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Update on sensing seismic platform relative motion using Digital Interferometry

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The relative motion of seismic platforms, via coupling to the auxiliary length controls of the suspended optics, are predicted to be the limiting noise source for future gravitational-wave detectors at frequencies below 1 Hz. By measuring, then stabilizing this relative motion, the effective control feedback to the optics will be reduced and hence the noise coupling will be less, and potentially improve detector noise performance. The measurement of the relative motion with forms of suspension platform interferometry is an ongoing area of interest and research. Digitally-enhanced Interferometry is a decade-mature technique for sensing relative motion, by providing time-tagged pseudorandom phase modulation to isolate signals based on time-of-flight delay. The application of digitally-enhanced interferometry for suspension sensing is an active area of development within the Newtonian Noise research program at the Australian National University, and offers another potential method for sensing relative platform motion. We present an update on recent developments of digitally-enhanced interferometry towards suspension sensing and measurement.

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