Title: **One-Shot Detection Limits of Quantum Illumination**

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Quantum illumination is a method to detect the presence or absence of an object using entanglement. The underlying theoretical problem is a problem of quantum channel discrimination, where analytic solutions are rare. In this talk, we present a family of analytic solutions to the problem of quantum illumination for any finite dimension, where a decision is made for every use of the quantum channel, which gives the one-shot minimal errors for target detection. These solutions allow us to identify and quantify the quantum advantages of quantum illumination versus classical illumination.