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COBRI Sensor development for seismic isolation and control

Current gravitational wave detectors are limited at frequencies below 10 Hz by sensing and control noise related to the active seismic isolation systems and their local displacement sensors.
In order to overcome these limitations, the use of new, more accurate local displacement sensors, has been proposed.
In this talk I present our current design for a compact local displacement sensor based on "Deep-Frequency modulation interferometry"and show the infrastructure and performance of our first build "Compact Balanced Readout Interferometer (COBRI)" prototype.
The COBRI features a quasi-monolithic component including all optics (expect the target mirror) in a compact setup, which is connected to a custom build amplifier and a MTCA based phasemeter. The phasemeter runs a newly developed (analytic) readout algorithm to extract the signal parameters, implemented in an FPGA, enabling a close to optimal precision and a high readout bandwidth.

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