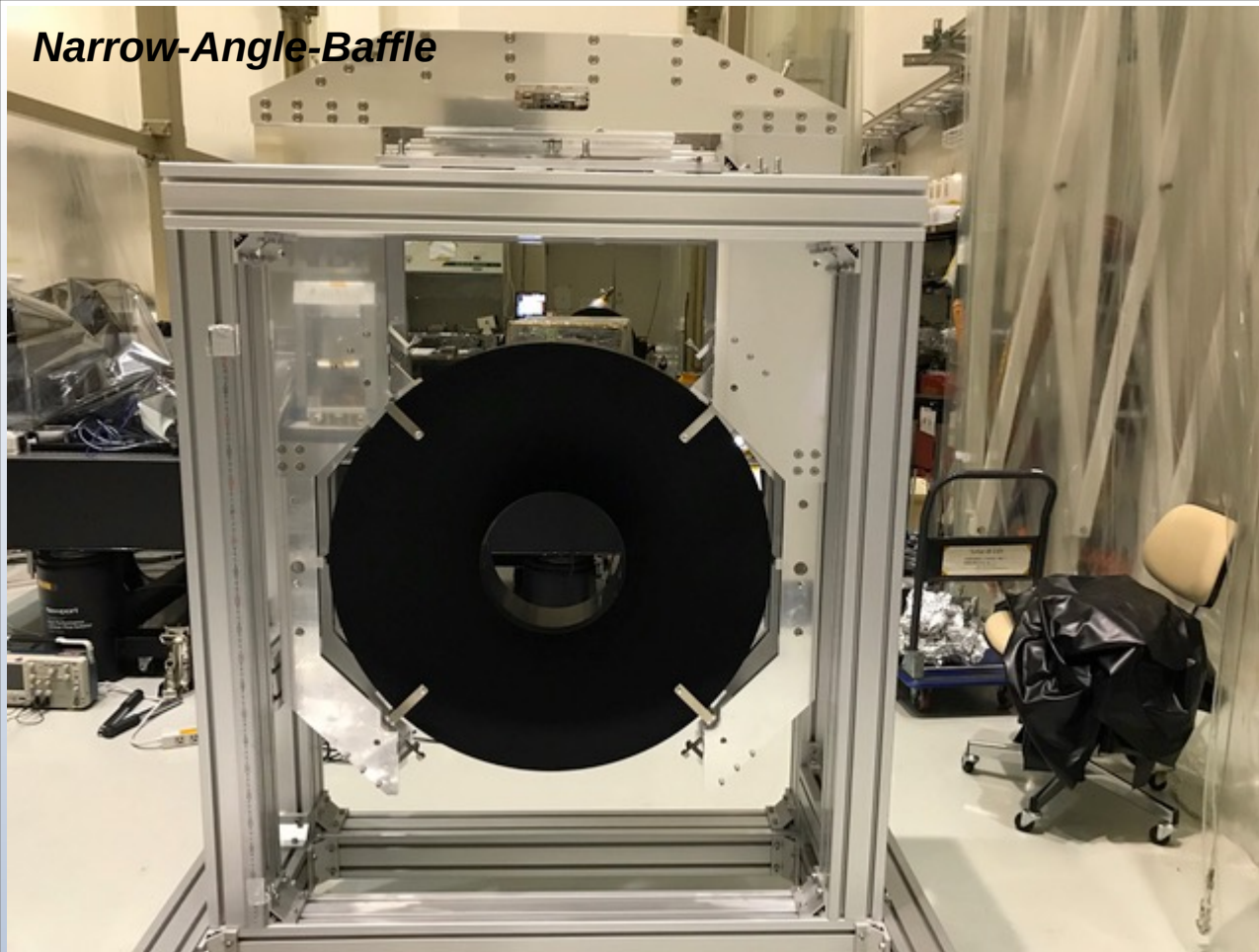
Mode	Frequency [Hz]	Quality-Factor	Quality-Factor (with Cu)
longitudinal	0.84	12.66	20
transverse	1	22.34	21.7
vertical	3.47	84.03	111
roll	5.79	75.19	(~80)

