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Experimental Verification of Arm Locking for LISA JAMES IRA THORPE, SHAWN MITRYK, GUIDO MUELLER, University of Florida — The Laser Interferometer Space Antenna (LISA) is a joint effort of NASA and ESA to build a space-based gravitational wave detector which will study gravitational waves in the 10-4 Hz to 10-1 Hz frequency regime. The mission calls for a constellation of three separate spacecraft (SC) flying in a triangular formation with an intra-SC distance of 5 Gm. The distance between the SC will be measured interferometrically with pm accuracy in an effort to detect modulations caused by gravitational waves. A major challenge for these measurements is reducing the phase noise of the laser light source. A technique known as arm-locking has been proposed to address this problem. We present the results of arm-locking in an electronic model of LISA. Additionally, we discuss progress towards integrating the electronic model with an optical model of the LISA interferometry. This combined model will incorporate many of the essential features of the LISA interferometry and will allow us to test arm-locking under more realistic conditions.

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