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Dynamical thermal compensation techniques for Advanced Virgo

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An adaptive optics system (named thermal compensation system - TCS) is currently in operation in Advanced Virgo to monitor and compensate wavefront distortions with an accuracy of the order of nanometers ensuring a duty cycle of the interferometer higher than 75%. During preparatory phase for O3, the TCS actuators have been commissioned and tuned. New research and development activities are being carried out in order to optimize the TCS single actuators operation and the combined action of multiple actuators to become operational in view of the next observing run (O4). The sensors dedicated to the measurement of optical aberrations in Advanced Virgo are the Hartmann Wavefront Sensors (HWS). These devices directly measure the change of a wavefront with respect to a reference encoded in an auxiliary probe beam. To fulfill the more stringent requirements, a significant improvement of the HWS sensor performances are mandatory. The most recent developments of the compensation system will be presented.

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