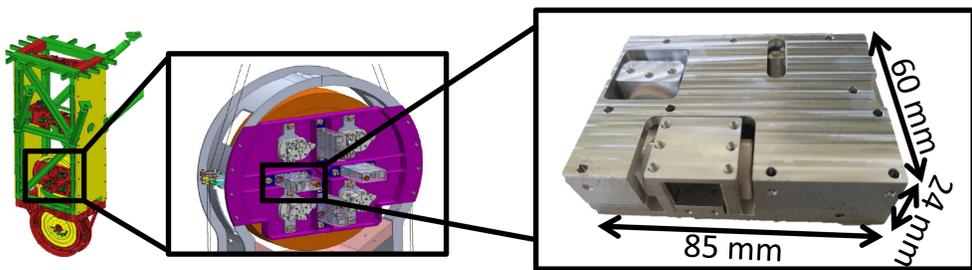


# HoQI for the LIGO Beamsplitter

This poster presents a compacted redesign of a HoQI interferometer, which fits the envelope for placement in the LIGO Big Beamsplitter Suspension. It should have sufficient sensitivity to allow for local damping between the Penultimate Mass (PUM, M2) and the suspension frame (Lower Tablecloth).

The proposal for HoQI in the LIGO beamsplitter has been funded by STFC, and while it is not part of the A+ baseline, it is possible to retrofit a HoQI in the Big Beamsplitter Suspension.



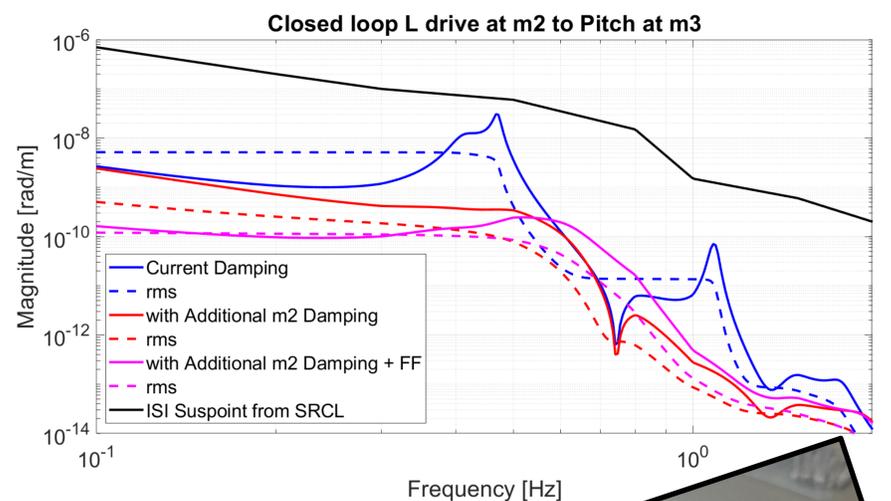
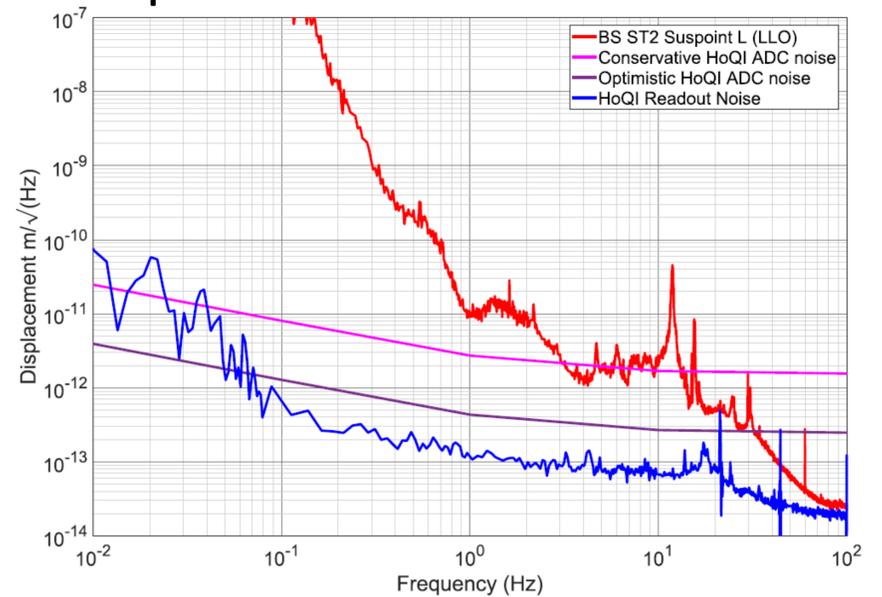
**Top** [LIGO-E1900252]: Picture from the A+ beamsplitter PDR, showcasing the Hoqi envelope and placement.

**Right Top** [LIGO-G1900999]: Comparison between Stage-2 motion of the BSC-ISI (red) compared with measurement readout noise of HoQI (blue) with conservative (magenta) and optimistic (purple) ADC noise. Showcasing the necessary sensitivity.