Narrow-Angle-Baffle

Narrow-Angle-Baffle Assembly



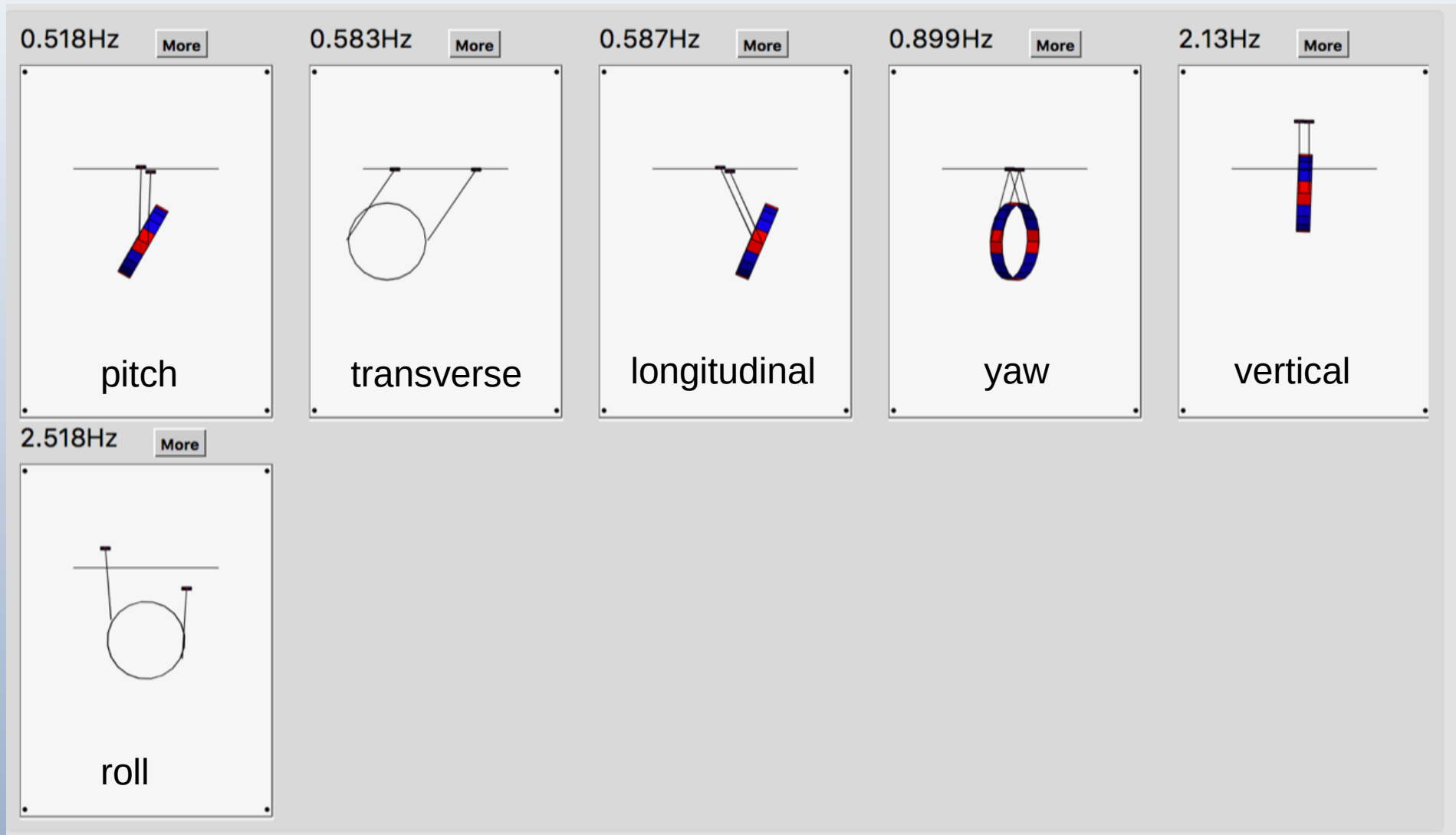
Narrow-Angle-Baffle



Status:

- 2 baffles (+ suspension structure) assembled
 - 1 installed and finalized → IXA
 - 1 still in Mitaka
- 2 more baffles to be assembled

Eigenmodes:



