« Atelier sur l'information quantique et mécanique statistique quantique »
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Constructing completely positive semigroups from resonance data

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We consider microscopic quantum system-reservoir models and analyze the reduced system dynamics. We show how to construct an approximate system dynamics with the following properties:

(1) the approximate dynamics is a completely positive, trace preserving semigroup

(2) its deviation from the true system dynamics is small in the system-reservoir coupling, uniformly for all times

(3) its deviation from the true system dynamics vanishes exponentially quickly in the limit of large times

Our approach is based on the dynamical resonance theory, a representation of the propagator in terms of quantum resonance energies and resonance states.

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