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Telescope design considerations and prototyping for a space-based gravitational wave observatory
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Space-based mission designs for observation and study of gravitational waves in the 0.1 mHz to 1 Hz band continue to evolve. Nevertheless, all current designs require the propagation of a laser beam over immense distances between science crafts. To achieve this optical link, catoptric telescopes are utilized in full-duplex configuration - simultaneously sending and receiving laser light via the same optical elements. Many of the telescope subsystem design criteria are closely tied to observatory-level requirements, due to the fact that the telescopes are in the measurement beam path. We review these design requirements and the possible design implementations. Furthermore, we discuss our efforts to validate a particular design through modeling and prototyping.

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