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Remote Phase Sensing by Coherent Single Photon Addition

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In this work, we introduce a new kind of nonlocal interferometer based on the delocalized addition of a single photon onto distinct field modes. Since the quantum state produced by this conditional operation strongly depends on the phase set in a physically-separated heralding station, we propose and experimentally demonstrate a remote phase estimation technique, characterized by a sensitivity that scales with the intensity of light that never interacted with a distant sample.

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