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Quantum states for Heisenberg limited interferometry HERMANN UYS, PIERRE MEYSTRE, Department of Physics, University of Arizona — An important aspect of quantum metrology is the engineering of quantum states with which to achieve Heisenberg limited measurement precision. In this limit the measurement uncertainty is inversely proportional to the number of interfering particles, N, a $1/\sqrt{N}$ improvement over the standad quantum limit. We have used numerical global optimization strategies to systematically search for quantum interferometer input states that achieve Heisenberg limited uncertainty in estimates of the interferometer phase shift. We compare the performance of candidates so obtained with that of non-classical states already known to yield Heisenberg limited uncertainty.

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