

Shaking test at the OMC Chamber

2013/6/12 (Updated 2013/6/13)

Kate Dooley, Sheila Dwyer, Tomo Akutsu, Yoichi Aso

Shaker and an accelerometer are mounted on top of the OMC chamber

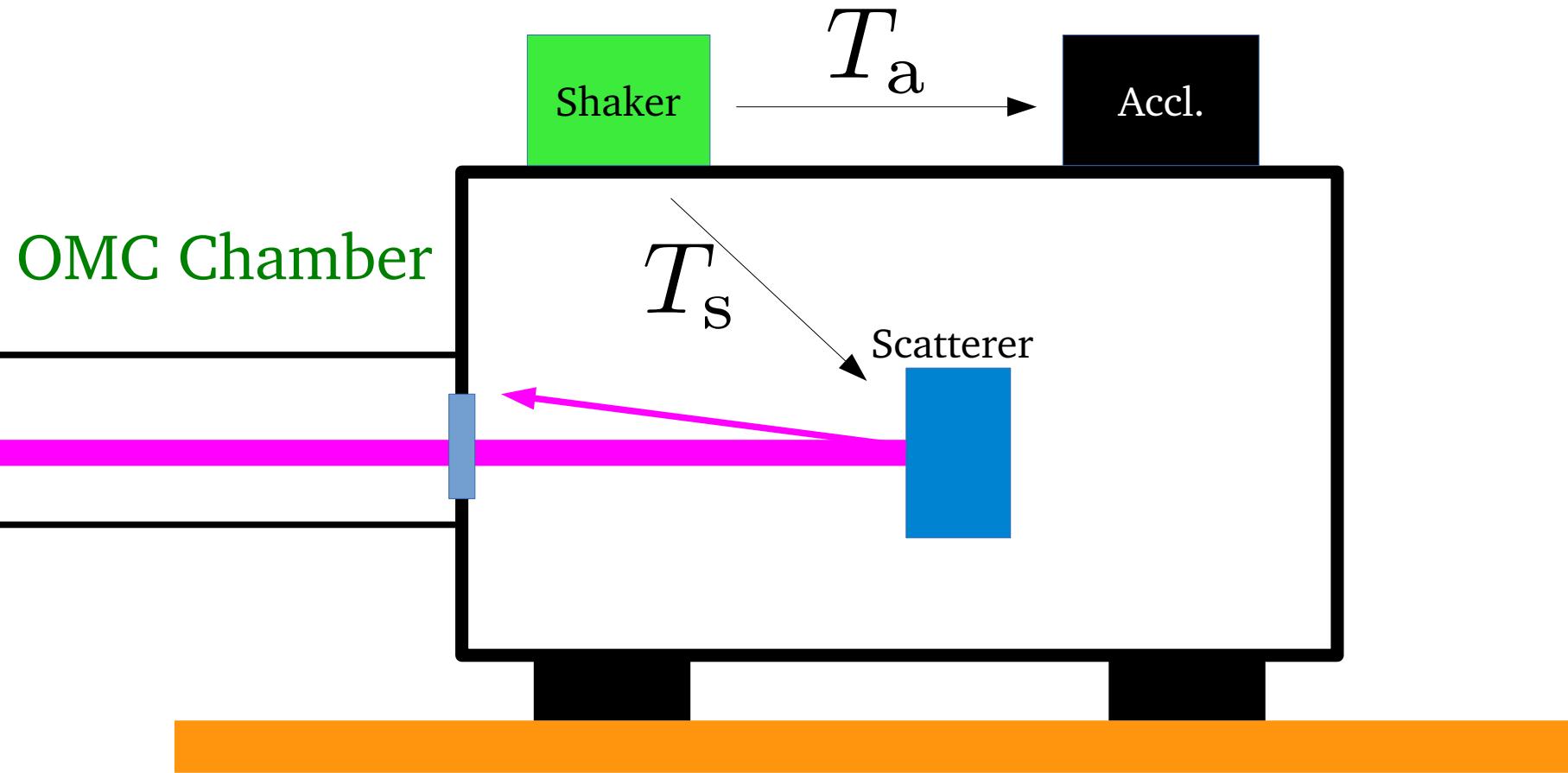
Accelerometer DAQ channels

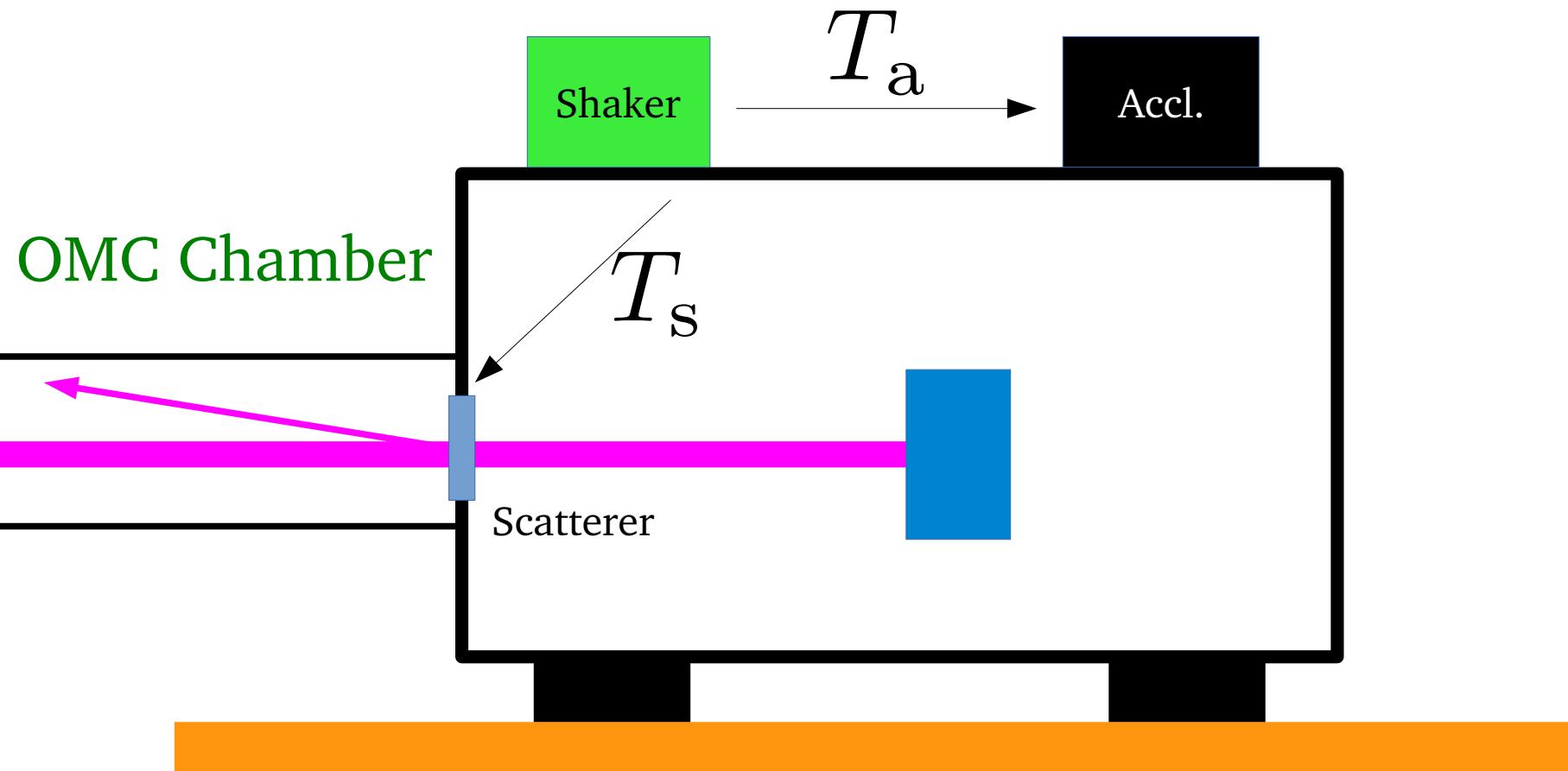
X: LSC_MID_OPN
Y: G1:ASC_MID_FP-MCE-ESD1
Z: G1:LSC_MID_FP-MCE-MCN

