One-dimensional limit of two-band Fractional Chern Insulators

Błażej Jaworowski,[1] Piotr Kaczmarkiewicz,[1] Paweł Potasz,[1] and
Arkadiusz Wójs[1]

[1]*Department of Theoretical Physics,
Wrocław University of Science and Technology,
Wybrzeże Wyspiańskiego 27, 50-370 Wrocław, Poland*

We analyze the stability of Fractional Chern Insulators (FCIs) [1-4] against interband excitations within the thin-torus limit [5-6]. Although initially the FCIs were thought to be destroyed by interband interactions, it was shown that they may remain stable even for infinite interactions [4]. Using Density Matrix Renormalization Group method, we study the conditions of their stablilty in the 1D limit. We show that for special values of parameters, for which the system can be mapped to a fully dimerized Su-Schriefer-Heeger model [6], the energy gap remains finite for arbitrary strength of interaction. Next, we analyze the effects of deviations from this limit. Both particle and hole Laughlin-like states are investigated.

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