SEI
Seismic Isolation and Alignment for Advanced LIGO

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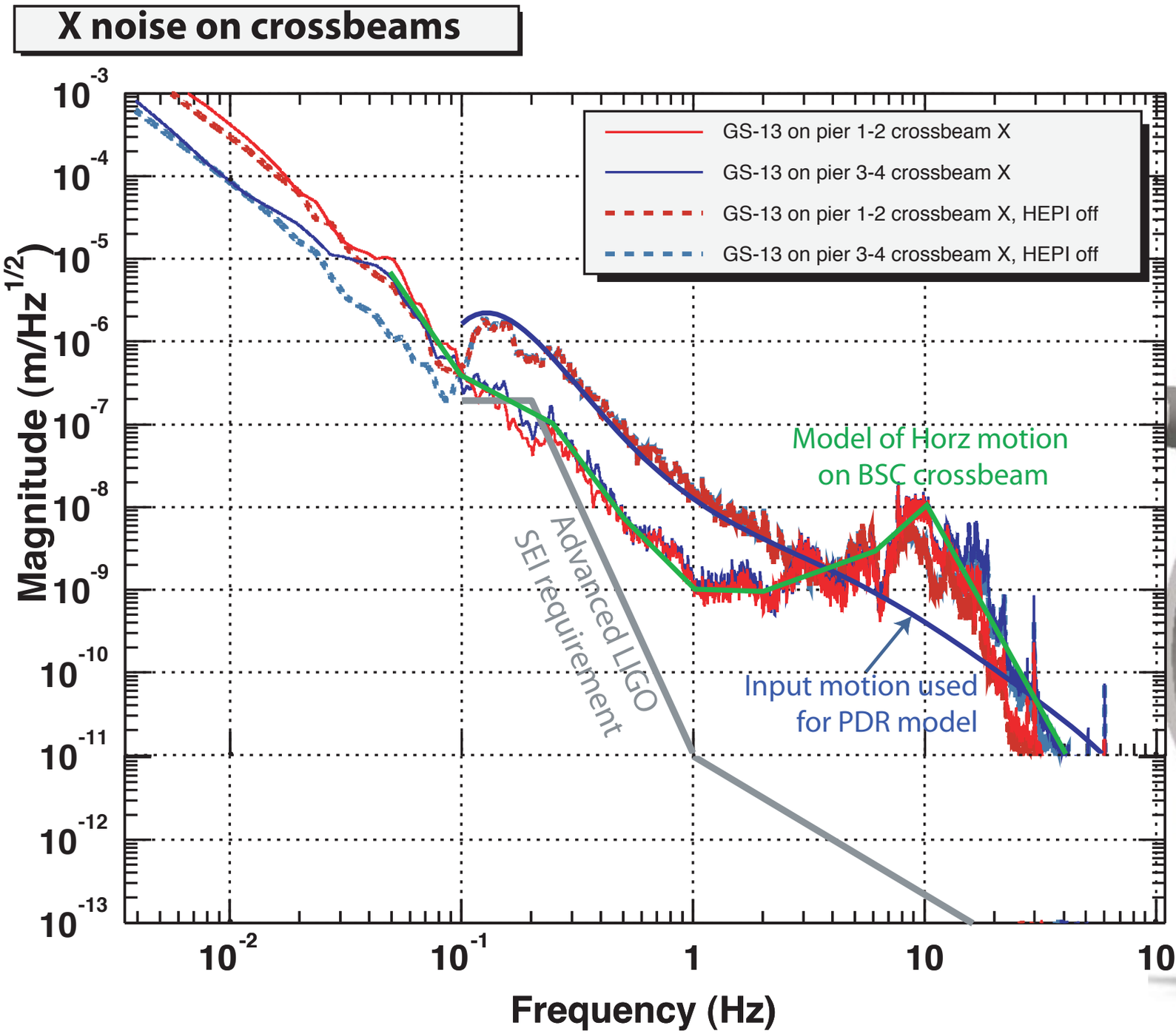
Summary