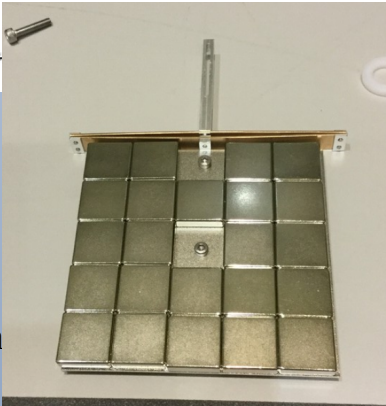
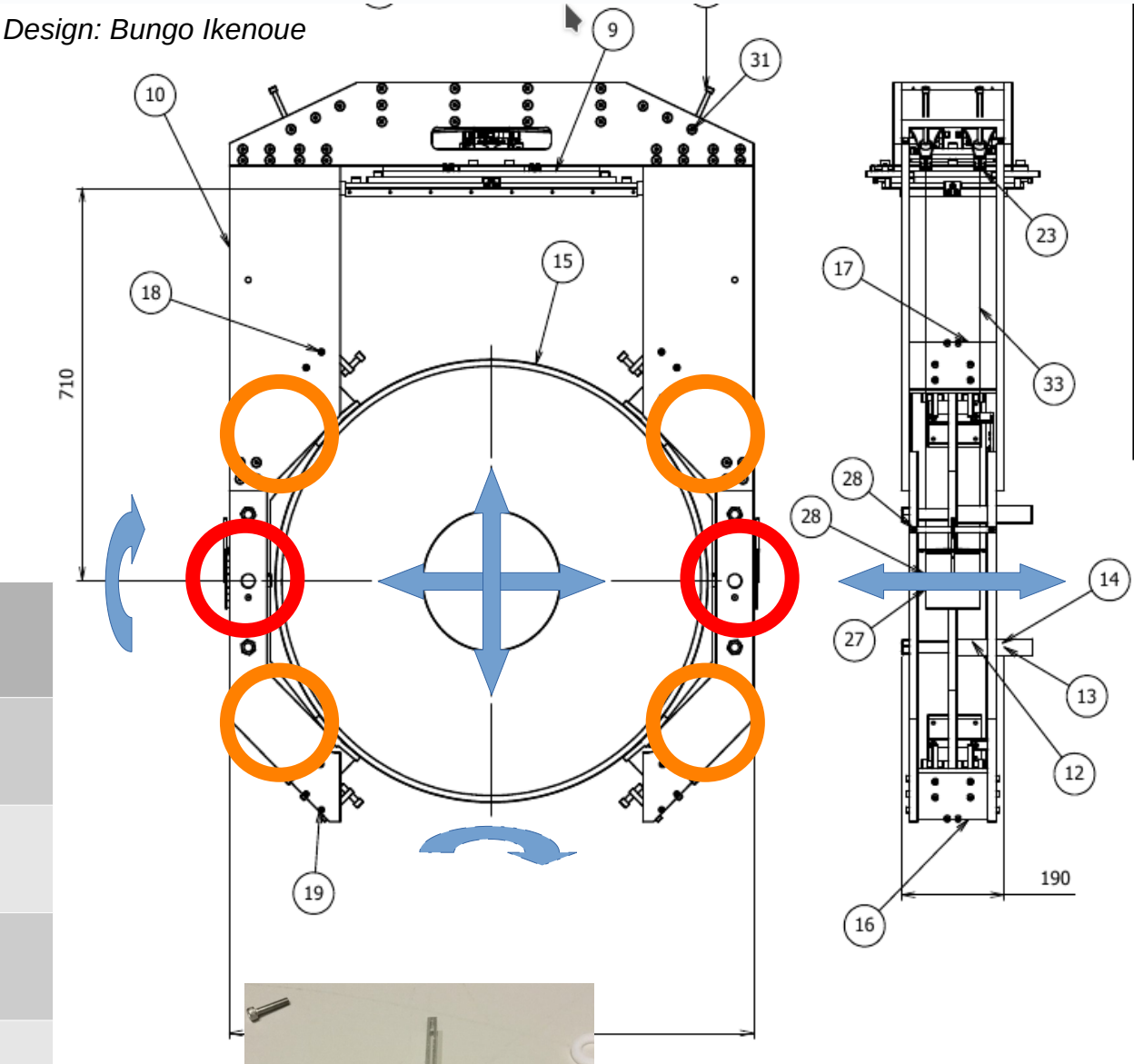
Narrow-Angle-Baffle

