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Quantum noise reduction in Advanced Virgo

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In order to detect the small distance variations induced by gravitational waves, very sensitive devices must be used. Gravitational wave (GW) detectors are sophisticated interferometers sensitive even to vacuum fluctuations. These latters are responsible for quantum noise (QN). Due to the frequency-dependent response of GW interferometers, QN manifests itself as Radiation Pressure Noise (RPN) for frequencies below 100 Hz, while as Shot Noise (SN) for higher frequencies.
The solution that has been adopted in order to reduce QN is the injection, through the interferometer output port, of vacuum states with correlated amplitude and phase uncertainties, called "squeezed".
A Frequency-Independent Squeezing (FIS) technique, as a method for the reduction of the QN, has been already demonstrate in Advanced Virgo.
RPN does not limit the sensitivity of the present interferometers, being this completely covered by other noises. But, in the near future, these noises will be reduced and also this quantum noise component will be relevant.
The adopted solution to have a broad-band quantum noise reduction is a Frequency-Dependent Squeezing (FDS) technique.
In this talk I will talk about the results obtained in Advanced Virgo using the FIS technique and the status of the FDS project.

Is this abstract from experiment?

Yes

Is the speaker for that presentation defined?

Yes

Name of experiment and experimental site

Virgo - https://www.virgo-gw.eu/

Internet talk

Yes

Details

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