Implementation of Time Delay Interferometry using the UF LISA simulator RACHEL J. CRUZ, MICHAEL HARTMAN, GUIDO MUELLER, University of Florida — The Laser Interferometer Space Antenna (LISA) is a joint mission between NASA and ESA to detect gravitational waves generated by astronomical sources in the range of 0.1 mHz to 0.1 Hz. LISA is comprised of three spacecraft separated by five million kilometers in a triangular formation. In order to detect gravitational waves, LISA must measure differences between the spacecraft to an accuracy of picometers per square root Hertz. Due to the orbits of the spacecraft, the distances of the interferometer arms will not be equal. This arm mismatch results in laser frequency noise being the dominant noise source. The interferometric measurement can be brought below detection requirements by using a method called time delay interferometry (TDI) which cancels the laser frequency noise. We will test the implementation of first-generation TDI in an optical system using the LISA simulator that is being developed at the University of Florida. I will present the current status of the frequency stabilization and cancellation experiment in the LISA simulator.

Guido Mueller
University of Florida

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