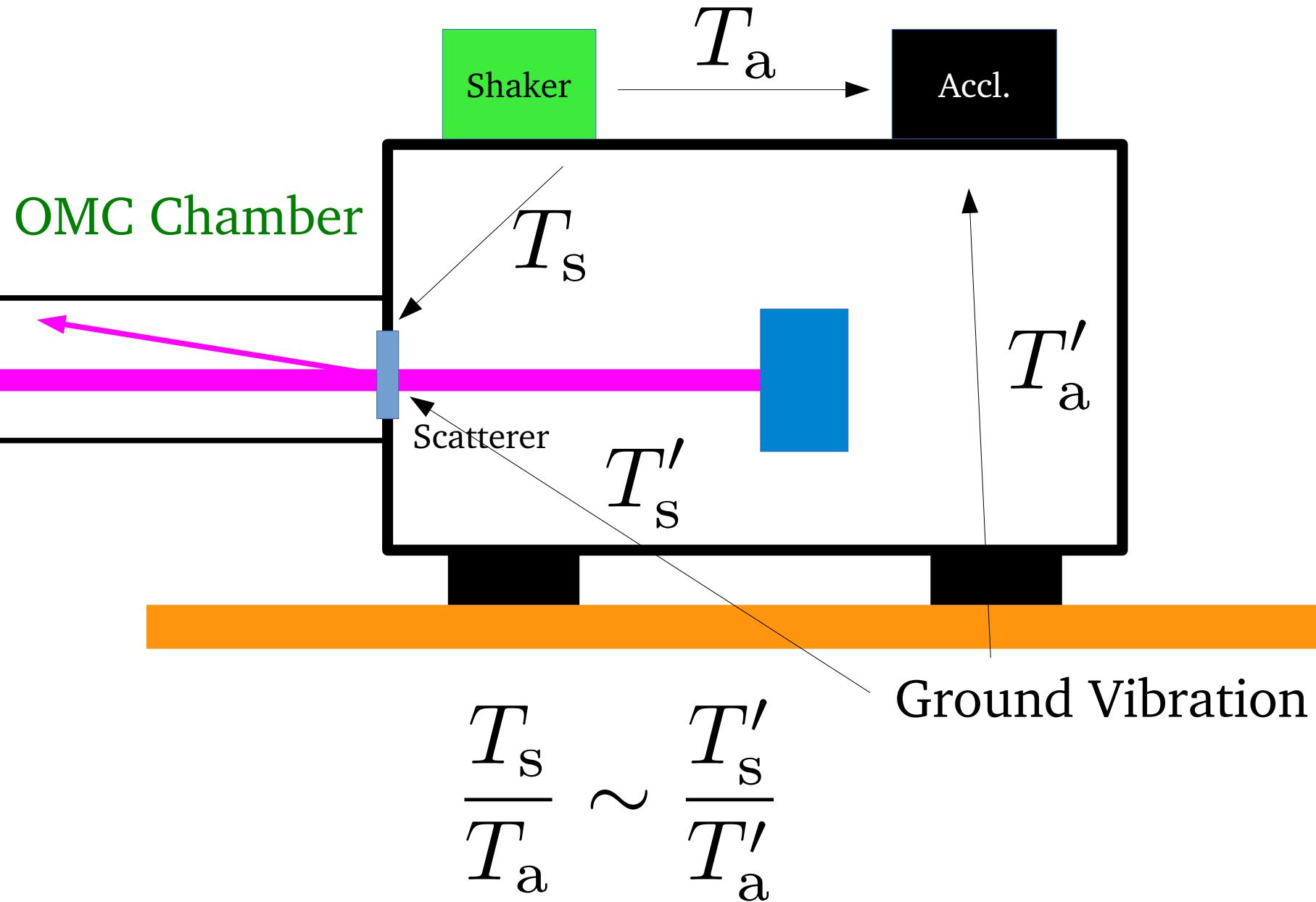
Accelerometer

Shaker



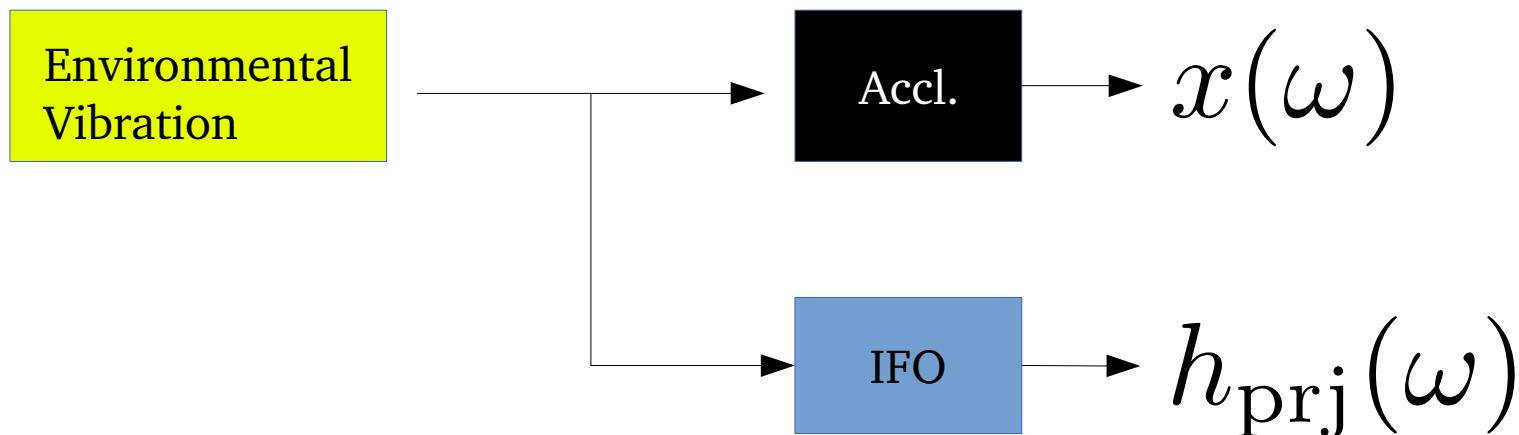








$$T_i(\omega) = \frac{h_{\text{inj}}(\omega)}{x_{\text{inj}}(\omega)}$$



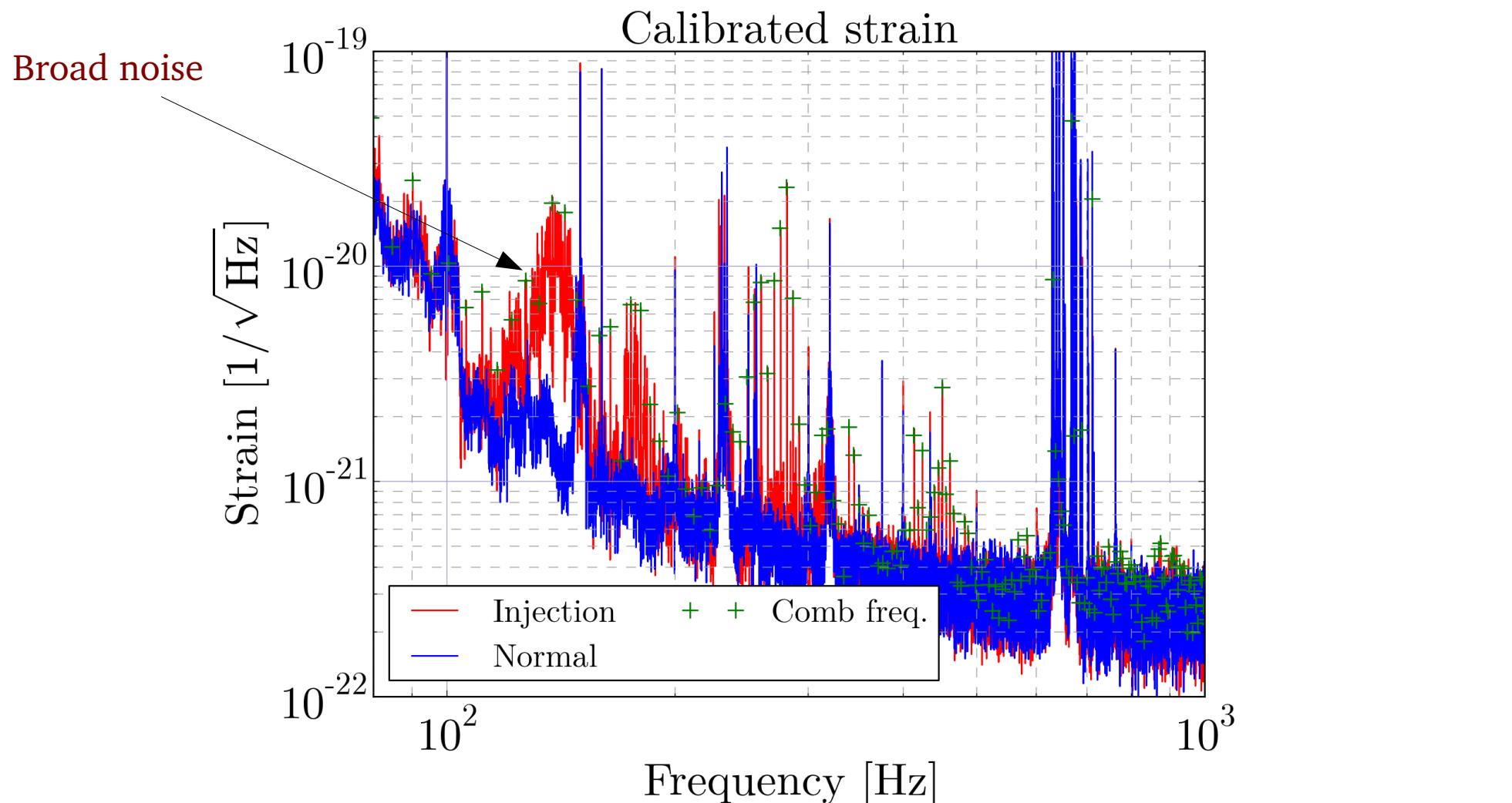
$$h_{\text{prj}}(\omega) = T_i(\omega) \cdot x(\omega)$$

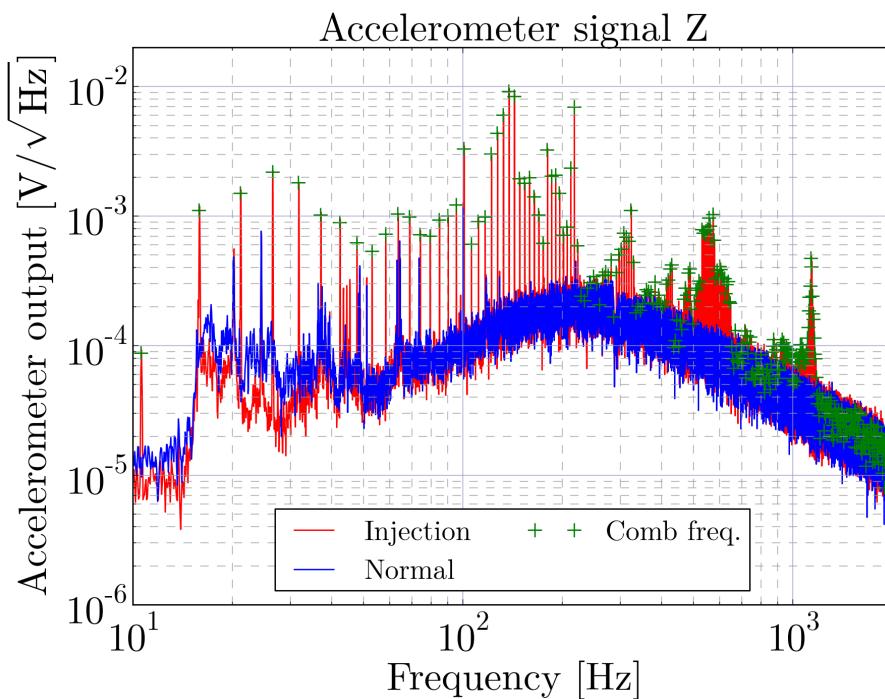
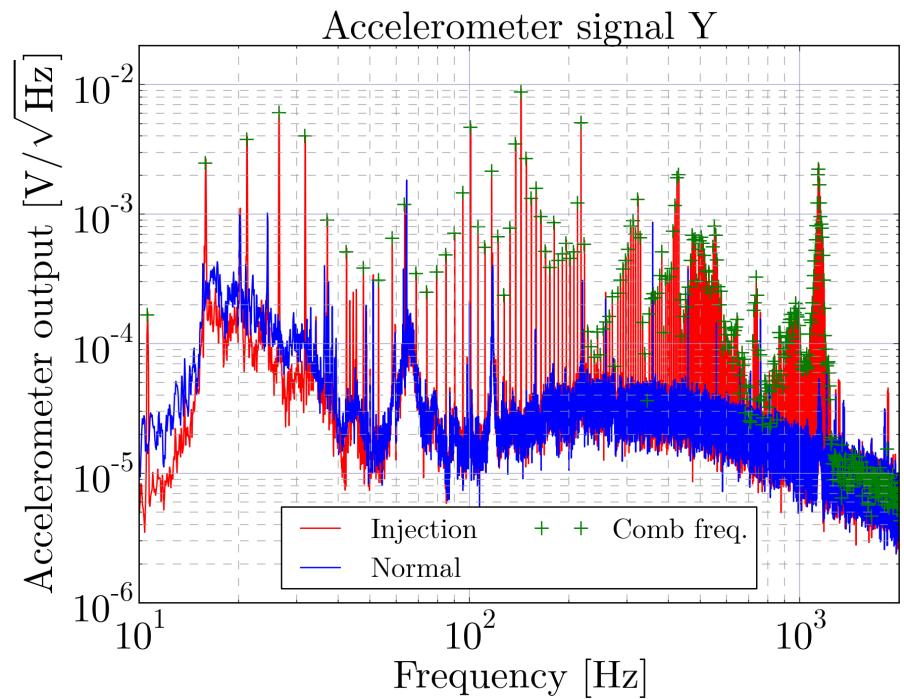
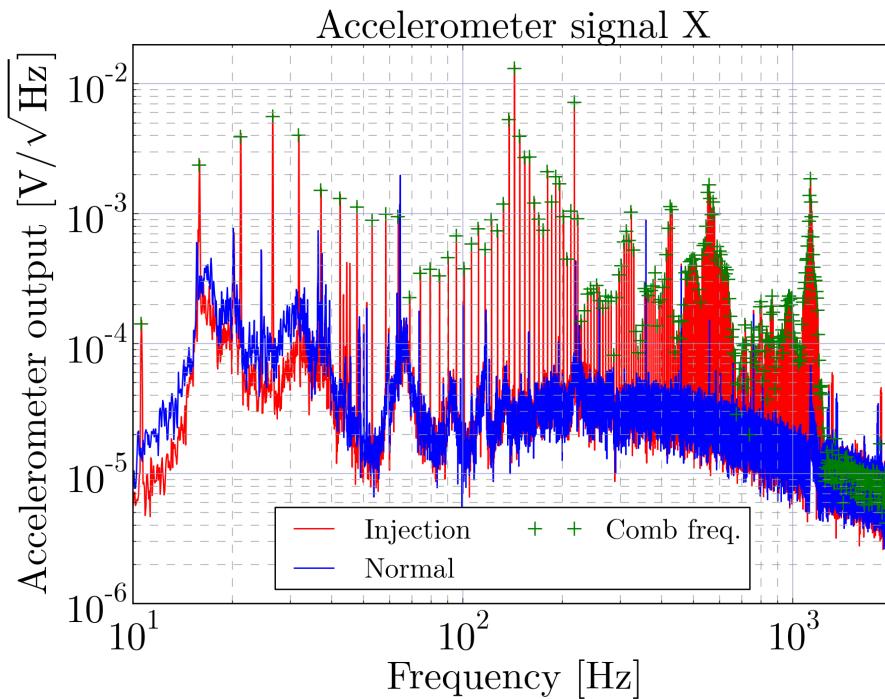
Saw Tooth Injection

5.3Hz, 500mVpp to the shaker amplifier

13:34:40 – 13:38:00 (UTC)

