

Intercalibration of Advanced LIGO and Advanced Virgo for the third observing run O3

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Abstract

The astrophysical parameters estimation of the sources detected by Advanced LIGO and Advanced Virgo is biased by the uncertainty on the physical parameters of each detector of the network and thus the final uncertainty on the reconstruction of the gravitational waves signal $h(t)$. Before the observing run O3, Advanced LIGO and Advanced Virgo had different *absolute* references for their calibration procedure to derive the uncertainty on $h(t)$ [1] [2]. We present the first results of the intercalibration between Advanced LIGO and Advanced Virgo photon calibrators with respect to the LIGO Gold Standard which has been chosen to be the *absolute* reference for the time being. This work should lead to a *relative* calibration of the interferometers network during O3 using the same *absolute* reference for Advanced LIGO and Advanced Virgo and thus better quantify the global uncertainty of the network. Future interferometers joining the network, for instance KAGRA which has worked for more than one year with LIGO on their Working Standard for calibration, will also be calibrated with respect to the LIGO Gold Standard to be on the same level of absolute uncertainty.

References

- [1] Virgo Collaboration. Calibration of Advanced Virgo and Reconstruction of the Gravitational Wave Signal $h(t)$ during the Observing Run O2. *Classical and Quantum Grav.*, 2018.
- [2] C. Cahillane et al. Calibration Uncertainty for Advanced LIGO's First and Second Observing Runs. *Physical Review D*, 2017.