

Arrow of time for repeated and continuous quantum measurement

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We will present theoretical results on the statistical arrow of time for a quantum system being monitored by a sequence of measurements. For a continuous qubit measurement example, we demonstrate that time-reversed evolution is always physically possible, provided that the measurement record is also negated. Despite this restoration of dynamical reversibility, a statistical arrow of time emerges, and may be quantified by the log-likelihood difference between forward and backward propagation hypotheses. We then show that such reversibility is a universal feature of non-projective measurements, with forward or backward Janus measurement sequences that are time-reversed inverses of each other.