The Abdus Salam International Centre for Theoretical Physics

Conference on Frontiers of Nanoscience
24 August - 1 September 2015, Trieste, Italy

Flatband Engineering of Mobility Edges

Carlo Danieli,[1] Joshua D. Bodyfelt,[1] and Sergej Flach[1, 2]

[1]New Zealand Institute for Advanced Study,
Centre for Theoretical Chemistry & Physics, Massey University, Auckland,
New Zealand
[2]Center for Theoretical Physics of Complex Systems,
Institute for Basic Science, Daejeon, Korea

Abstract:

Properly modulated atband lattices have a divergent density of states at the atband energy. Quasiperiodic modulations are known to host a metal insulator transition already in one space dimension. Their embedding into atband geometries consequently allows for a pr ecise engineering and _ne tuning of mobility edges. We obtain analytic expressions for singular mobility edges for two atband lattice examples. In particular, we engineer cases with arbitrarily small energy separations of mobility edge, zeroes, and divergencies.