Originally only **two** dampers designed

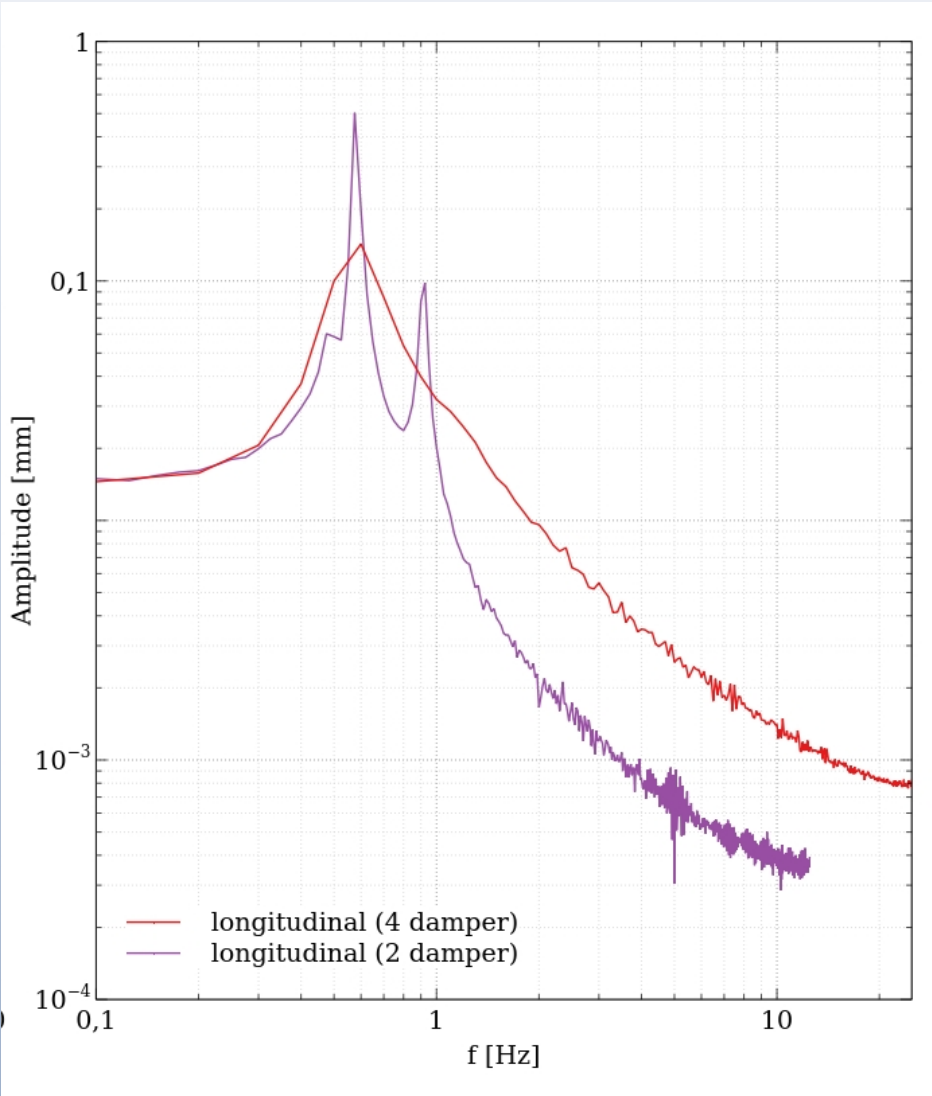
Due to poor damping of especially the pitch-mode, we revised the design

→ Now 4 dampers

Mode	Frequency [Hz]	Quality-Factor
pitch	0.5	>700
longitudinal	0.58	100
transverse	0.58	50
yaw	0.9	50
vertical	2	286
roll	2.34	201

