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Broadband quantum noise reduction for AdV+

Technical noise limits the low-frequency sensitivity of interferometric gravitational-wave detectors. Consequently, an effort has been made in recent decades to reduce them, which has led to the emergence of other limiting sources in the overall low-frequency noise budget. Among these noise sources there is the radiation pressure noise which, as demonstrated by LIGO and Virgo in the third observation run„ can deteriorate the low frequency sensitivity when large amounts of FIS is injected. In the next few years a huge work to improve the low frequency sensitivity of the gravitational wave interferometers is planned, therefore the quantum radiation pressure noise will limit the low frequency sensitivity even without FIS injection. For this reason, all collaborations are developing a frequency-dependent squeezing sources that should allow to fully benefit from the injection of squeezed states leading to a reduction of quantum noise in the whole detector bandwidth.
In this talk we present the status of the development and commissioning of the AdV+ frequency dependent squeezing source based on the filter cavity rotation method. Additionally to the reduction of the quantum noise at all frequencies, in the AdV+ FDS setup, a mitigation system for the stray light detrimental effect is also implemented.

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