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Information back-flows in non-Markovian dynamics

Non-Markovian effects in an open-system dynamics are usually associated to information back-flows from the environment to the system. However, the way these back-flows manifest and how to detect them is unclear. The talk reviews recent results on how to the lack of completely positive divisibility leads to an increase of state distinguishability or of the correlations of the evolved system with another unperturbed particle. Some of the results are constructive: for a given non-Markovian dynamics we provide the states to be used as probes to detect the back-flow.