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Laser frequency stabilization¹ DARSA
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Laser ranging and interferometry are essential technologies allowing for many astounding new space-based missions such as the Laser Interferometer Space Antenna (LISA) to measure gravitational radiation emitted from distant super massive black hole mergers or distributed aperture telescopes with unprecedented angular resolution in the NIR or visible regime. The requirements on laser frequency noise depend on the residual motion and the distances between the spacecraft forming the interferometer. The intrinsic frequency stability of commercial lasers is several orders of magnitude above these requirements. Therefore, it is necessary for lasers to be stabilized to an ultrastable frequency reference so that they can be used to sense and control distances between spacecraft. Various optical frequency references and frequency stabilization schemes are considered and investigated for the applicability and usefulness for space-based interferometry missions.

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