

Optical interferometry in the presence of large phase diffusion

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The measurement problem for the optical phase has been traditionally attacked for noiseless schemes or in the presence of amplitude or detection noise. In this presentation we address, both theoretically and experimentally, the estimation of a phase shift in the presence of phase diffusion and, in particular, of large phase diffusion. We present a nearly optimal interferometric scheme based on homodyne detection and coherent signals for the detection of a phase shift in the presence of large phase diffusion. In our scheme the ultimate bound to interferometric sensitivity is achieved already for a small number (hundreds) of measurements without using nonclassical light.

References

- M. G. Genoni, et al., Phys. Rev. Lett. 106, 153603 (2011).
- M. G. Genoni, et al., Phys. Rev. A 85, 043817 (2012).

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