

Abstract Submitted
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Quantum parameter estimation and coherent control with a time-dependent Hamiltonian¹ ANDREW JORDAN, SHENGSHI PANG, University of Rochester — We present our theoretical results on quantum metrology of a general parameter when the Hamiltonian is time-dependent. We obtain the optimal solution to the quantum Fisher information, and show that coherent control can give an advantage in maximizing it. We derive the optimal Hamiltonian control required, and with a minimal example of a spin-1/2 particle in a rotating magnetic field, we find that the fundamental limit of T^2 time scaling for the quantum Fisher information of time-independent Hamiltonian can be exceeded when the Hamiltonian is time-dependent, which reaches T^4 time scaling in estimating the rotation frequency of the field. This may be understood intuitively as the acquired quantum phase accelerating in time. Reference: arXiv:1606.02166

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