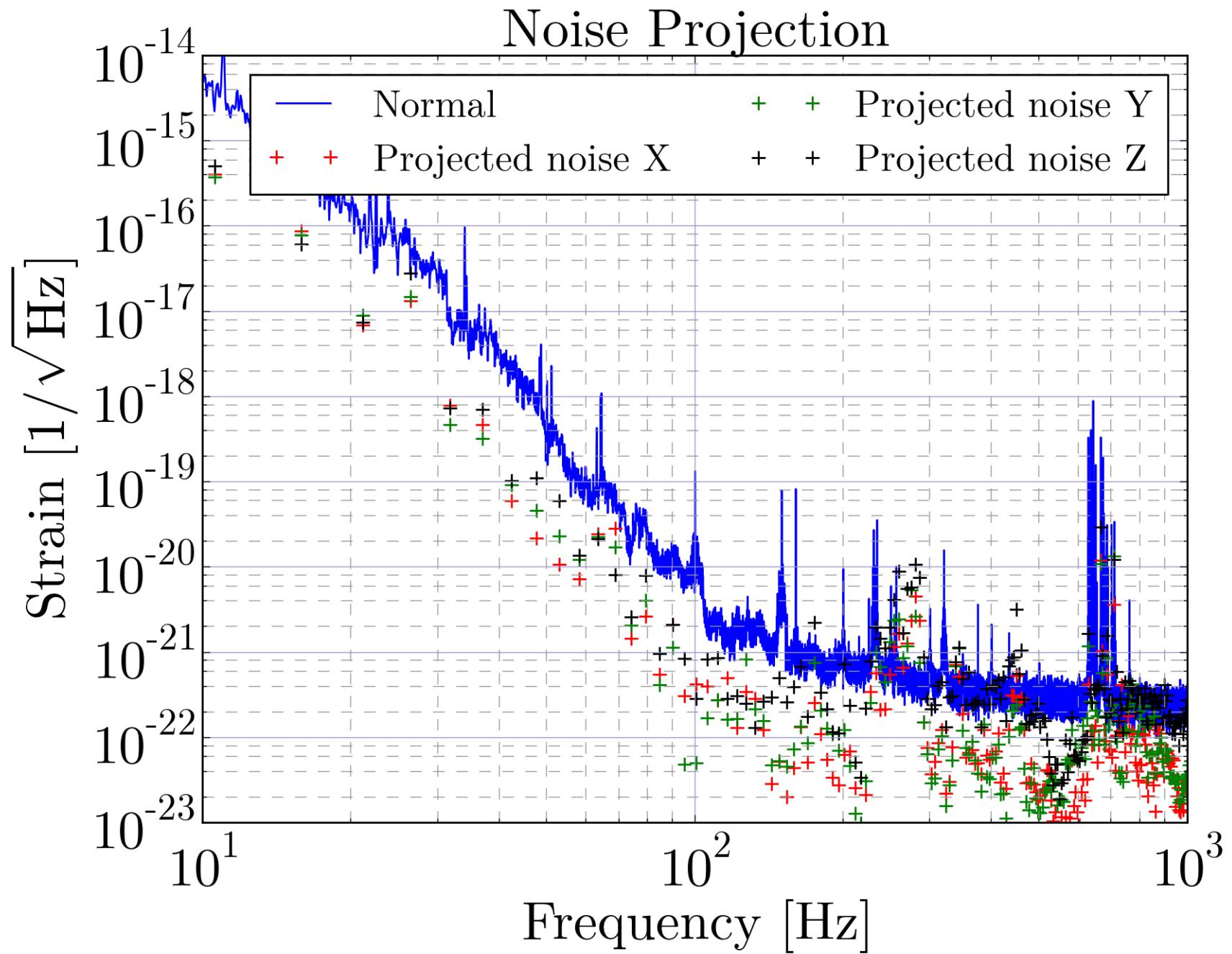
Peaks appear in the strain noise





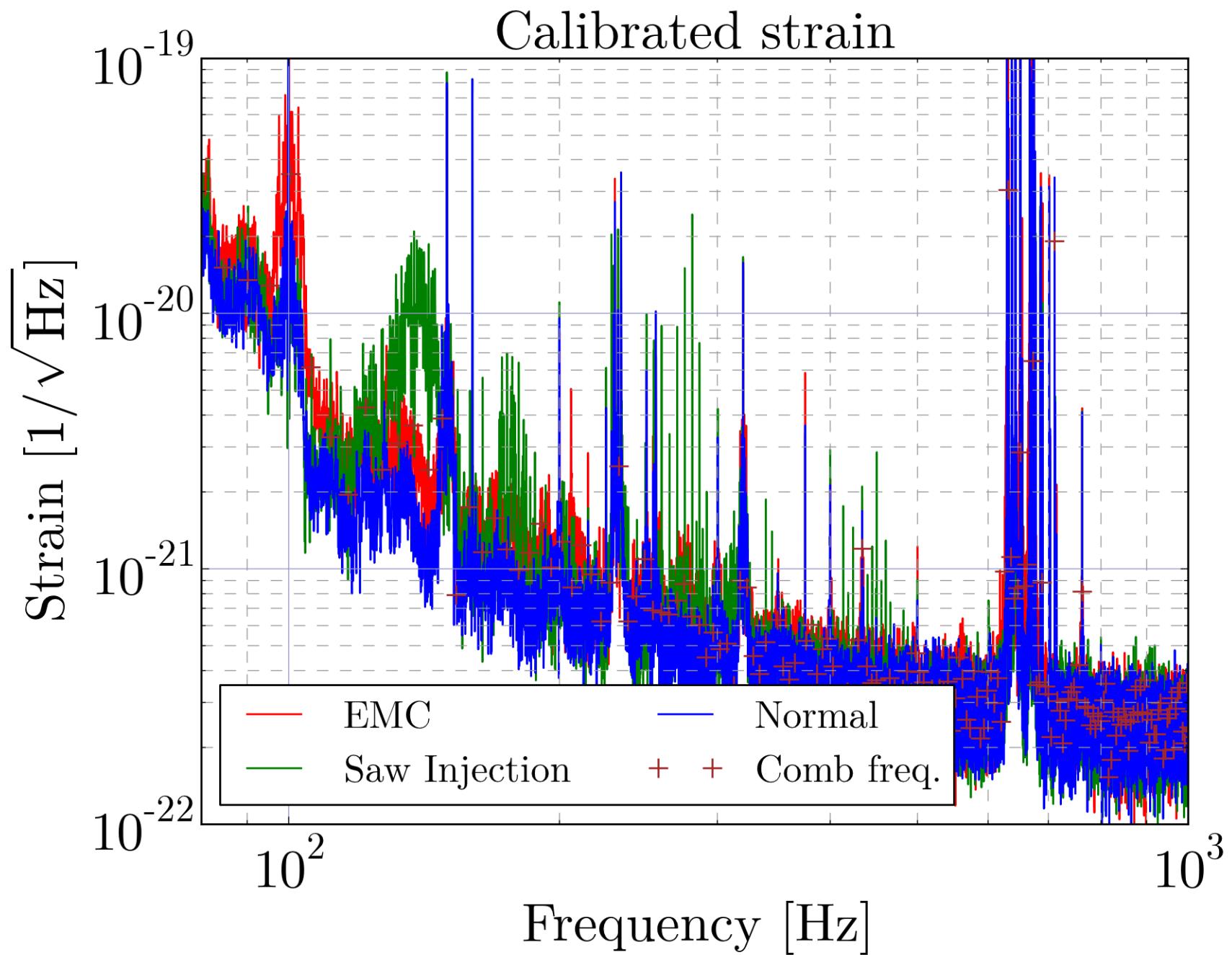
Comb appears in
the accelerometer signals

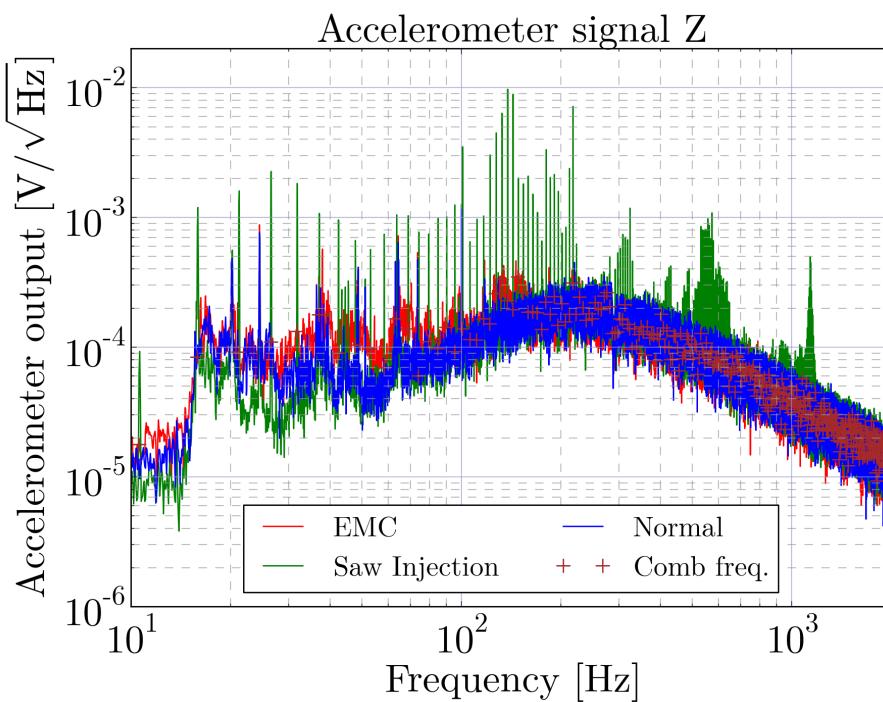
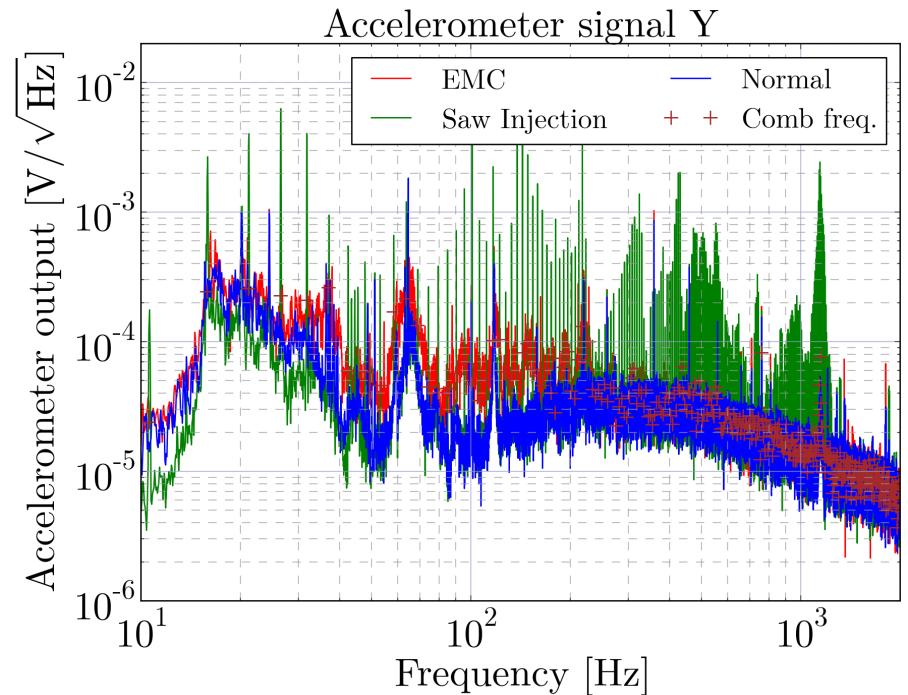
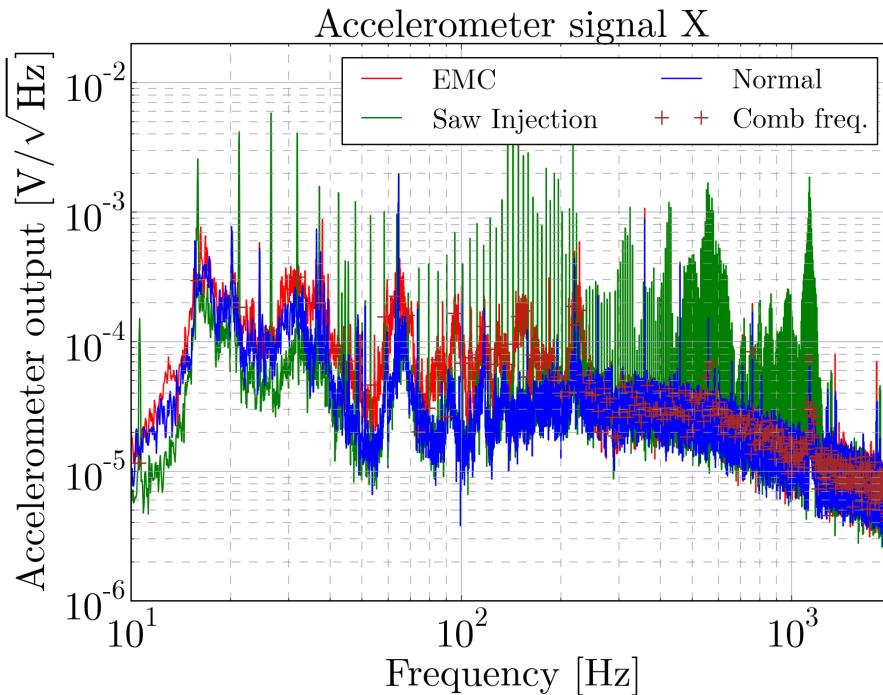
Projected noise



