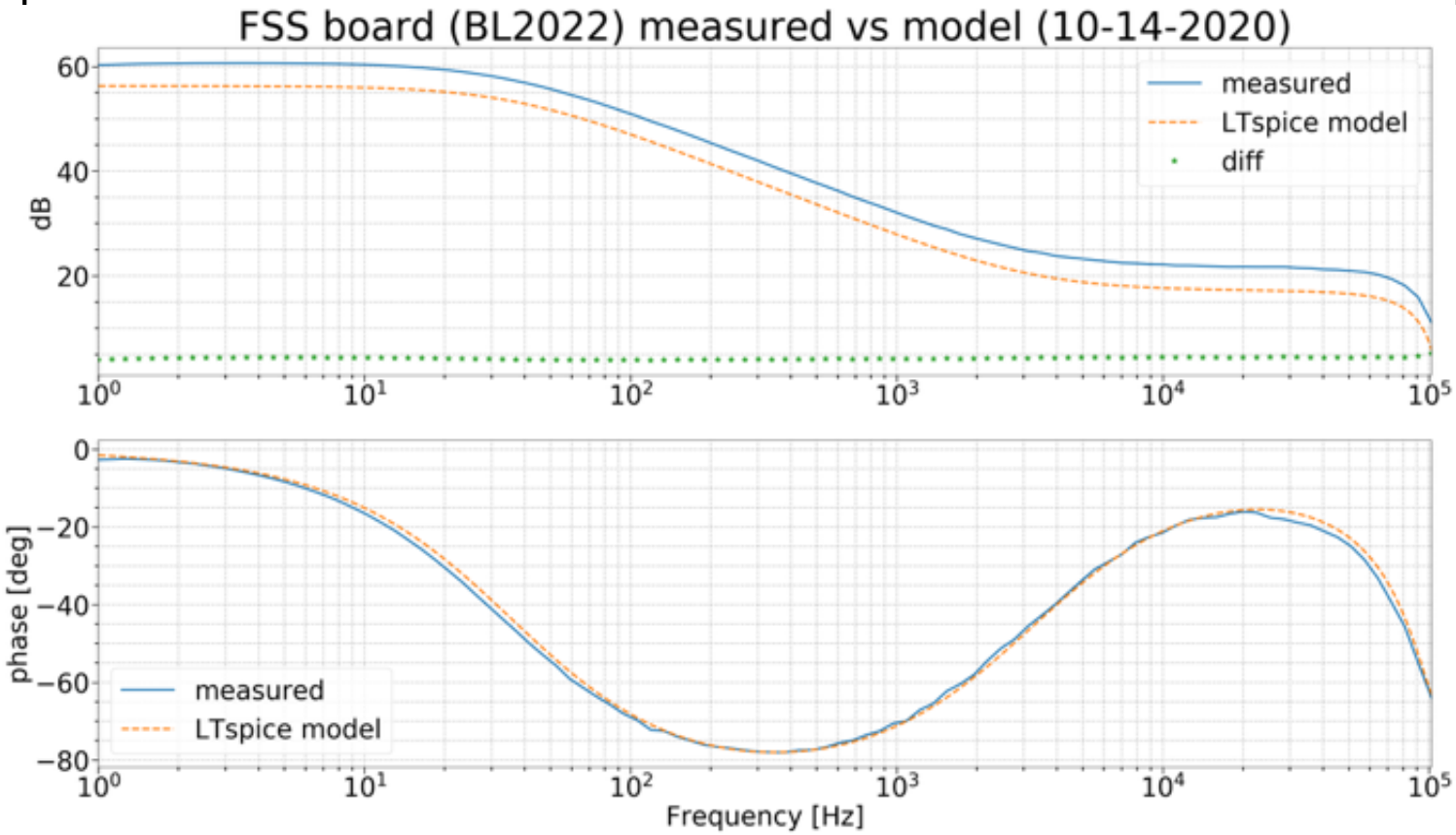
Ballmer lab (AlGaAs electro-optic experiment) Link

05:22, Wednesday 21 October 2020 - daniel.vander-hyde@LIGO.ORG (815)

FSS characterization / notes (BL2022)

A long overdue task for this experiment is a thorough characterization of the MIT FSS board (D980536-C / BL2022, with modifications some mentioned in elog entries 408, 751)

