

ANALYSIS AND DIFFERENTIAL GEOMETRY SEMINAR

Dispersive estimates for the discrete Schrödinger equation on a honeycomb lattice

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Abstract: The discrete Schrödinger equation on a two-dimensional honeycomb lattice is a fundamental tight-binding approximation model that describes the propagation of electrons on graphene. By the Fourier transform on the honeycomb lattice, the free Schrödinger flow can be represented by a certain oscillatory integral whose phase function has conical singularities at Dirac points as well as degeneracy at some other frequencies. We show that the degenerate frequencies are completely characterized by three symmetric periodic curves, and that the three curves meet at Dirac points. Based on this observation, we prove the dispersion estimates for the free flow estimating the oscillatory integral. Our proof is direct and uses only elementary m

Friday, February 28, 2025, 11:00 am
Mathematics and Science Center: MSC W303

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