



Expanding the density of states on crystals

Evert-Jan Hekkelman¹ and Fedor Sukochev²

Abstract

The density of states is a concept in solid state physics describing conductivity of material, whose existence is notoriously difficult to prove in general situations. We develop a formula for this density of states for a class of discrete metric spaces which has the advantage that it is guaranteed to be well-defined - and it agrees with the density of states if it does exist. The class of metric spaces that are considered includes all crystals, as well as certain models of quasicrystals and random subgraphs of Z^n resulting from percolation.

¹University of New South Wales, Sydney, Australia. Email: e.hekkelman@unsw.edu.au

²University of New South Wales, Sydney, Australia. Email: f.sukochev@unsw.edu.au