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Quantum Control by Self-fulfilling prophecy

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We describe a method based on a sequence of measurements combined with feedback that allows us to prepare a quantum system in a target state or smooth target dynamics and protect it against noise. The convergence for arbitrary initial states is based on the gradual increase of information about the post-measurement state in the course of the measurements, which have to be weak in order to yield smooth state trajectories. The mechanism is the same that enables the continuous monitoring of quantum states and is related to the monotonicity of fidelity between any two quantum states under selective (non-trace-preserving) operations, as we will demonstrate.

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