

Colloquium Notice

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*Lieb lattices and pseudospin-1 dynamics under
barrier- and well-like electrostatic interactions*

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In this talk, I'll discuss the confining and scattering phenomena of electrons in a Lieb lattice subjected to the influence of a rectangular electrostatic barrier. In this setup, hopping amplitudes between nearest neighbors in orthogonal directions are considered different, and the next-nearest neighbor interaction describes spin-orbit coupling. This makes it possible to confine electrons and generate bound states, the exact number of which is exactly determined for null parallel momentum to the barrier. In such a case, it is proved that one even and one odd bound state is always generated, and the number of bound states increases for non-null and increasing values of the parallel momentum. That is, these bound states carry current. In the scattering regime, the exact values of energy are determined where the resonant tunneling occurs. The existence of perfect tunneling energy in the form of super-Klein tunneling is proved to exist regardless of the band gap opening. Finally, it is shown that perfect reflection appears when solutions are coupled to the intermediate flat-band solution.
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Monday

March 27, 2023

Starts at 12:15 PM

Coffee at 12:00 PM

Physics Conference Room, SB B326

This talk is accessible via [Zoom](#) or use

meeting ID 829 2687 2594 and **passcode 866995** to join