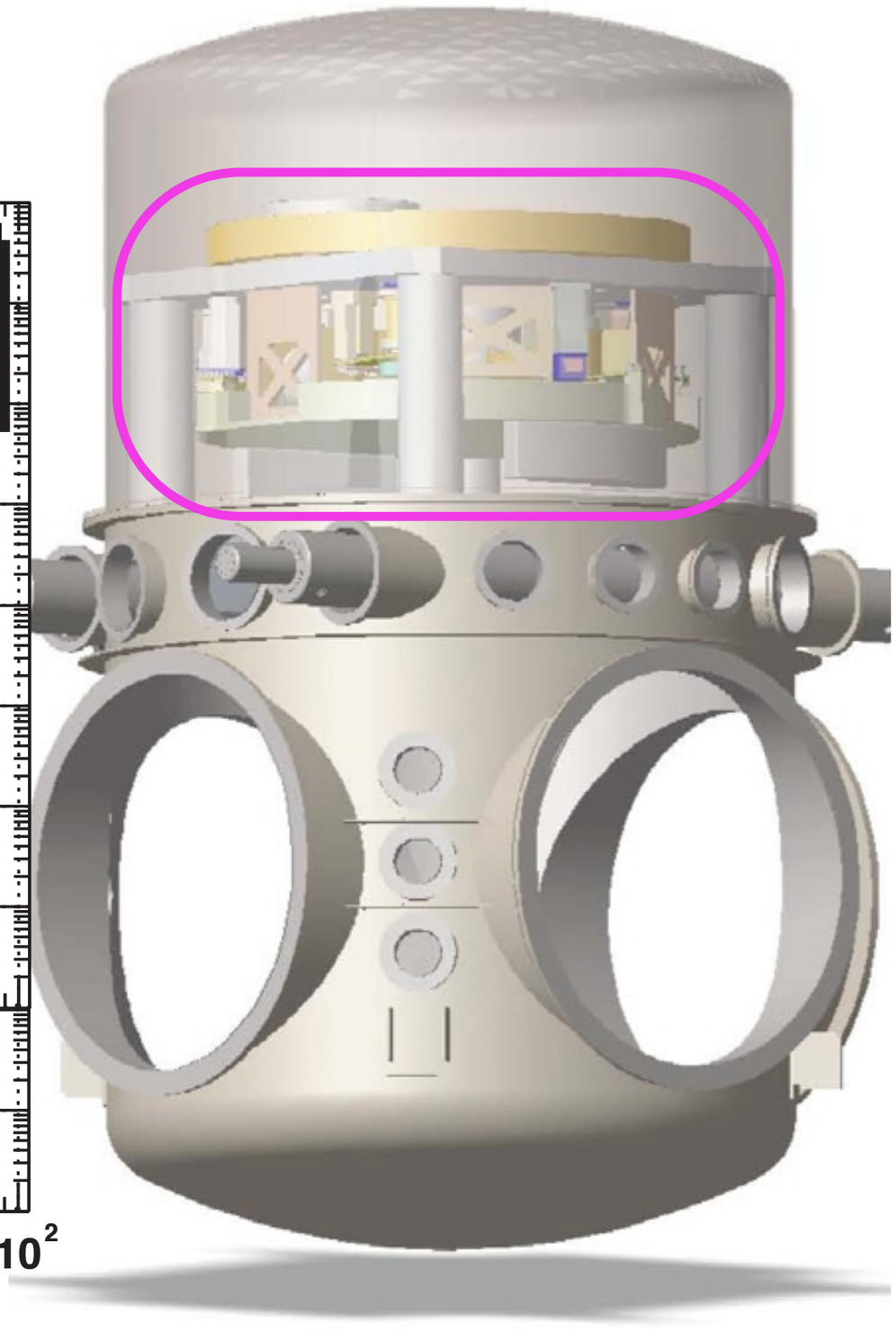
Based on

1) Experimental results at the Stanford Engineering Test Facility,
2) Performance models of the system designed for the BSC by ASI, and
3) Experience with HEPI,

LIGO has decided to proceed with the manufacture of the next prototype.