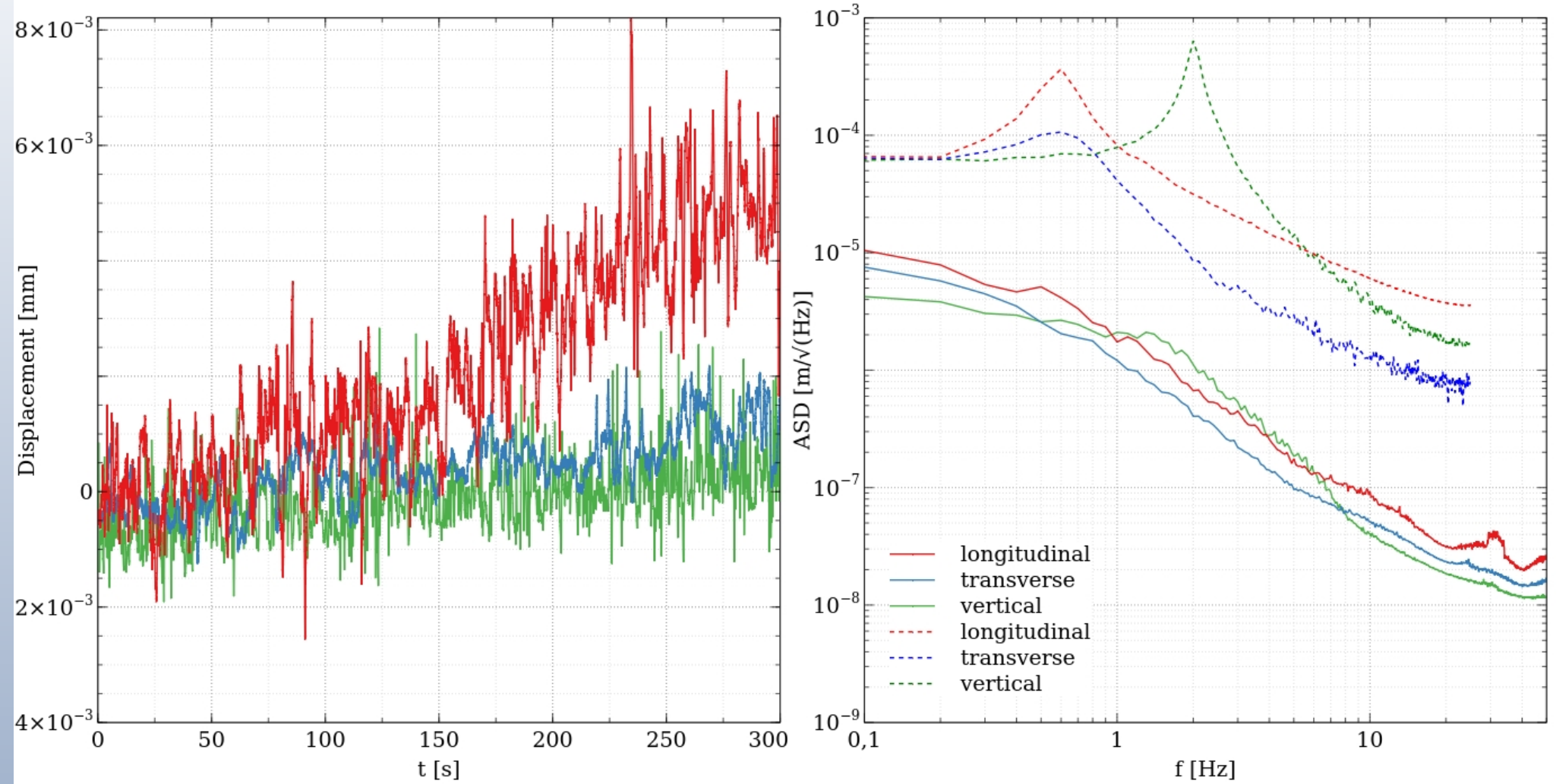


Using “Laser Displacement Sensors” for analyzing baffle movement



Mode	Frequency [Hz]	Quality-Factor
pitch	0.57	4.5
longitudinal	0.59	7.2
transverse	0.65	3.2
yaw	--	--
vertical	2	20
roll	--	--

NAB IXA 4 Dampers, Background



Summary

WAB:

- Finalizing of IXC WAB almost finished
- Did several improvements on the design since the cooling-test
- → exchanged Cu-plates with Al (6061)
- Q-factor (@ 300K) decreased for almost all modes
- Let's hope there is just a minor effect on the conductivity due to cryogenic temperatures

NAB:

- Two NABs assembled, one already installed!
- Adjusted the design of the dampers (2 along axis → 4 off axis)
- Damping increased by a factor of ~ 10 ! → maybe sufficient
- Still relatively high background (but: IXA still open!)

Thank you for your attention!