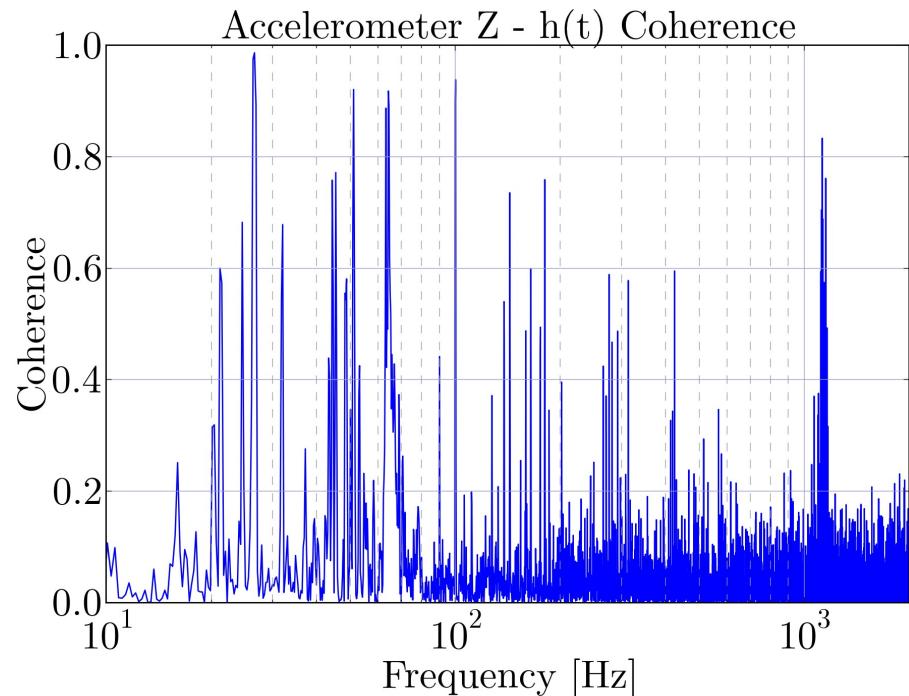
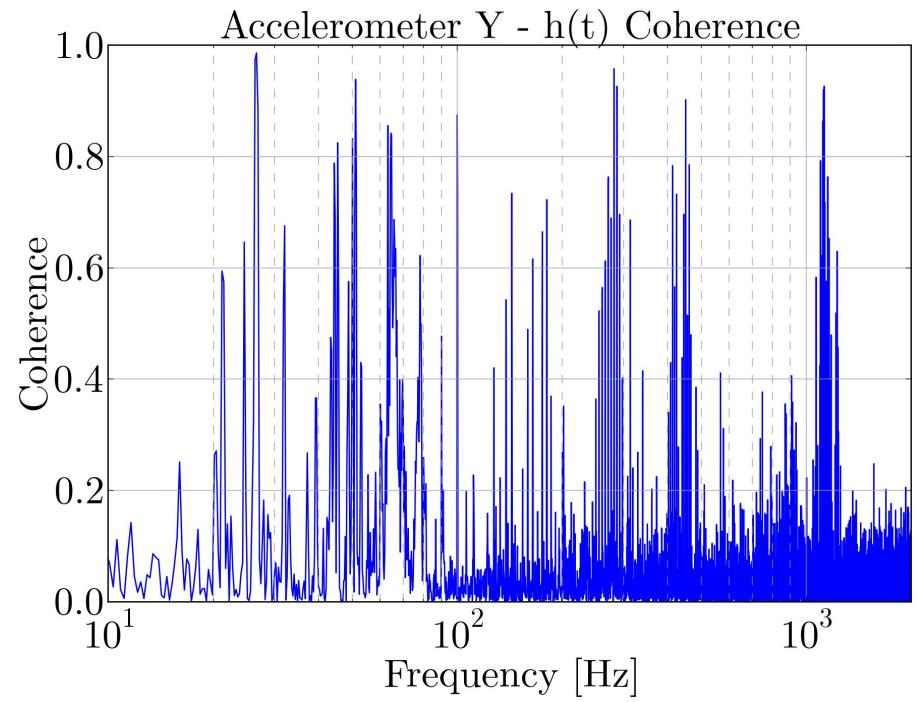
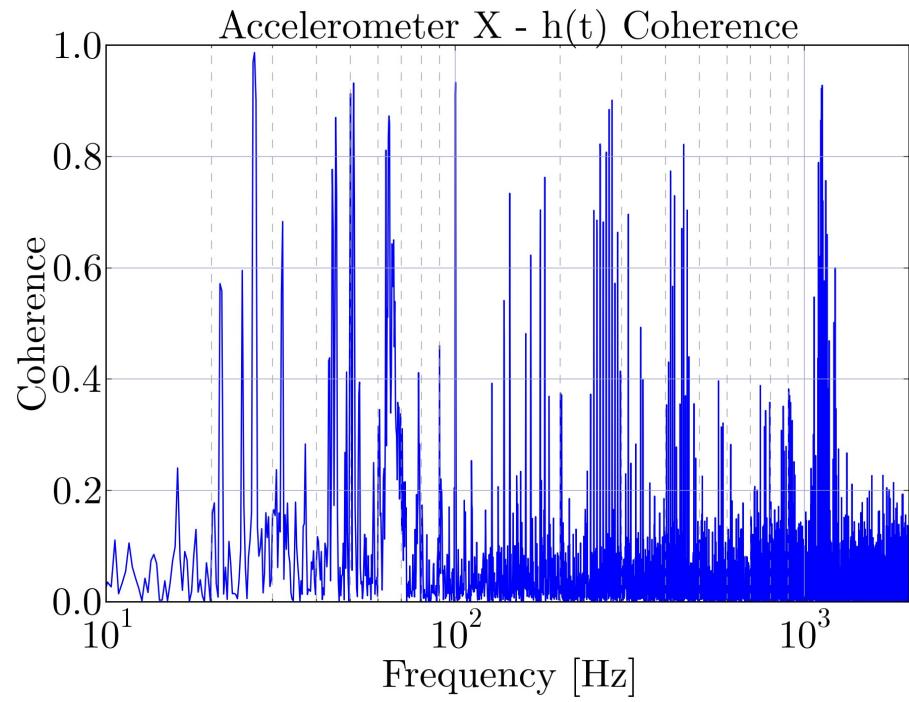
Electro-Magnetic Coupling (EMC)

Holding the shaker up in the air by hands



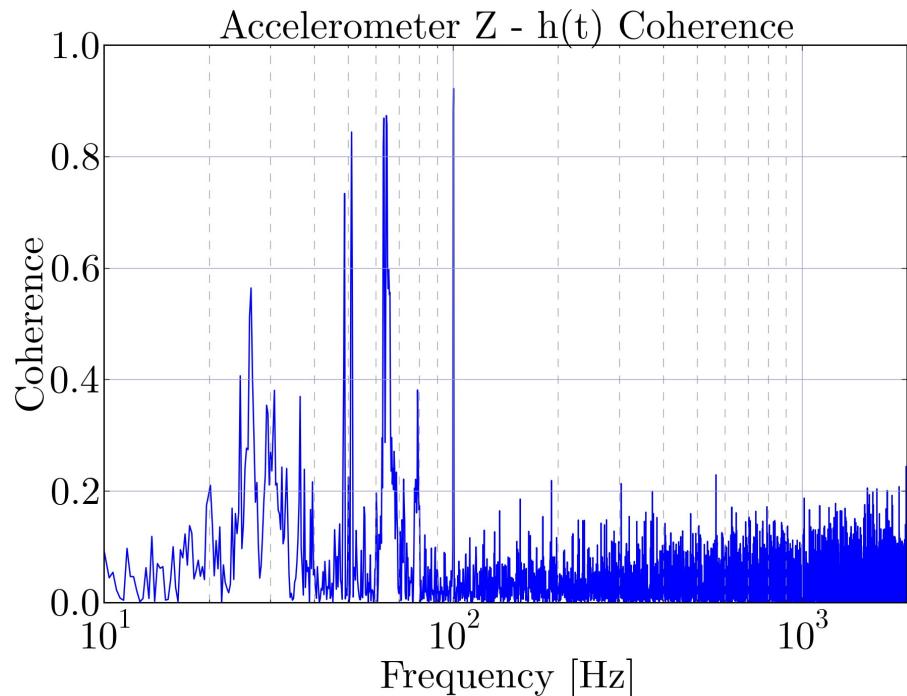
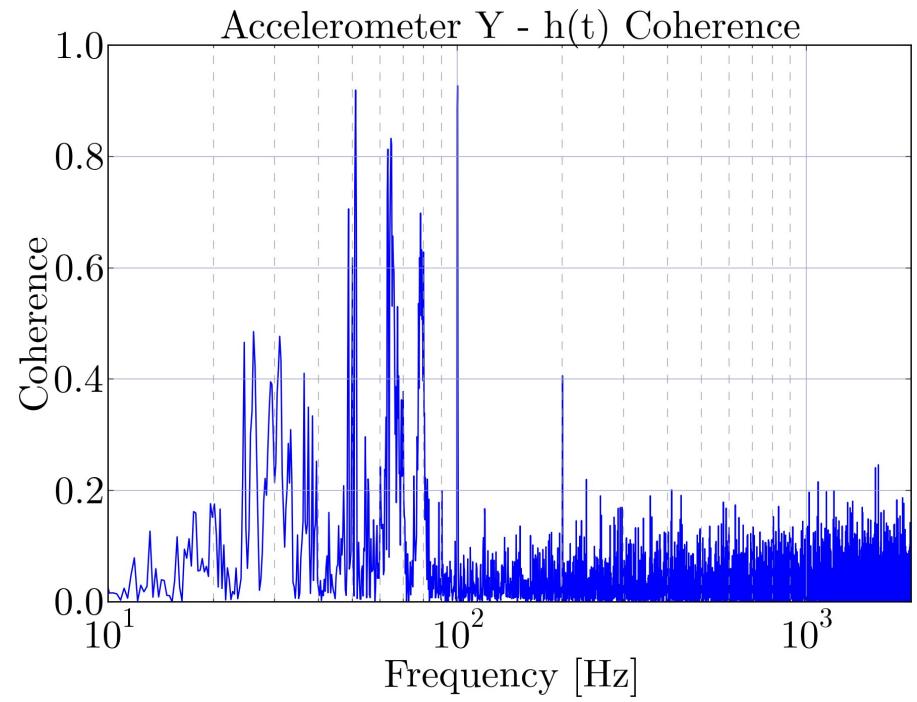
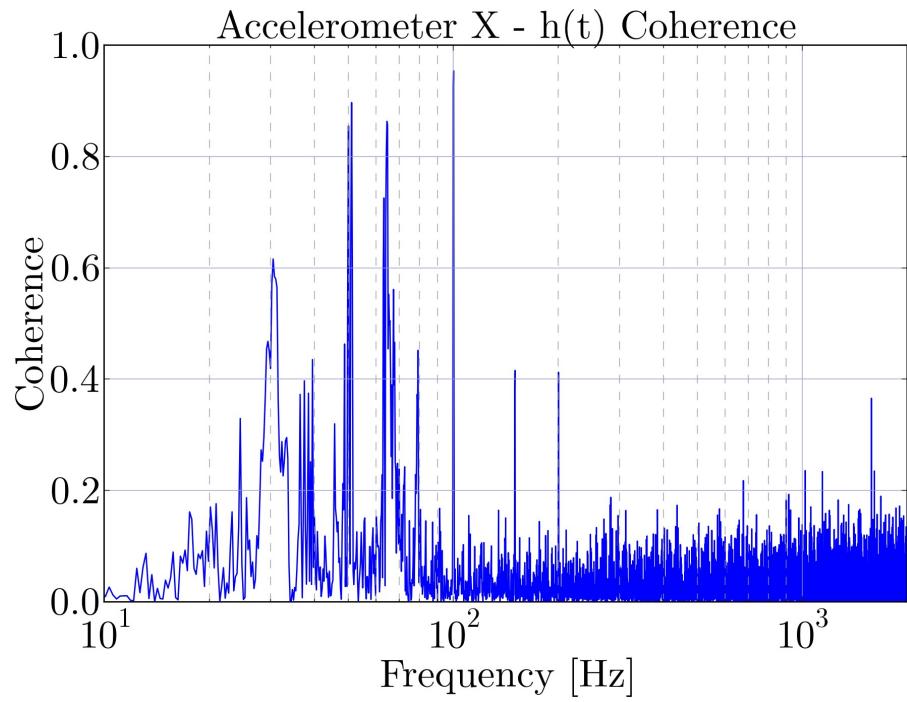


