GWADW2023 - Gravitational-Wave Advanced Detector Workshop



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Observation and interpretation of bichromatic thermal detuning in Virgo filter cavity

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Bichromatic control schemes are used to control Fabry-Perot cavities used as filter cavity for frequency dependent squeezing and to acquire the lock of kilometric arm cavities. In the Advanced Virgo+ filter cavity, we observed that the phases of different colors of light are subject to temperature changes in the mirrors. Here we report the evidence of this thermal detuning and its interpretation. The coating thermal properties are used to calculate the detuning and are found to be consistent with the experimental results. The knowledge and effect of this thermal detuning are important to set requirements for the mirrors and their temperature stability anytime bichromatic controls are used but also provide a new method to measure the thermal properties of mirror coatings.

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