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Non-Markovian behavior of small and large complex quantum systems CARLOS PINEDA, Instituto de Fisica, Universidad Nacional Autonoma de Mexico, Mexico D.F. 01000, Mexico, MARKO ZNIDARIC, Physics Department, Faculty of Mathematics and Physics, University of Ljubljana, Ljubljana, Slovenia, IGNACIO GARCÍA-MATA, Instituto de Investigaciones Fisicas de Mar del Plata (IFIMAR-CONICET), Funes 3350, 7600 Mar del Plata, Argentina — The channel induced by a complex system interacting strongly with a qubit is calculated exactly under the assumption of randomness of its eigenvectors. The resulting channel is represented as an isotropic time dependent oscillation of the Bloch ball, leading to non-Markovian behavior, even in the limit of infinite environments. Two contributions are identified: one due to the density of states and the other due to correlations in the spectrum. Prototype examples, one for chaotic and the other for regular dynamics are explored.

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