EMC for accelerometer signals



Coherence between accelerometers
and $h(t)$

With Saw Tooth Injection



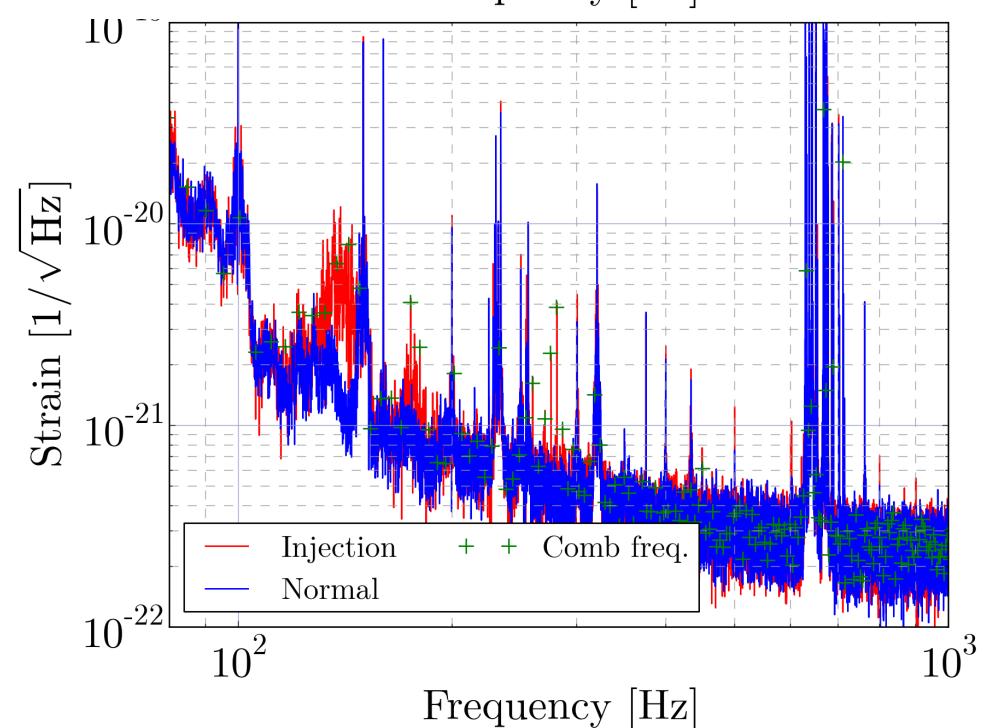
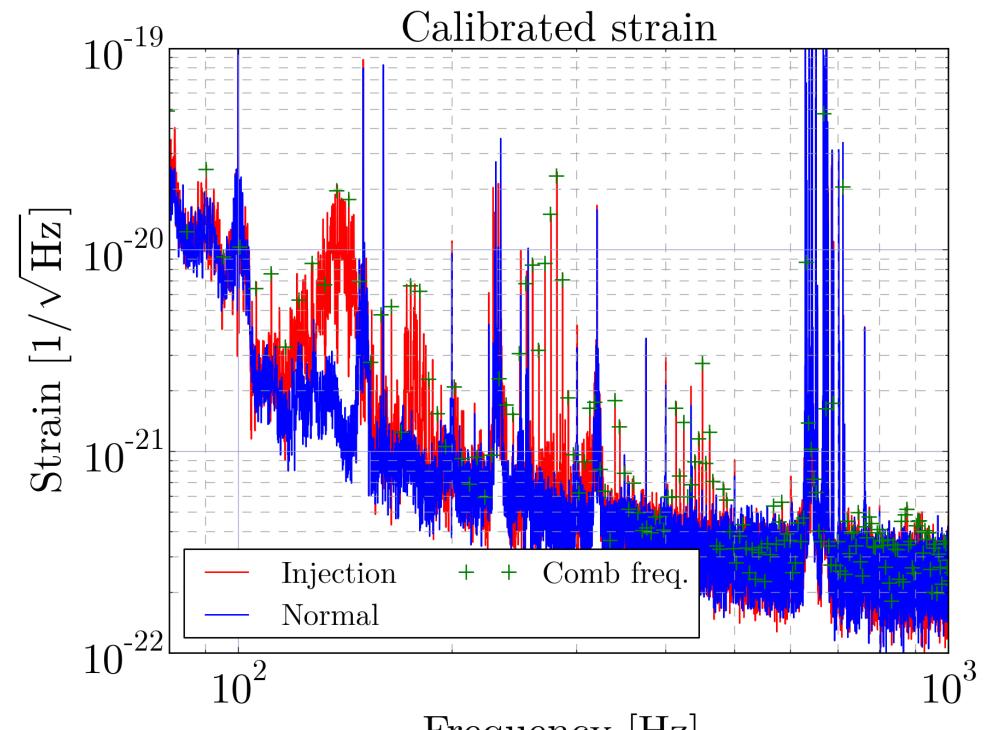
Coherence between accelerometers
and $h(t)$

Quiet State

Saw Tooth Injection with different amplitudes

500mVpp

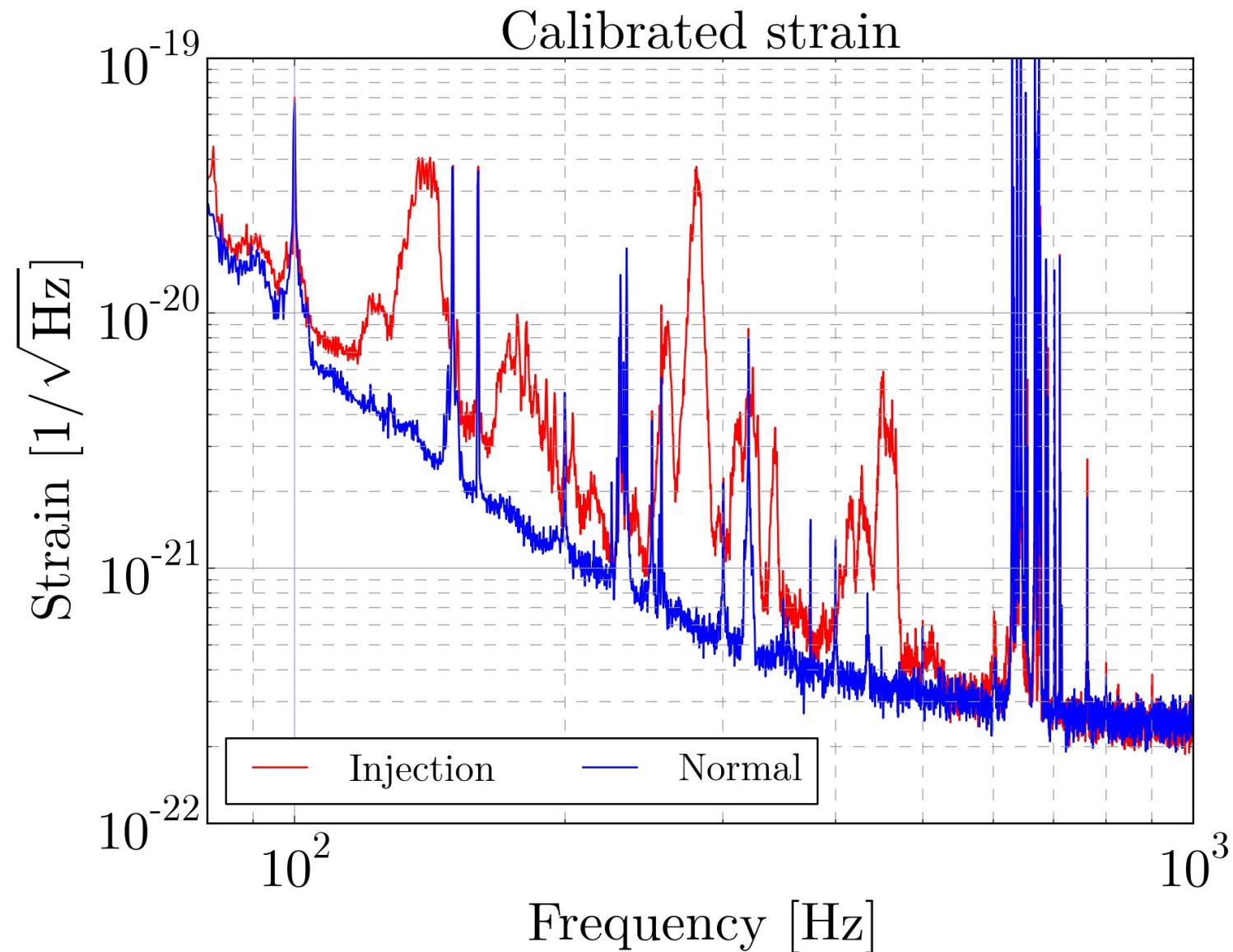
200mVpp

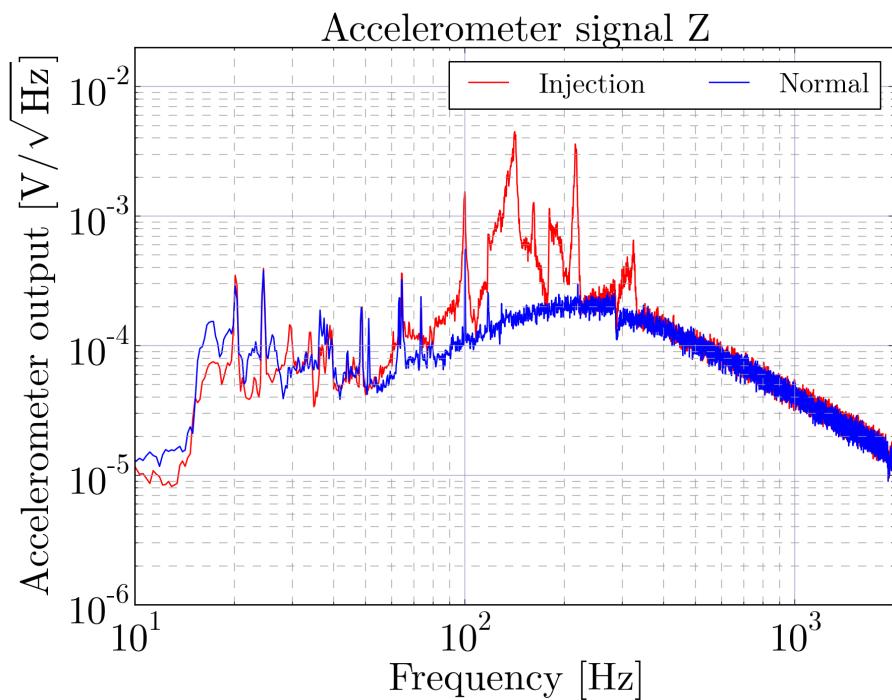
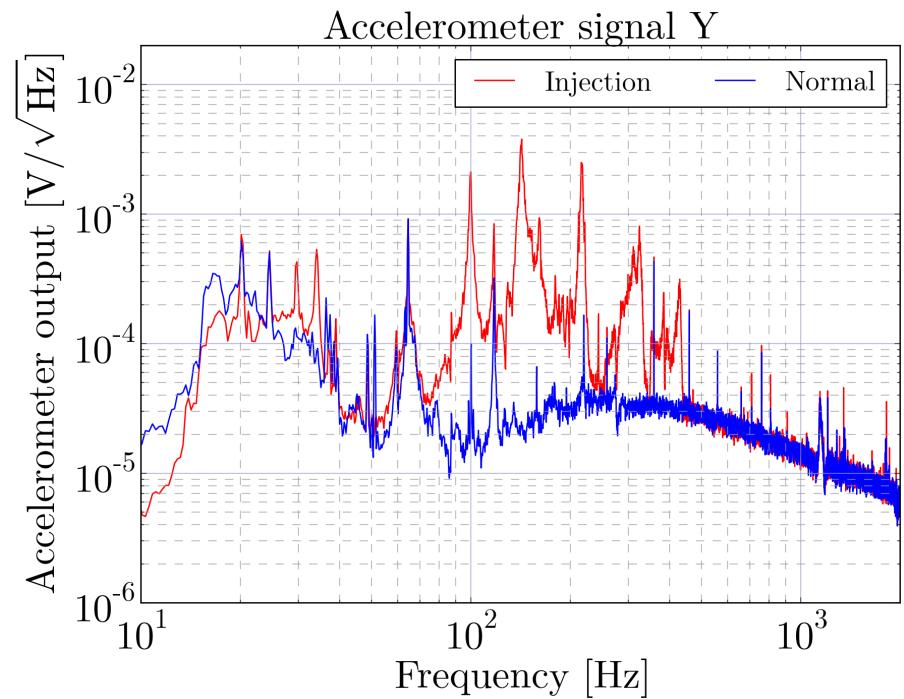
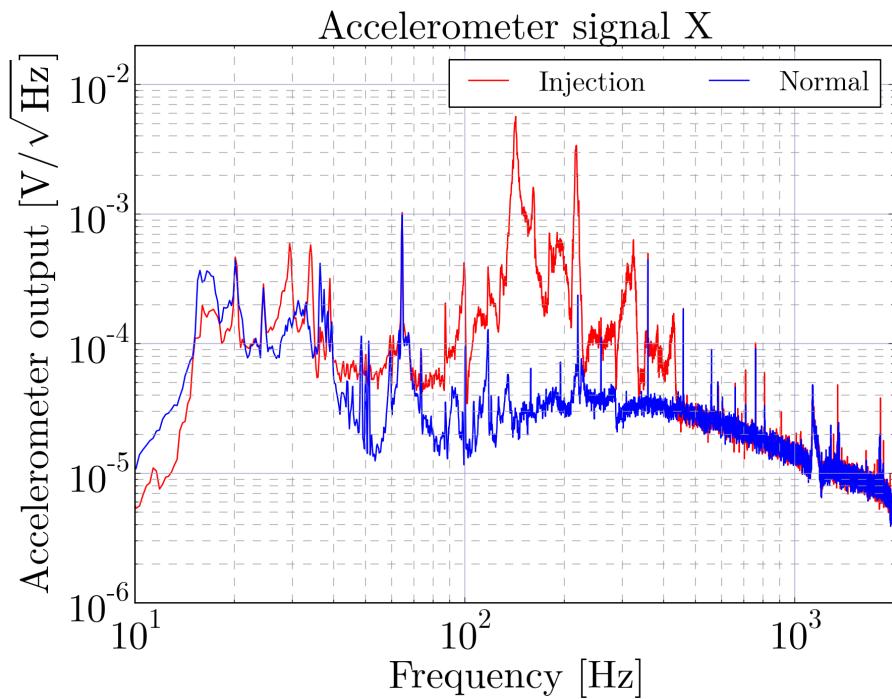


