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Title:	Noise self-canceling picoscale twisted interferometer
Authors:	Munjal, Pooja (/jspui/browse?type=author&value=Munjal%2C+Pooja) Chaudhary, Komal (/jspui/browse?type=author&value=Chaudhary%2C+Komal) Singh, Kamal P. (/jspui/browse?type=author&value=Singh%2C+Kamal+P.)
Keywords:	Noise self pico scale twisted interferometer
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Abstract:	We show a noise self-canceling real-time picometer scale interferometer by exploiting the unique spiral phase structure of twisted light. We use a single cylindrical interference-lens to implement the twisted interferometer and perform simultaneous measurement on N phase-orthogonal single-pixel intensity pairs chosen on the petal of the daisy-flower-like interference pattern. A cancellation of various noises by three orders of magnitude was achieved in our setup compared with a conventional single-pixel detection, enabling a sub-100 picometer resolution in measuring a non-repetitive intracavity dynamic event in real-time. Furthermore, the noise cancellation capability of the twisted interferometer scales up statistically for higher radial and azimuthal quantum numbers of the twisted light. The proposed scheme could find applications in precision metrology and in developing analogous ideas for twisted acoustic beam, electron beams, and matter waves.
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