BSC System for Advanced LIGO





original plot from J. Giaime

CAD drawing from ASI

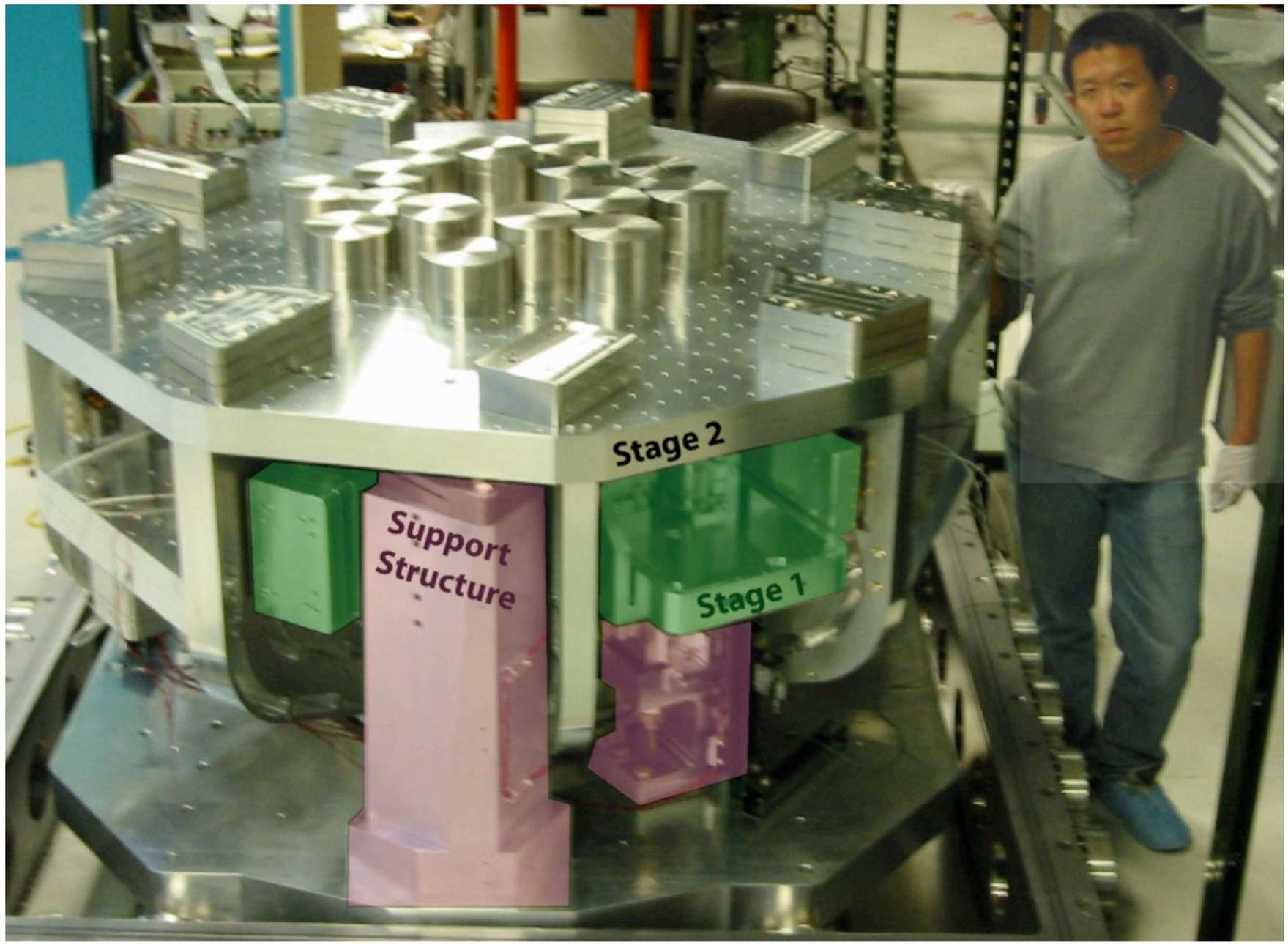
ETF Technology Demonstrator

2 stage isolation and alignment system.

