

# Bounds on expectation values in Quantum mechanics

*Thursday, 8 December 2022 15:00 (20 minutes)*

The range of motion of a particle with certain energy  $E$  confined in a potential is determined from the energy conservation law in classical mechanics. The counterpart of this question in quantum mechanics can be thought of as what the possible range of the expectation values of the position operator  $x$  of a particle, which satisfies  $E = H$ . This range would change depending on the state of the particle, but the universal upper and lower bounds, which is independent of the state, must exist. In this talk, I show that these bounds can be derived by using the uncertainty relations and their generalization.

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