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## Evolution of negative probability distributions

(joint work with Marcin Karczewski)

There is an intriguing idea that quantum theory would be recovered if standard probabilities were replaced by negative probabilities and some events were deemed unobservable. However, such approach would be able to recover only one half of quantum theory-state description and measurement. The other half of the theory describes how states change in time. In this presentation I will discuss which evolutions of negative probability distributions are allowed. It is known that the evolution of standard probability distributions is determined by stochastic matrices, which generate either simple reversible permutations, or fundamentally irreversible dynamics. On the other hand, the evolution of negative probability distributions can be described by pseudo-stochastic matrices, i.e., matrices whose entries are given by negative probabilities. These matrices give rise to a much richer dynamics with nontrivial reversible transformations. In addition, pseudo-stochastic matrices may allow to reverse some irreversible stochastic transformations, i.e., by allowing probabilities to go negative we get a possibility to reverse some processes.