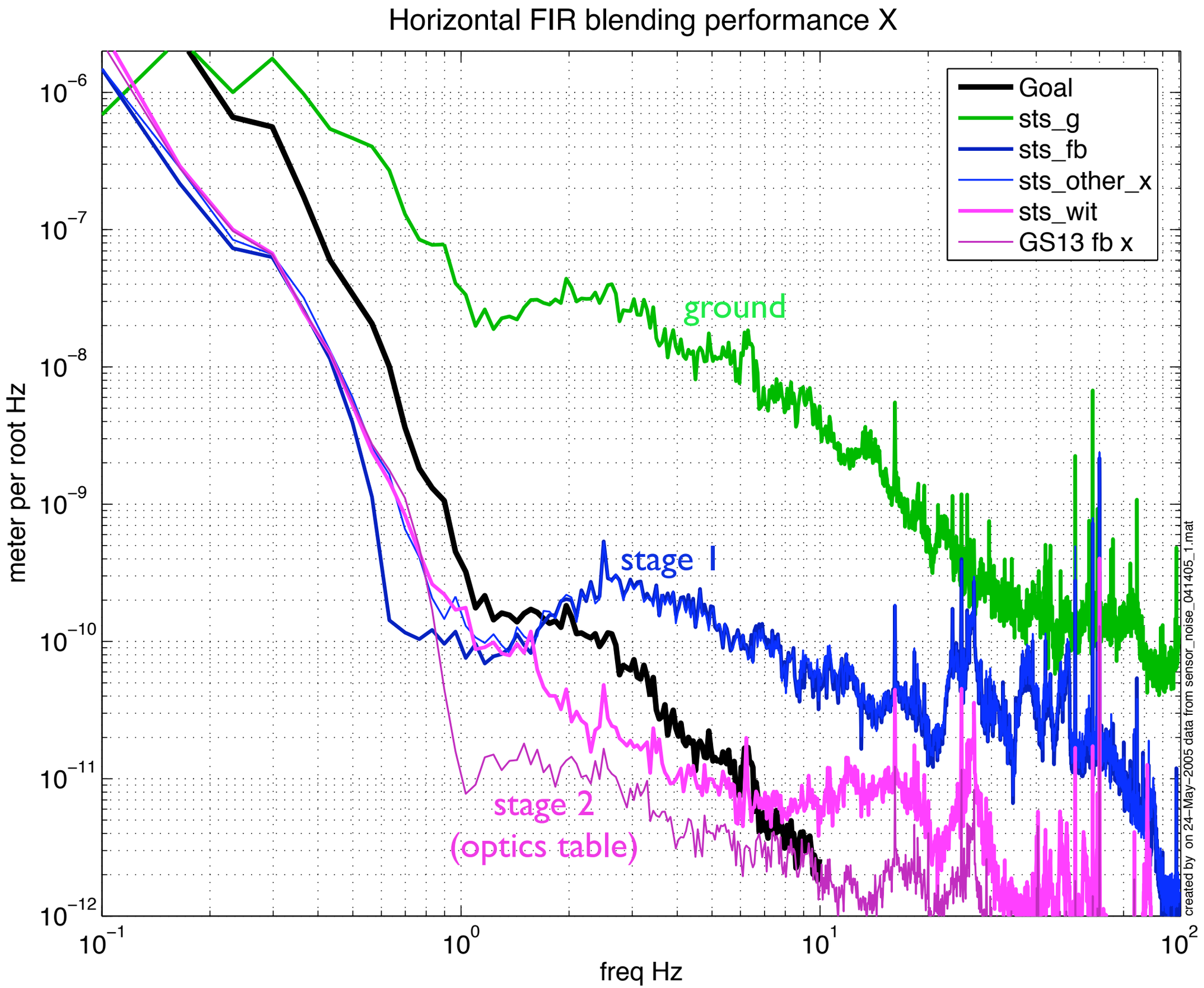
Each stage aligned and isolated in 6 DOF.

