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(POS-23) Group Theory and Energies of a Cornerless Two Dimensional Su-Schrieffer-Heeger Model

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There exists about three different ways of stacking 1D Su-Schrieffer-Heeger (SSH) chains, and creating an SSH sheet, in such a way that the couplings are alternating in both (x and y) directions, which is the key component of the SSH model. It is known that whereas the original, one dimensional, SSH model had topological edge states, the two dimensional version has edge and corner states. We are interested in what happens when the corners are strongly coupled do leads (semi-infinite, undimerized, chains that model the environment). Such a coupling effectively removes the corners from the system, destroying the corner states. We found that new states, located near the now unexistent corner appear. Those states are isolated in energy and are weakly perturbed by changes to the parameters of the system, suggesting they are topological in nature. The treatment of finite system is particularly challenging, and group theory offers considerable insight, greatly simplifying the system.

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Condensed Matter

Keyword-2

Group Theory

Keyword-3

Author: IAKOUB, Ilya (Université de Montréal)

Presenter: IAKOUB, Ilya (Université de Montréal)

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