

Quantum Physics

Consistency of the adiabatic theorem and perturbation theory

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We present an analysis of the adiabatic approximation to understand when it applies, in view of the recent criticisms and studies for the validity of the adiabatic theorem. We point out that this approximation is just the leading order of a perturbation series, that holds in a regime of a perturbation going to infinity, and so the conditions for its validity can be only obtained going to higher orders in the expansion and removing secular terms, that is terms that runs to infinity as the time increases. In this way, it is always possible to get the exact criteria for the approximation to hold.

Comments: 15 pages, no figures. Added a relevant clarification and minor corrections

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