



# Minimum-Time Quantum Transport with Bounded Trap Velocity

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We formulate the problem of efficient transport of a quantum particle trapped in a harmonic potential which can move with a bounded velocity, as a minimum-time problem on a linear system with bounded input. We completely solve the corresponding optimal control problem and obtain an interesting bang-bang solution. These results are expected to find applications in quantum information processing, where quantum transport between the storage and processing units of a quantum computer is an essential step. They can also be extended to the efficient transport of Bose-Einstein condensates, where the ability to control them is crucial for their potential use as interferometric sensors.

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