

Synthesis of Quantum-Noise-”Free” Systems

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The sensitivity of quantum-noise limited systems can be greatly increased by engineering the quantum correlations of the probing field either externally (e.g. squeezed light) or internally (e.g. strong nonlinearities and/or coherent quantum control). Techniques used in the optimization of classical electrical circuits can be applied to the maximization of SNR in the context of the quantum Rao-Cramer bound, including losses, and thereby minimize the impact of decoherence on the reconstruction of the desired signal (e.g. LIGO, ADMX, etc). Not only can this approach be used for linear measurements of classical fields, but also for hypothesis testing of deviations from QM and GR.

Presenter: ADHIKARI, Rana

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