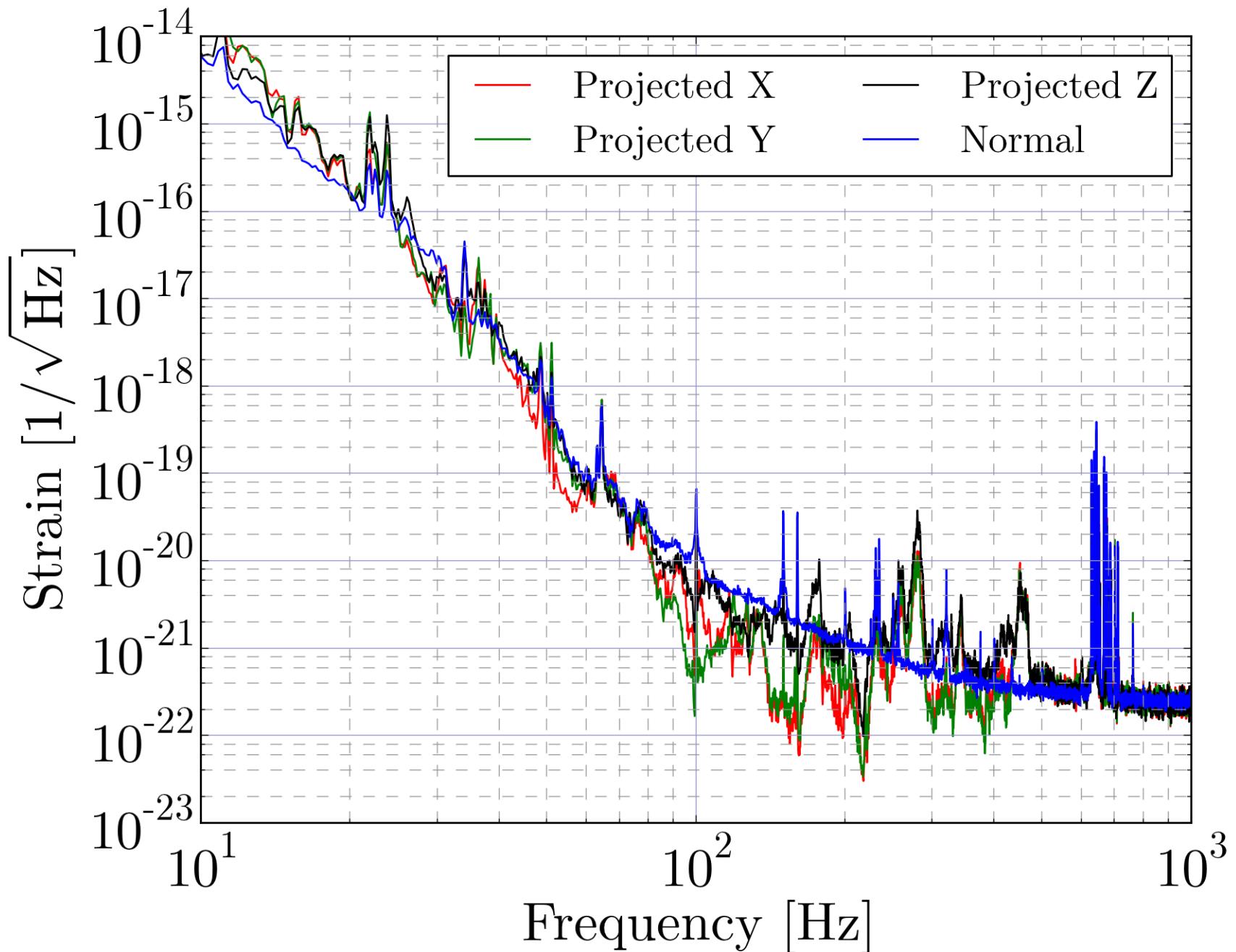
Band Limited White Noise (BLWN) Injection

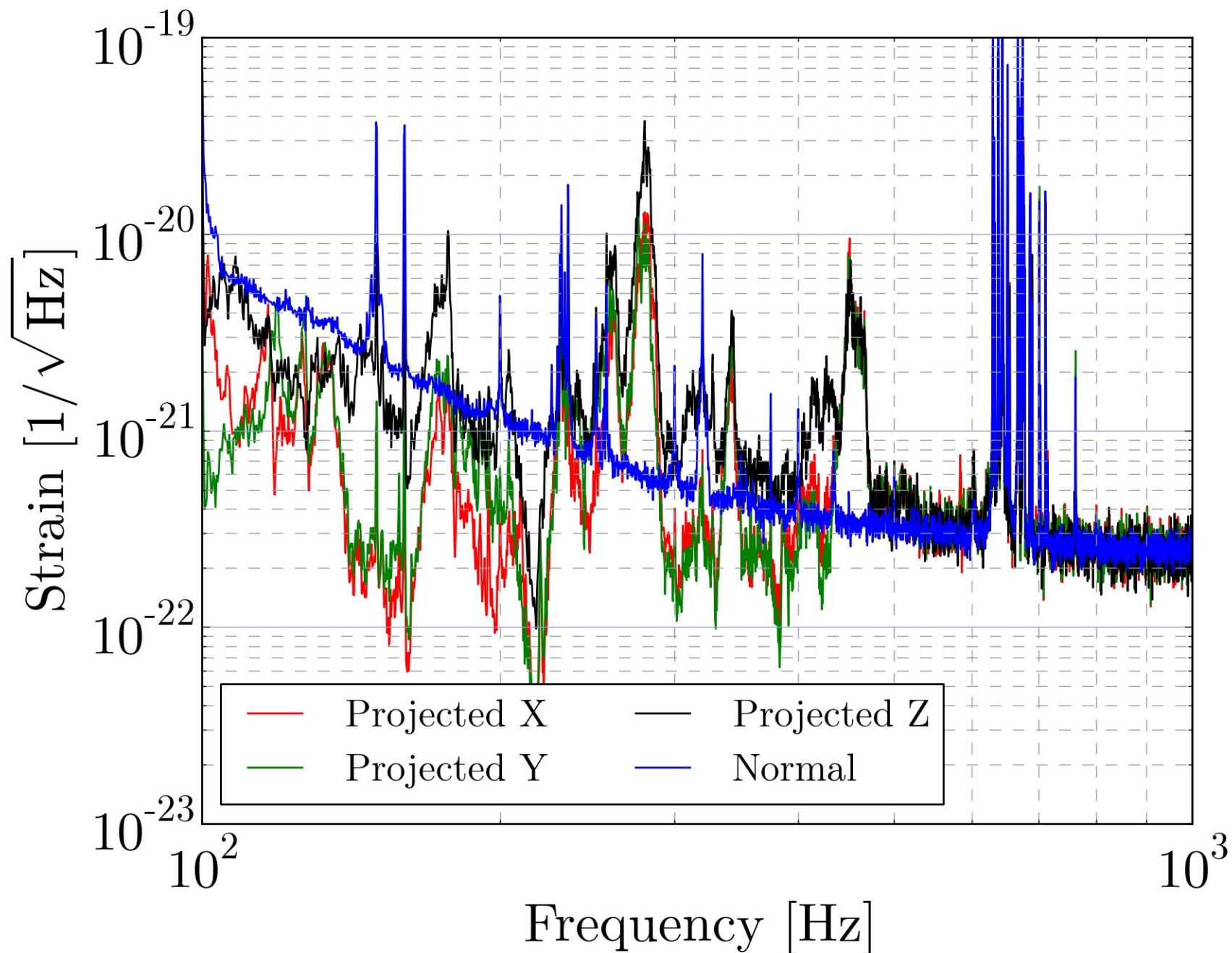
100-300Hz, 500mVpp to the shaker amplifier

14:06:30 – 14:09:10 (UTC)

