

Abstract Submitted
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Semi-classical approach to transitionless quantum driving: Explicitness and Locality BENJAMIN LOEWE, RAFAEL HIPOLITO, PAUL M. GOLDBART, Georgia Institute of Technology — Berry has shown [1] that, via a reverse engineering strategy, non-adiabatic transitions in time-dependent quantum systems can be stifled through the introduction of a specific auxiliary hamiltonian. This hamiltonian comes, however, expressed as a formal sum of outer products of the original instantaneous eigenstates and their time-derivatives. Generically, how to create such an operator in the laboratory is thus not evident. Furthermore, the operator may be non- local. By following a semi-classical approach, we obtain a recipe that yields the auxiliary hamiltonian explicitly in terms of the fundamental operators of the system (e.g., position and momentum). By using this formalism, we are able to ascertain criteria for the locality of the auxiliary hamiltonian, and also to determine its exact form in certain special cases. [1] Berry, M. V. Transitionless quantum driving. J. Phys. A 42, 365303 (2009)

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