



Mathematical Physics

# Adiabatic theorems for generators of contracting evolutions

J. E. Avron, M. Fraas, G. M. Graf, P. Grech

(Submitted on 23 Jun 2011 (v1), last revised 4 Jun 2012 (this version, v2))

We develop an adiabatic theory for generators of contracting evolution on Banach spaces. This provides a uniform framework for a host of adiabatic theorems ranging from unitary quantum evolutions through quantum evolutions of open systems generated by Lindbladians all the way to classically driven stochastic systems. In all these cases the adiabatic evolution approximates, to lowest order, the natural notion of parallel transport in the manifold of instantaneous stationary states. The dynamics in the manifold of instantaneous stationary states and transversal to it have distinct characteristics: The former is irreversible and the latter is transient in a sense that we explain. Both the gapped and gapless cases are considered. Some applications are discussed.

Comments: 31 pages, 4 figures, replaced by the version accepted for publication in CMP

Subjects: **Mathematical Physics (math-ph)**

DOI: [10.1007/s00220-012-1504-1](https://doi.org/10.1007/s00220-012-1504-1)

Cite as: **arXiv:1106.4661 [math-ph]**

(or **arXiv:1106.4661v2 [math-ph]** for this version)

## Submission history

From: Philip Grech [[view email](#)]

[v1] Thu, 23 Jun 2011 09:18:21 GMT (339kb,D)

[v2] Mon, 4 Jun 2012 14:11:03 GMT (340kb,D)

[Which authors of this paper are endorsers?](#)

Link back to: [arXiv](#), [form interface](#), [contact](#).

## Download:

- [PDF](#)
- [Other formats](#)

Current browse context:

math-ph

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1106](#)

Change to browse by:

[math](#)

## References & Citations

- [NASA ADS](#)

Bookmark([what is this?](#))

