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Design and Fabrication of an Optical Truss Interferometer for the LISA Telescope[1] KYLAN JERSEY, YANQI ZHANG, Texas AM University; University of Arizona, IAN HARLEY-TROCHIMCZYK, FELIPE GUZMAN, Texas AM University — The LISA telescope is a bidirectional component that is used to expand a laser beam that is transmitted to the far spacecraft and compress a large incoming beam that is received to a diameter of a few mm at the optical bench. Since the telescope is directly in the path of the LISA long-arm interferometer, it must have a very high structural stability in the pm/$\sqrt{}$Hz level at mHz frequencies. One way to measure the stability of the LISA telescope structure is by using compact optical truss interferometers (OTI). The OTI setup consists of three Fabry-Perot cavities mounted around the mirrors of the telescope to monitor structural distortions over time, which are operated with a common laser source. Each cavity is to be equipped with acousto-optic and electro-optical modulators to shift the nominal laser frequency for each cavity as well as to modulate the laser phase for Pound-Drever-Hall locking. Changes in each cavity's length will translate to changes in their corresponding laser frequency, which can be measured against a reference laser that is locked to an external ultra-stable cavity. We have created a design and initiated the fabrication of prototypes of the OTI and will present on our design process and prototype testing.

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Kylan Jersey
Texas A
M University; University of Arizona

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