Explanations & links to relevant LIGO Papers

This document contains information in relation to the **Einstein Telescope_Vibration Damping** technology domain. More information regarding Einstein Telescope technology domains, go to www.einsteintelescopeforbusiness.nl

Date: 19/3/2024

Author: Dr. Conor Mow-Lowry

Find below a short-list to four paper references drawn up by Nikhef Scientists Conor Mow-Lowry and Alessandro Bertolini:

1
Carbone 2012 describes the sensors and actuators used on LIGO's quadruple suspensions, including things such as force requirements.

2
Matichard 2014 is the best overall summary of LIGO's highest-performing active isolation system, the BSC-ISI. It leaves out a tremendous amount of information (necessarily), but the performance plots are well presented.

3
Ross 2020 shows how an inertial rotation sensor improves LIGO's duty cycle. This is useful since it illustrates the complexity of identifying and calculating a metric such as the "residual velocity along an arm", as well as showing some of the signal flow and modelling.

4
Van Dongen 2023 is an analysis of a LIGO suspension's performance if improved interferometric sensors are included. Much of the work was in collecting the correct models and inputs, and in designing the controllers. The flow of (expected) performance to the gravitational-wave channel that is presented may be useful.

The 4 PDFs are located in this public SURF Drive link:
https://eur02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fsurfdrive.surf.nl%2Ffiles%2Findex.php%2Fs%2F8iPyr2PmornUylj&data=05%7C02%7Calbert.vandorssen%40innovationquarter.nl%7C04b5551b71bc4f9c1bdc08dc47e904e2%7C474d4b176c7c424d9d917a4417329d21%7C0%7C0%7C638464313356437165%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=ULCuoeq4kZPd1AuMkjqObuiQHFo%2F3nRYtG5F95yXhnc%3D&reserved=0

Note that all papers are LIGO papers due to the increased rate of publications and deeper use of active controls. Virgo papers on the topic are less directly relevant to the call.