Passive isolation above 1 Hz horz, 3 Hz vert

Active isolation below 30 Hz



ETF: X Performance



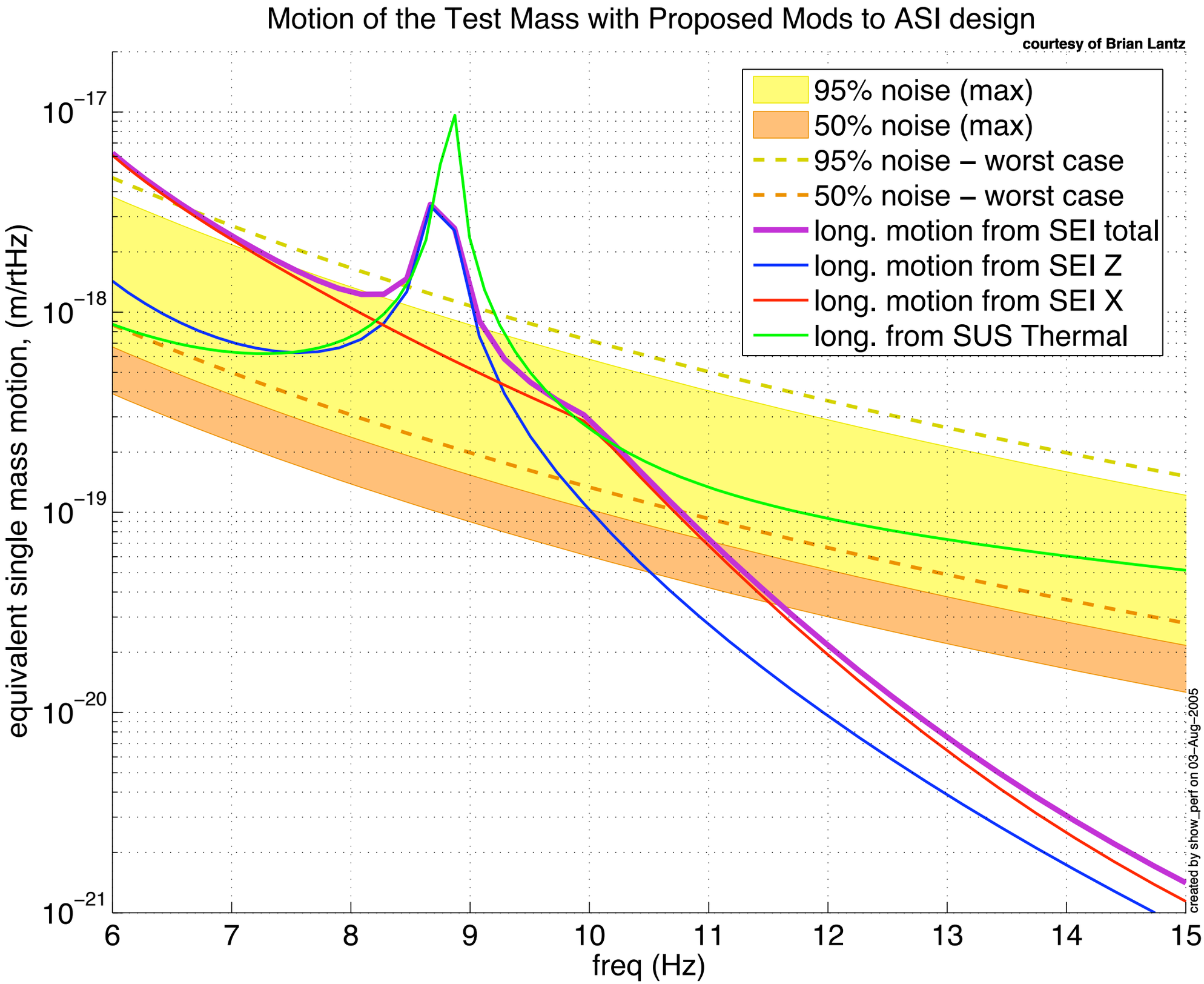
Improvements

Better readout electronics for stage 2 sensors (GS-13)
We have demonstrated noise <1e-11 m/rtHz at 1 Hz.

Improve the BSC system tip/ tilt isolation at 10 Hz.

Then:
Make a big model of the system w/ a quad pendulum.
Seismic crosses thermal noise at 10.3 Hz.

Predicted Performance w/ Pendulum



We are building the BSC prototype, the plan is:

LIGO (Ken Mason) managing the production

May 2006: "Dirty Assembly" at MIT - LASTI

Modal testing in air, disassemble,s clean

Sept 2006: reassemble, continue air testing

Dec 2006: Install in BSC at MIT

2007: In vacuum testing and control development