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Precision measurements in gravitational wave detectors

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The detection of gravitational waves requires the ability to measure extremely small effects, specifically variations in the length of the interferometer arms that are 1000 times smaller than the size of a proton. Central to the success of detectors such as Virgo and LIGO are advanced optical technologies that enable unprecedented sensitivity and precision in the control of the interferometer working point. In this talk, some of the typical issues of these systems will be described, with a focus on adaptive optics systems which are essential in detecting and compensating optical aberrations in the interferometer core optics. The concepts behind the system that monitors and actively corrects aberrations in current and future detectors will be reported.

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