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**LISA Optical Truss Readout**[1] PAUL EDWARDS, PAUL FULDA, University of Florida — In LISA, the optical truss is a subsystem proposed to track pathlength variations in the telescope and ensure the telescope structure meets the required picometer stability. The optical truss is located at the telescope and comprises three separate Fabry-Perot cavities in a triangular configuration, with cavity input mirrors embedded in the telescope primary mirror assembly (M1) and cavity end mirrors around the telescope secondary mirror (M2). If the telescope is not picometer stable, cavity length measurements serve as a potential witness channel for length noise. A simple method of cavity length measurements would involve three separate lasers, each locked to their respective cavities. However, one alternative, which uses only a single laser source, is to lock pairs of sidebands to each of the three cavities. Via this sideband locking, the frequencies of sidebands are tuned to track resonance. An implementation of this locking scheme for the optical truss was performed. An electro-optic modulator (EOM) was used to phase modulate the beam, and the cavity locking error signal was applied to a voltage controlled oscillator (VCO) to tune the EOM and lock sidebands to a single cavity. We report early demonstrations of this scheme and plans for its characterization and optimization.

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