Abstract Submitted
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Picometer dimensional stability testing of the LISA telescope at the University of Florida[1] JOSE SANJUAN, ADA UMINSKA, SOHAM KULKARNI, JOSEPH GLEASON, PAUL FULDA, GUIDO MUELLER, University of Florida — The European Space Agency (ESA) future space-based gravitational wave detector LISA, with a scheduled launch in 2034, consists of three spacecraft (SC) forming a triangle of 2.5 Gm on a side in a heliocentric orbit 20^{o} behind the Earth. Laser links between the SC enable laser interferometry to measure relative displacements at the picometer level. The measurement sensitivity is ultimately limited by the number of photons exchanged between the SC, which is maximized using telescopes that serve as afocal beam expanders and reducers. The telescopes, one of NASA's contributions to the mission, are part of the science interferometer and as such, they need to be dimensionally stable at the 1 pm/$\sqrt{\text{Hz}}$ level in the milli-Hertz band, which is particularly challenging given the properties of the telescopes: one-meter long with a 300 mm primary mirror and a magnification of 134. The LISA telescope engineering model dimensional stability will be tested at the University of Florida throughout 2022/23 and will conclude the efforts to reach technology readiness level (TRL) 6. In this presentation, we will give an overview of the measurement challenges and the efforts being made at the University of Florida to carry out the telescope dimensional testing.

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