

Quantum Physics

Non-adiabatic transitions in a non-symmetric optical lattice

L. Morales-Molina, S. A. Reyes

(Submitted on 1 Jun 2011)

We study Landau-Zener interband transitions for a non-symmetric optical lattice in the presence of an external force. We show that gain and losses of the light beam, as well as the relative occupation probabilities of the bands involved in the transitions can be accurately managed upon tuning the amplitude of the non-Hermitian component of the lattice. Exact expressions for the transition and non-transition probabilities for a non-symmetric system obtained within a two-mode approximation are provided. These equations successfully account for the main features of the transitions in the optical lattice. We also interpret the non-conventional Bloch oscillations at criticality studied in Phys. Rev. Lett. 103, 123601 (2009) as a series of a Landau-Zener transitions.

Comments: 6 pages, 5 figures

Subjects: **Quantum Physics (quant-ph)**; Other Condensed Matter (cond-mat.other);
Mathematical Physics (math-ph)Cite as: **arXiv:1106.0063 [quant-ph]**
(or **arXiv:1106.0063v1 [quant-ph]** for this version)

Submission history

From: Luis Morales-Molina [[view email](#)]

[v1] Wed, 1 Jun 2011 00:21:16 GMT (290kb)

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

Download:

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

Current browse context:

quant-ph[< prev](#) | [next >](#)[new](#) | [recent](#) | [1106](#)

Change to browse by:

[cond-mat](#)[cond-mat.other](#)[math](#)[math-ph](#)

References & Citations

- [INSPIRE HEP](#)
([refers to](#) | [cited by](#))
- [NASA ADS](#)

Bookmark (what is this?)

Science
WISE