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Characterisation of the aLIGO monolithic suspensions

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At Glasgow we are working to improve the characterization of the aLIGO detector monolithic suspensions. We have utilized realtime monitoring software to extract frequency, phase and amplitude of the fused silica suspension fibre violin modes. This has allowed the measurement of the Q-factors of some of these modes.

In addition, we have used preliminary FEA modeling of the fibre profiles, measured during aLIGO detector suspension installation, to predict the observed departure of the frequencies of violin mode harmonics from whole multiples of the fundamental frequency.

Using these analysis techniques for the lower glass stage of the suspension, in the future we shall compare the measured violin mode Q values with detailed FEA modeling of the aLIGO detectors monolithic suspensions. This information will help to better understand the aLIGO detectors low frequency noise performance.

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