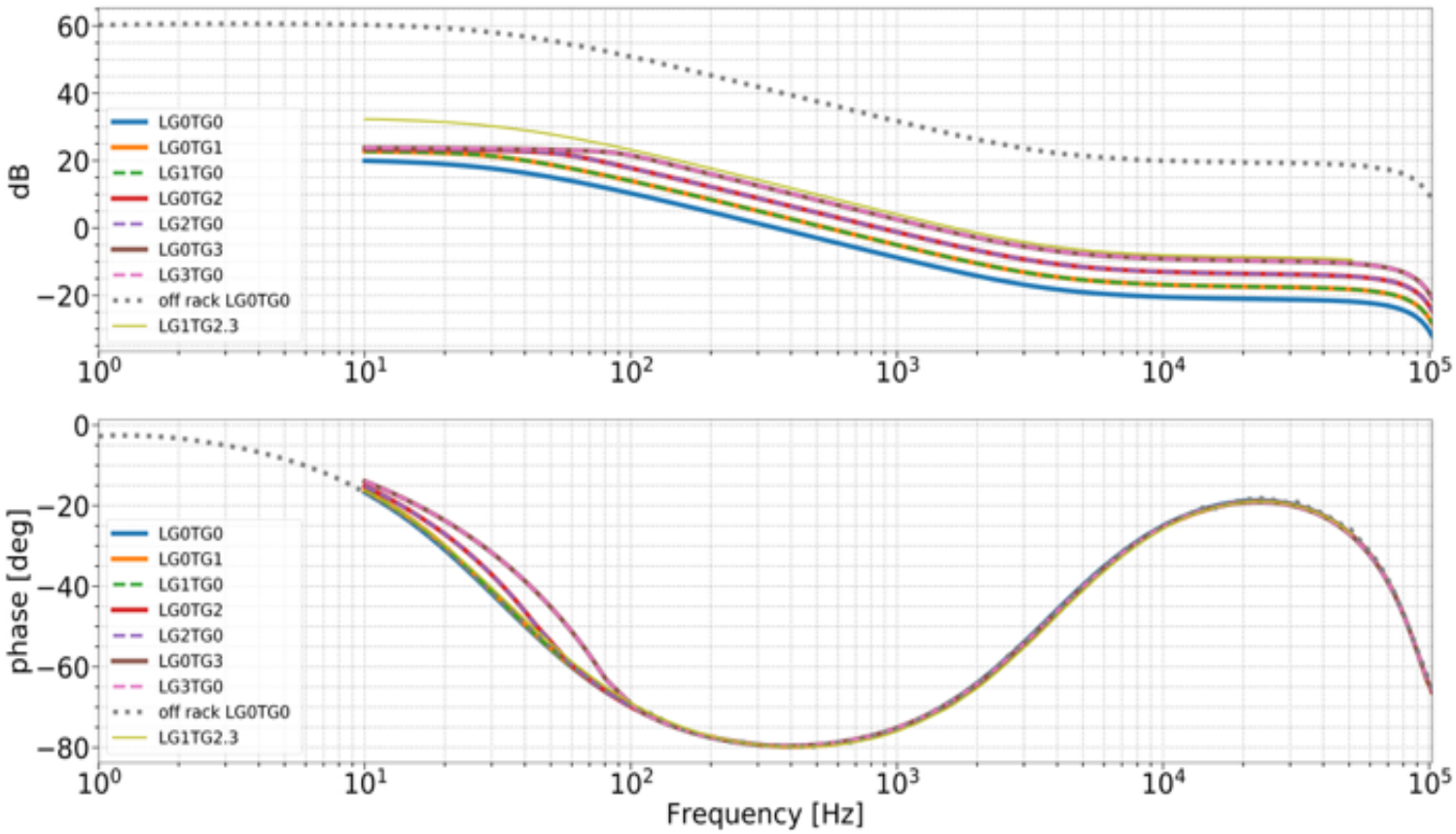
Spice Model vs. Measurement



- The model was built in LTspice (diagram can be seen among log attachments)
- There is about a 4 dB offset between the model and measured curves which I can only attribute at the moment to the translation of the AD602JR dual variable gain off amp chip into two single AD602 op amp chips which may not be the best comparison.
- The measurement was performed with a 50mVpk swept sine.

Limitations when installed on the rack

- The above measurement was taken in the electronics lab so the next test was to measure the board transfer function while in-situ (in the optics lab electronics rack).
- The following figure tests this with varying gain settings (LG = Laser gain knob setting, TG = Total Gain knob setting)



- The low gain settings compared to the off the rack measurements can be explained by the negative voltage sent from FSS control board
- The artificial knee effect, shown for some gain settings, indicated that there was sign of railing and was soon corrected when I noticed that the power supply was only +/- 18 V (now set to +/- 24V) and the swept sine voltage (1Vpk) was set too high.
- The final curve labeled LG1TG2.3 only holds for a maximum input voltage (after the mixer) of 500mVpk, any higher and you will again notice the railing effect measured above. This will be my maximum gain setting for now and will adjust if needed.

Images attached to this report

Non-image files attached to this report

d980536-c.pdf