Entanglement propagation and typicality of measurements in a quantum version of the Kac ring JOHANNES OBERREUTER, INGO HOMRIGHAUSEN, STEFAN KEHREIN, University of Goettingen — Time development in quantum many body systems poses serious challenges to our understanding of classical statistical mechanics. Exact results are very rare due to the large Hilbert spaces and the resulting complexity involved. We propose a pedagogical approach with a very tractable toy model, in which questions of entanglement creation, propagation and destruction between a system and an environment can be studied explicitly. Comparing this quantum model with its classical counterpart [1], we find an intriguing correspondence between the typical result of repeated measurements on a classical ensemble and the repeated measurements of a quantum system in an appropriate superposition.

[1] G.A. Gottwald, M. Oliver, Boltzmann's Dilemma: An Introduction to Statistical Mechanics via the Kac Ring, SIAM Review (2009) Vol. 51, No. 3, pp. 613-635.

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