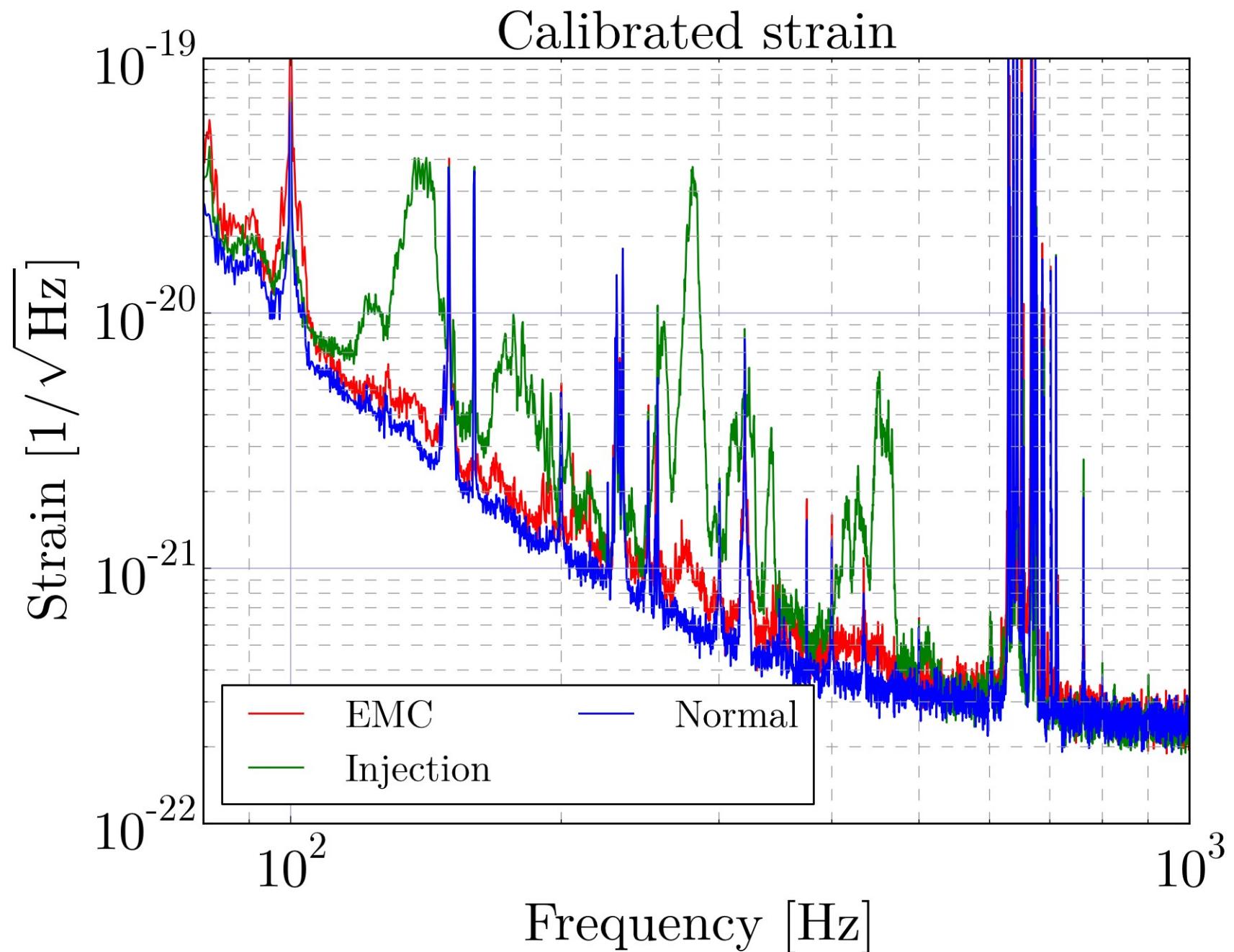


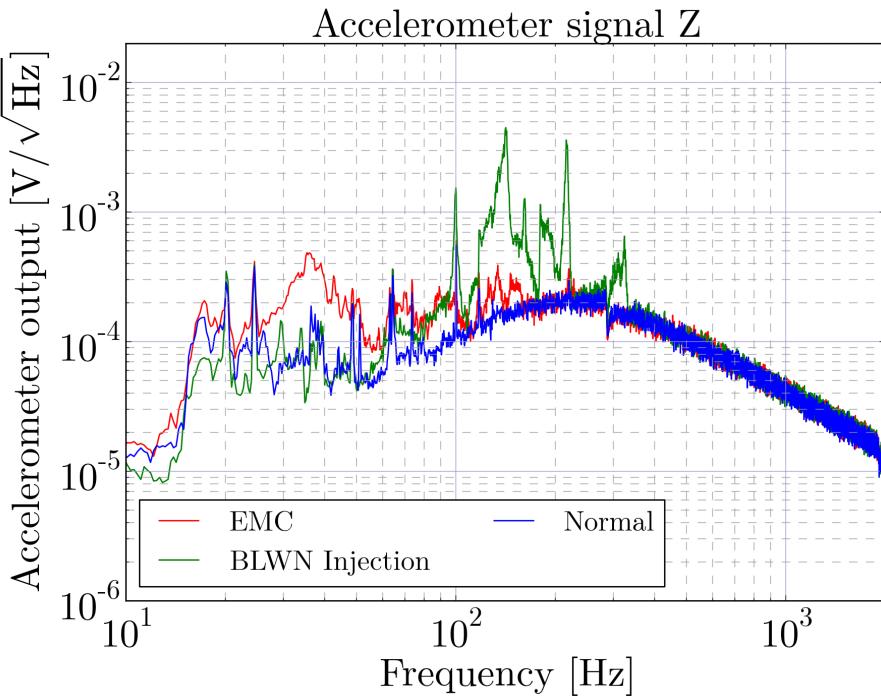
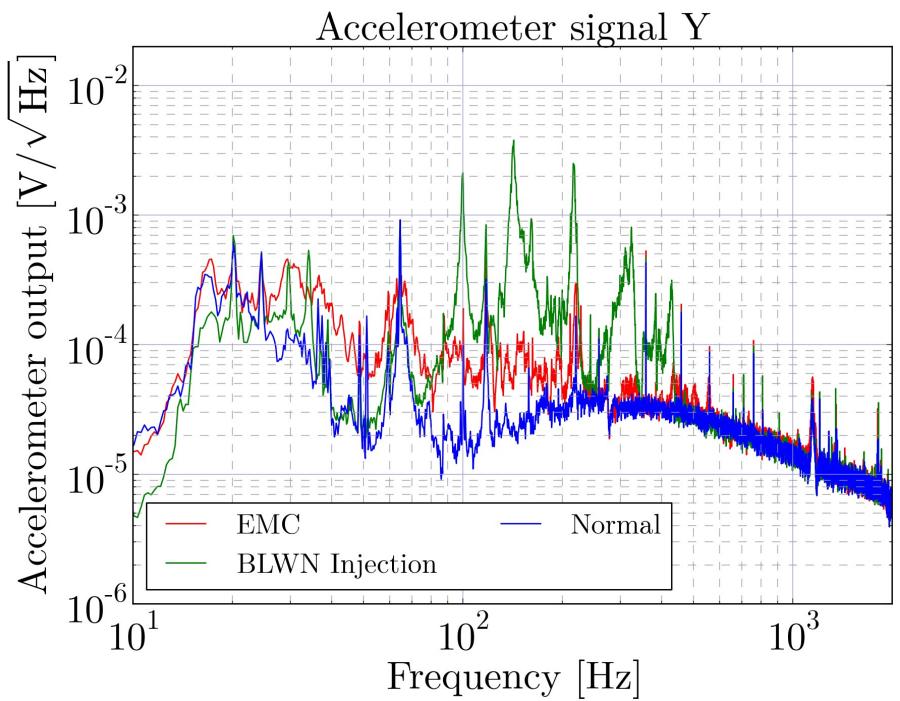
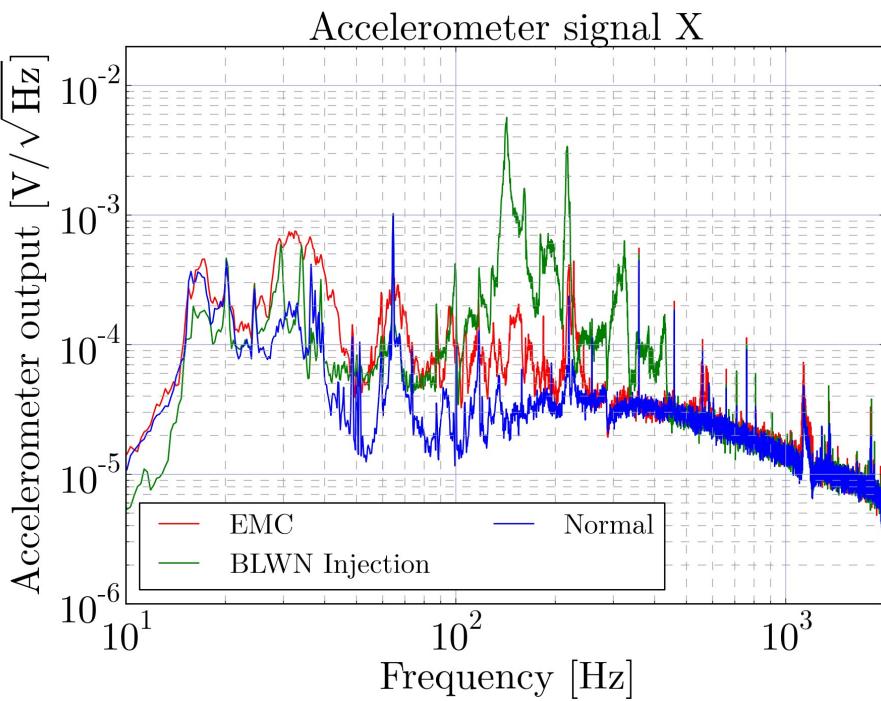




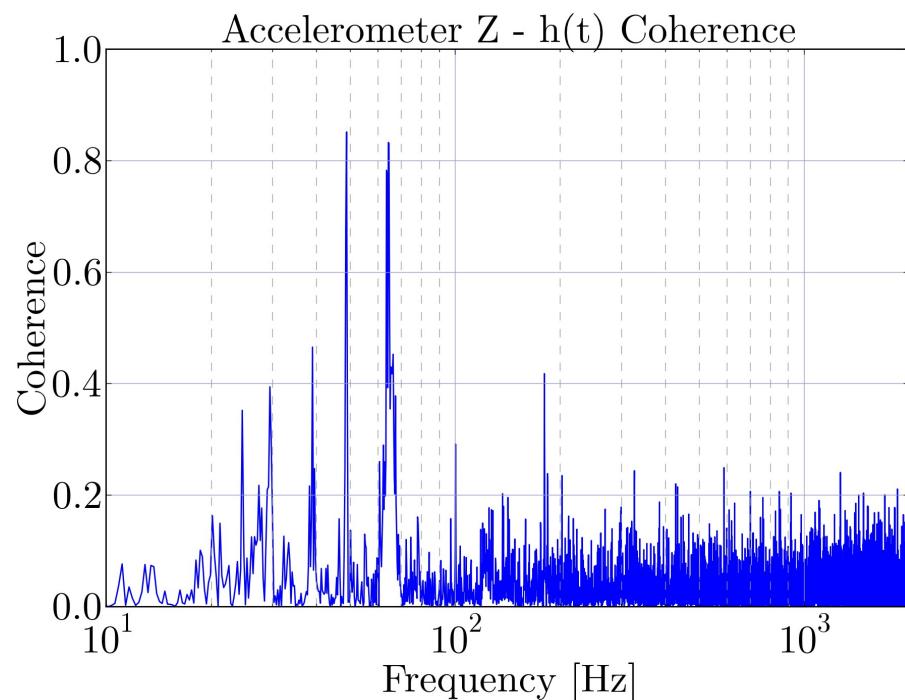
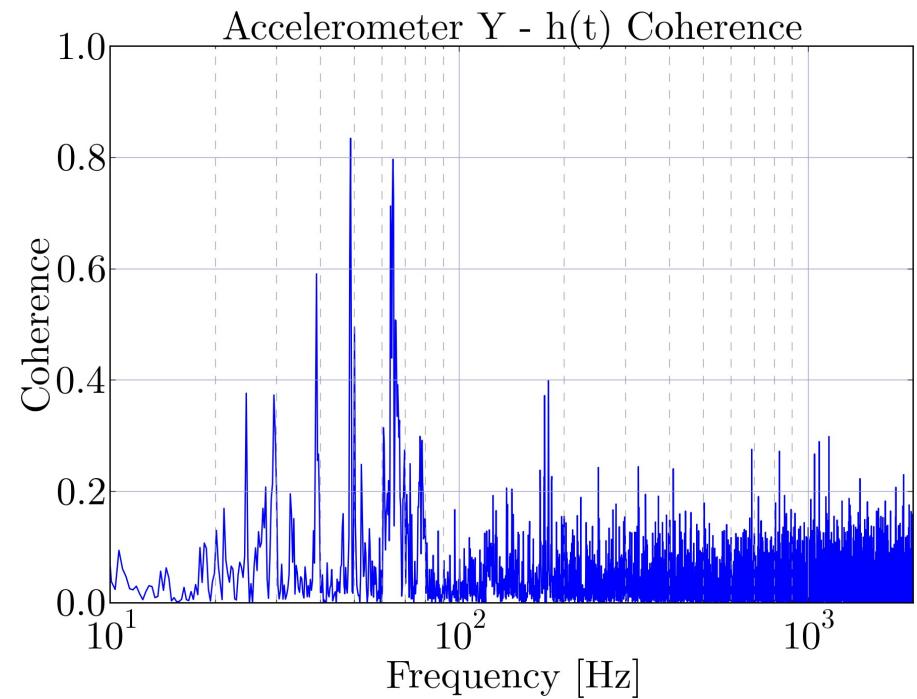
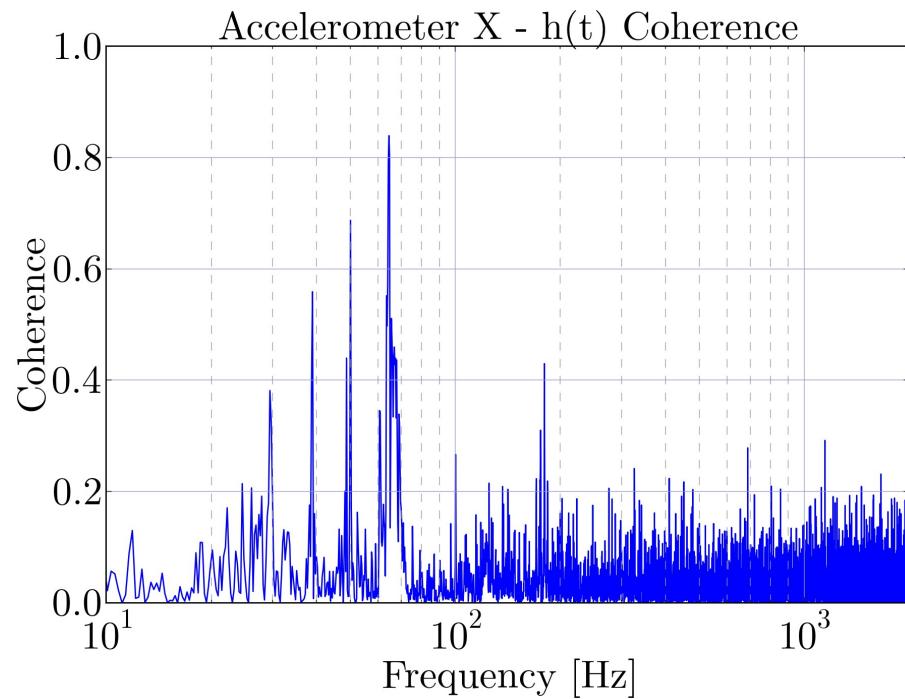


Electro-Magnetic Coupling (EMC)



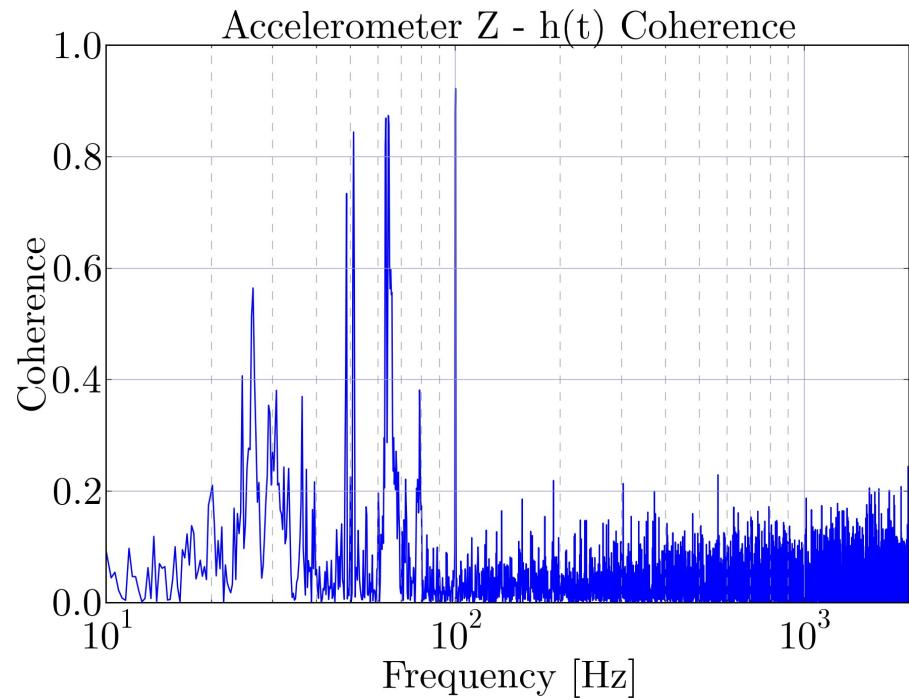
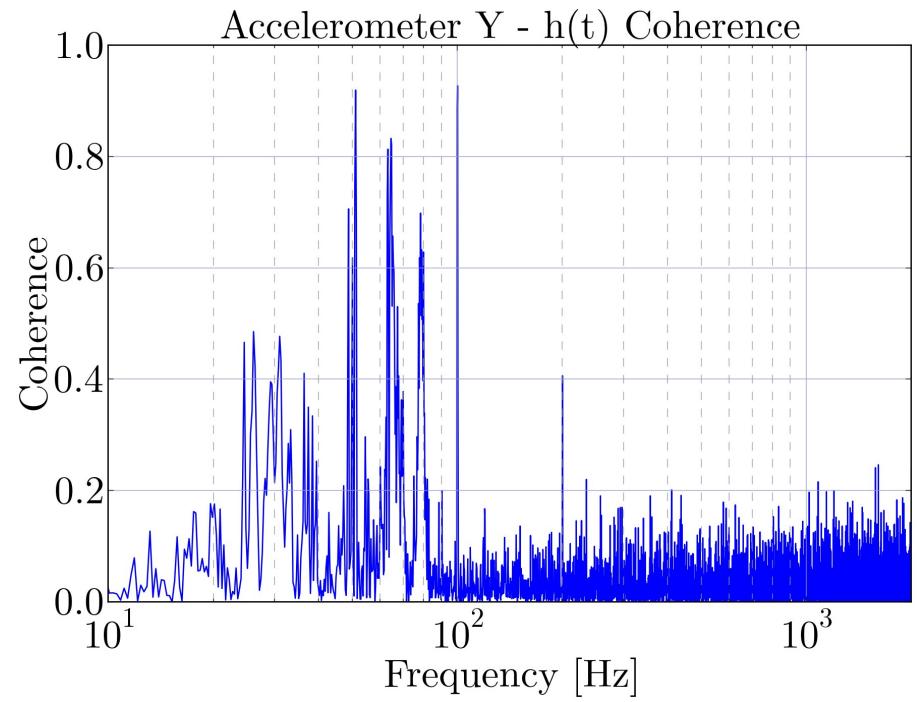
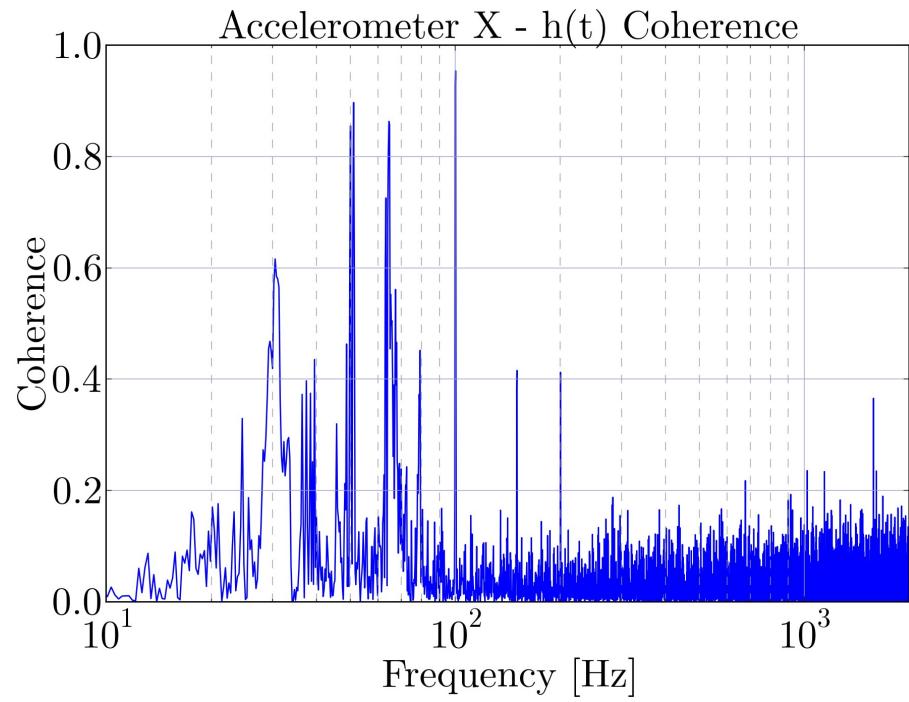


