

Abstract Submitted
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Quantum measurement bounds beyond uncertainty relations

SETH LLOYD, MIT, VITTORIO GIOVANNETTI, Scuola Normale Pisa,
LORENZO MACCONE, University of Pavia — Quantum measurements are limited
by bounds such as the Heisenberg uncertainty relations which limit the accuracy of
measuring a quantity via the standard deviation of the conjugate one. This talk
shows that the accuracy of measuring a quantity such as phase or time is limited by
the expectation value of the conjugate quantity. This result proves the long-standing
conjecture – recently challenged – that the ultimate phase-precision limit in inter-
ferometry is lower bounded by the inverse of the total number of photons employed
in the estimation process.

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