Canadian Association of Physicists
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Contribution ID: **4159** Type: **Oral not-in-competition (Graduate Student) / Orale non-compétitive (Étudiant(e) du 2e ou 3e cycle)**

(G) Entropy-based Bayesian approach to multi-parameter estimation

Monday 27 May 2024 11:00 (15 minutes)

We investigate and compare a number of different strategies for rapidly estimating the values of unknown Hamiltonian parameters of a quantum system. Rapid and accurate Hamiltonian parameter estimation has applications in quantum sensing, quantum control, and quantum computing. We show that an adaptive Bayesian method based on minimizing the Shannon entropy in each shot of a measurement sequence can successfully predict multiple unknown parameters more efficiently than a simple non-adaptive protocol. The adaptive protocol can be directly applied to ongoing experiments on spin qubits in double quantum dots, where multiple parameters (e.g.: exchange and magnetic fields) must be continuously estimated for good performance.

Keyword-1

Parameter estimation

Keyword-2

Bayesian inference

Keyword-3

Spin qubits

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