Contribution ID: **37** Type: **Poster presentation**

Precision limits and a readout algorithm for DFM Interferometry

Current gravitational wave detectors are limited by local sensor noise and other related technical noise sources at low frequencies below 10 Hz. We aim to use compact displacement sensors based on deep-frequency modulation interferometry for the local readout of test-masses to overcome these limitations.
In this poster I present our work on the readout of such compact displacement sensors. We analysed the limitations of such sensors by computing the Cramer-Rao lower bound of the phase estimate in the presence of common noise sources. And we developed a new algorithm to extract the interferometric phase in deep-frequency-modulation interferometry in a fast and non-recursive way.
First results show that our improved sensor can reach a higher precision than the currently ones used at the LIGO suspension while also having a larger dynamic range.

Primary authors: Mr ECKHARDT, Tobias (Universität Hamburg); Prof. GERBERDING, Oliver (Universität Hamburg)

Session Classification: Poster session III

Track Classification: Technical noises for low frequencies