

# Capitalizing on Schrödinger

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The superposition principle is a cornerstone of quantum mechanics and results from the linearity of the Schrödinger equation. In this talk, we motivate the non-linear wave equation of classical statistical mechanics as well as the linear Schrödinger equation of quantum mechanics from a mathematical identity. Moreover, the linearity is crucial for the use of matter wave interferometers as sensors for rotation and acceleration. We show that the phase in a Kasevich-Chu atom interferometer measures the commutator of two unitary time evolutions and thus the acceleration. In addition, we report the observation of the Kennard phase using water waves and the realization of a Kennard interferometer with a scaling superior to the Kasevich-Chu interferometer.