EMC for accelerometer signals



Coherence between accelerometers
and $h(t)$

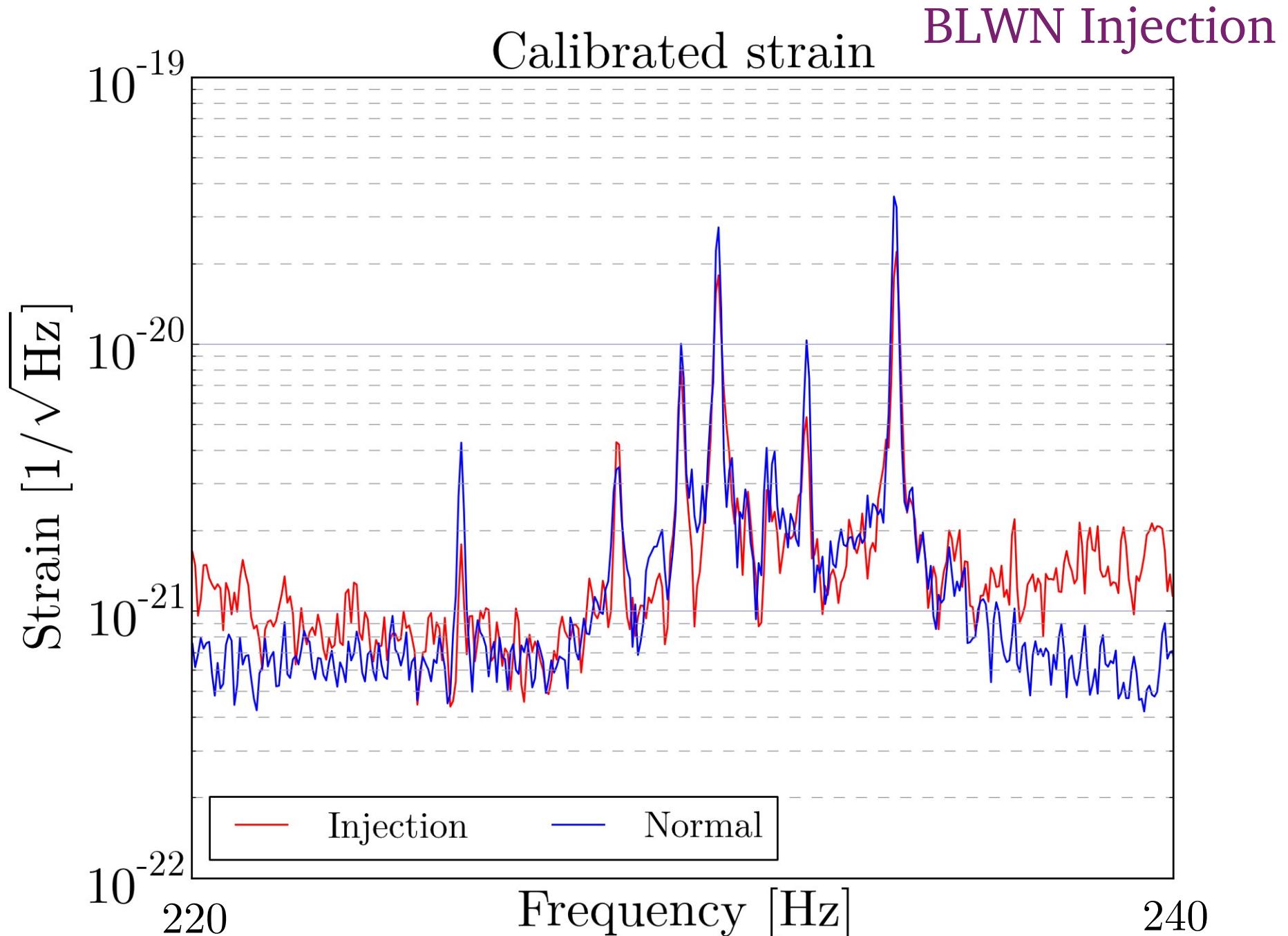
BLWN Injection

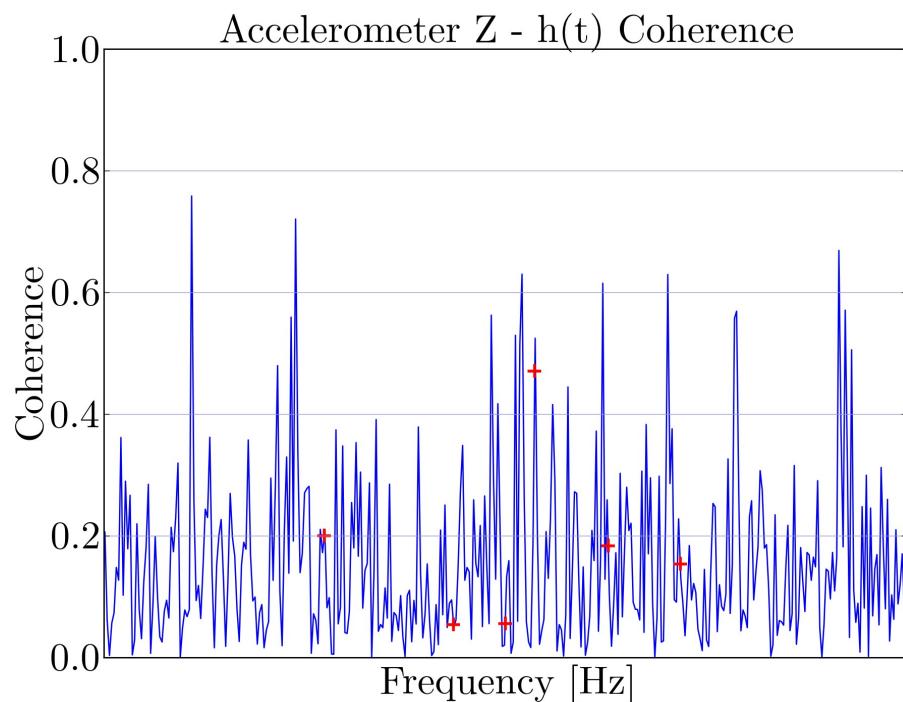
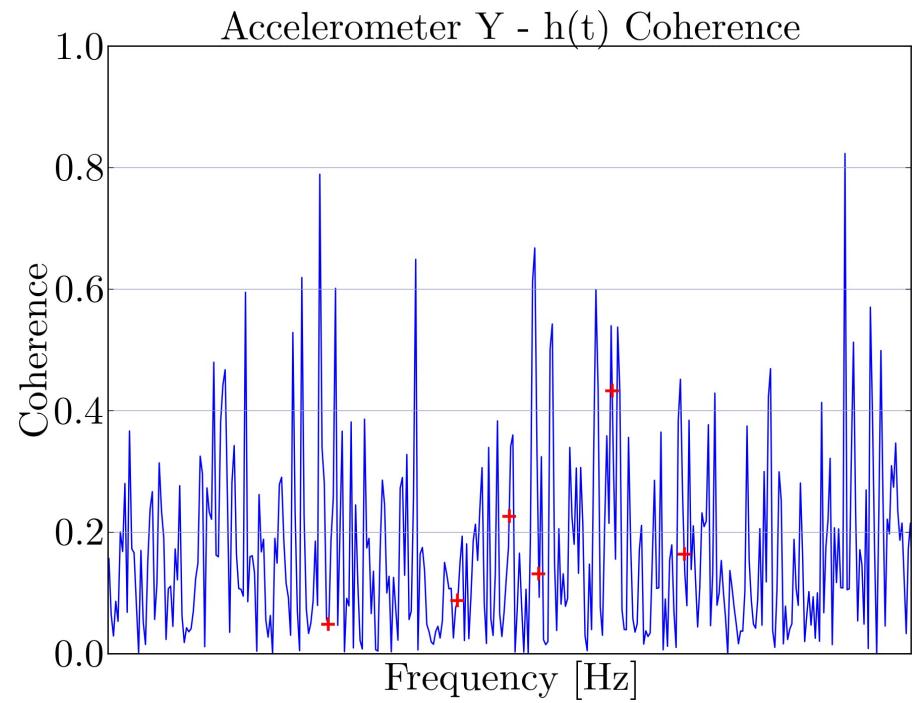
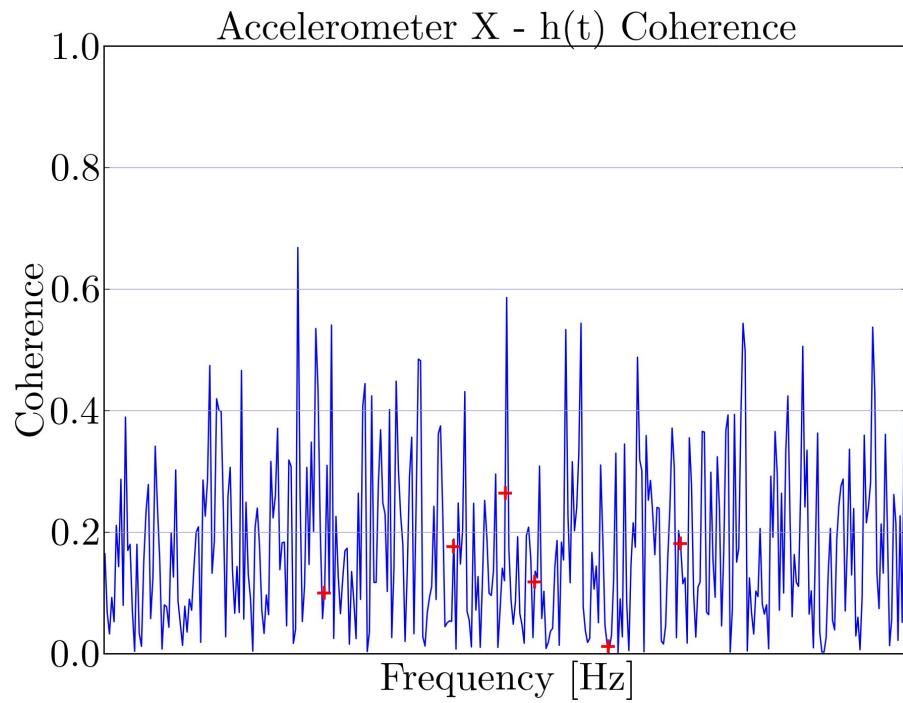


Coherence between accelerometers
and $h(t)$

Quiet State

230Hz peaks





BLWN Injection

Coherence Zoom
220Hz - 240Hz