Development of a Multi-axis Heterodyne Interferometry system for LISA

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Precision laser interferometric readout of test mass position and angle is one of the key technologies enabling a space-based gravitational wave mission such as LISA. At Goddard Space Flight Center we are developing a test-bed to demonstrate a Multi-Axis Heterodyne Interferometry (MAHI) system capable of meeting the measurement, range of motion and noise requirements for the short-arm measurement (test-mass to spacecraft) of LISA. Crucially, this system will use an optical design, photoreceivers and phase measurement systems which are also suitable for the long-arm measurement (spacecraft to spacecraft), thus reducing mission complexity. We will report on the progress of the MAHI system development, including preliminary measurements from a table-top prototype MAHI system.