**Right Bottom** [based on LIGO-T1800448]: Resulting pitch motion caused by length drive. Assuming the suspension is driven in length at the 2nd last stage (M2) with the input motion of the ISI as measured for SRCL (LIGO-G2100193), we show that improved damping reduces the resulting pitch motion by a factor of 50

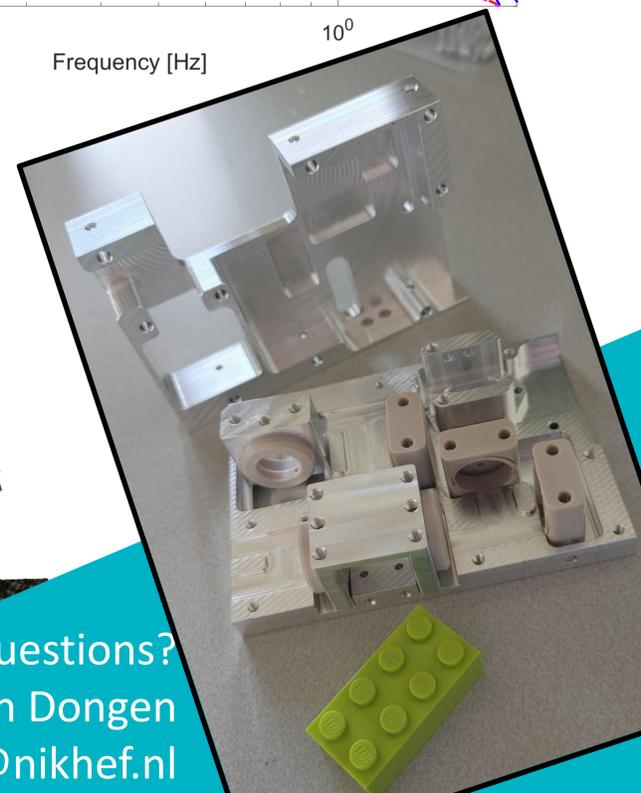
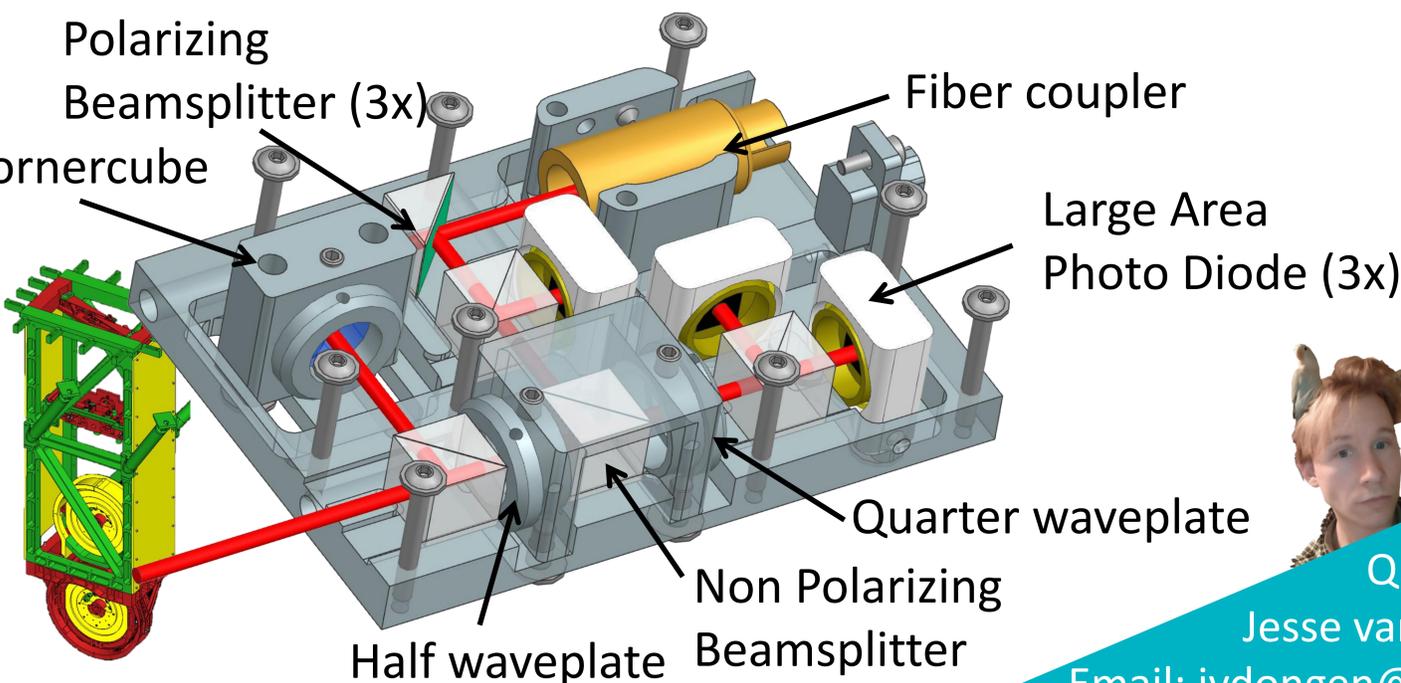
**Bottom Left:** Overview of the new mechanical redesign, fitting the envelope and taking into account manufacturing principles, which takes HoQI one step closer towards implementation.

**Bottom Right:** First production prototype with a LEGO brick for scale



**Related GWADW posters:**

- [Sam Cooper - Interferometric Suspension and Inertial Sensors](#)
- [Leo Prokhorov - 6D inertial seismic isolation](#)



Questions?  
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