



## Physical Sciences Seminar

# Quantum computing with qubits encoded in oscillators

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By encoding a logical qubit in the infinitely large Hilbert space of a quantum oscillator it might be possible to realize a more hardware efficient approach to quantum computing. Recent experiments have reached the so-called break-even point for error correction using this idea, where an encoded qubit has a longer life-time than an unencoded qubit. However, fault-tolerant schemes for these encodings have been missing. Without fault-tolerance, it is probably not possible to go much beyond break even. In this talk I will present ongoing theoretical work on a practical and fault-tolerant scheme for a large family of oscillator codes. Although our results do not provide any free lunch, they suggest that highly hardware efficient and fault-tolerant error correction is possible. We are also able to numerically compute fault-tolerance (pseudo) thresholds for codes in this family, including Cat- and Binomial codes, for the first time.

**Monday, August 6, 2018 11:00am - 12:00pm**

Big Seminar room Ground floor / Office Bldg West (I21.EG.101)



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

Please find a schedule of the ISTA Shuttle on our webpage:

<https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.