

HARVARD UNIVERSITY 17 Oxford Street Cambridge, MA 02138

Mathematical Picture Language Seminar



Tuesday, October 25 9:30 a.m. Boston time Philippe Faist Freie Universität Berlin

Time-energy uncertainty relation and quantum error correction for noisy quantum metrology

Abstract: Detection of weak forces and precise measurement of time are two of the many applications of quantum metrology to science and technology. I will introduce and study a fundamental trade-off which relates the amount by which noise reduces the accuracy of a quantum clock to the amount of information about the energy of the clock that leaks to the environment. The trade-off is quantified in terms of the quantum Fisher information, which is a standard measure of sensitivity in quantum estimation theory. I will then connect our results to the notion of quantum error correction. It turns out that a weaker variant of the standard conditions for quantum error correction are necessary and sufficient conditions for a state's sensitivity to be unaffected by the noise. I will discuss how such states, which we call "metrological codes," enrich the broader picture of developing schemes in quantum metrology based on quantum error correction.



Zoom QR Code & Link:

https://harvard.zoom.us/j/779283357?pwd=MitXVm1pYUlJVzZqT3lwV2pCT1ZUQT09

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