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Twin michelson interferometers with Einstein–Podolsky–Rosen squeezing

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A theoretical two-carrier heterodyne detection scheme, which agrees with the sensitivity performance of homodyne readout for a gravitational wave detector, has been recently proposed. This scheme, with careful choice of readout/heterodyne frequency, is predicted to avoid low frequency noises which generally plague audio band squeezing experiments such as scattered light, control noise or experimental control signals around the local oscillator.

In this work we experimentally investigate the quantum enhancement, via Einstein–Podolsky–Rosen (EPR) squeezed states, of the proposed two-carrier heterodyne detection scheme using a table-top twin Michelson sensor experiment with balanced heterodyne readout. Each sensor receives one of the entangled EPR pairs such that the signals encoded onto the optical carrier of each sensor can be detected together against an engineered, low noise, quantum state. We will present the latest results.

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