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Micro Hertz Temperature and Phase Stability of a LISA Phasemeter based on MicroTCA as ground-support equipment

Wednesday 3 December 2025 12:00 (15 minutes)

The University of Hamburg, in collaboration with DESY, is developing an electrical ground-support equipment phasemeter, or phasemeter simulator, based on the MicroTCA.4.1 standard, for the space-based gravitational-wave detector LISA, funded by the German Aerospace Agency (DLR).

The main task of the phasemeter is to extract the phase of various laser interferometer beat note signals with microcycle precision at frequencies between 0.1 mHz and 1 Hz, with a phase stability requirement of 6 µrad/√Hz. Additional functions include the readout and generation of ranging and data communication sidebands, frequency control of the lasers, and signal acquisition. The development is conducted in parallel to, and in collaboration with, the development of the flight hardware phasemeter. The simulator will be made available to the partners within the LISA consortium for the assembly, integration, verification, and testing (AIVT) phase of the mission and for the technology development of payload items.

We present the system design, the phasemeter software for controlling and data acquisition, temperature and phase stability measurements of our custom ADC, and the status of our hardware development.

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