Mathematics, Statistics, and Computer Science   **@ UIC**

Analysis and Applied Mathematics Seminar

Rigorous derivation of Nonlinear Dirac equations describing wave dynamics in Honeycomb lattices

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Abstract: We present recent work (jointly with C. Sparber) on the weakly nonlinear wave dynamics occurring in cubic nonlinear Schrödinger equations with a periodic honeycomb lattice potential. Using a semiclassical scaling, we rigorously derive an effective macroscopic model of nonlinear Dirac type. To this end we employ a multi-scale asymptotic expansion together with rigorous error estimates in certain scaled Sobolev spaces. If time permits, we shall also discuss the case of a non-local Hartree nonlinearity.

Monday, March 13 at 4:00 PM in SEO 636